



Dysdercus ruficollis (Linnaeus) in copula on *Pavonia sessiliflora* H.B.K., Sipaliwini, near airstrip, Suriname.

**A REVISION OF THE NEW WORLD
SPECIES OF DYSDERCUS GUÉRIN MÉNEVILLE
(HETEROPTERA, PYRRHOCORIDAE)**

by

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With 271 text-figures, frontispiece and 16 plates

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INTRODUCTION

Bugs of the genus *Dysdercus* are often serious pests of cotton. In piercing the bolls, they introduce micro-organisms which cause boll rot or a discoloration of the lint; hence their common name "cotton stainers". Many papers have been published on the genus, but most of the publications treat economic aspects rather than systematics. Freeman (1947) published an excellent revision of the Old World species, but the taxonomy of the American species

has not yet received sufficient attention. Recently, Lima, Guitton & Ferreira (1962) published a study entitled "Sôbre as espécies americanas do gênero *Dysdercus* Boisduval", but because they studied material only from Brazilian museums these authors had to restrict themselves almost entirely to the fauna of that country. Furthermore, Lima et al. did not investigate any type material, so that a number of species were erroneously interpreted. Because so much time-consuming labour is required to collect sufficient material and literature from the numerous countries of South and Central America, it is not surprising that a revision of the genus *Dysdercus* has been so long delayed.

The incentive to start this study was the fact that during my work at the Agricultural Experiment Station at Paramaribo, Suriname, *Dysdercus* was found frequently en masse as a pest on malvaceous crops and other wild plants. What appears at first glance to be a variably coloured species proved to be a congregation of usually three or four different species. Closer examination revealed a striking mimicry between two of the species, but at the same time the very uniform external morphology was in marked contrast to the distinct differences in the genital structures.

Accordingly, special attention was paid to the structure of the genitalia in both sexes. On this basis it proved possible to construct a key enabling satisfactory identification of the species of the Western Hemisphere.

In the present paper five species and six geographical races are described as new, bringing the total number up to 36 species and 24 subspecies.

It is not expected that future work will increase this number to any great extent. Regions such as Mexico, the Antilles, the Guyanas, and the eastern coast of South America have been fairly well investigated and it seems unlikely that any new species will be found there. But central Brazil, Bolivia, Peru, Ecuador, and Colombia are less well known and it is certainly possible that they will yield new discoveries.

For those unfamiliar with heteropteran morphology, some explanatory illustrations are provided in the appendix, pages 199-201.

HISTORY

The study of *Dysdercus* in the Western Hemisphere began with the publication of Volume II of "The Natural History of Jamaica" by Sir Hans Sloane in 1725. This work contains on page 203 a remarkably precise description of a bug, accompanied by illustrations (here reproduced in fig. 1):

"XVII *Cimex sylvestris oblongus e coccineo & nigro variegatus, supina parte Cruce Sti Andreae notatus. Tab. 237. Fig. 29, 30*".

Fig. 29.30. *Cimex filvestris oblongus*
 è coccineo & nigro variegatus, supina
 parte cruce S^{ti} Andreae notatus.



Fig. 1. *Dysdercus andreae*. Facsimile of Sloane's figs. 29 and 30.

"A Cimex of a scarlet Colour with a white St. Andrew's Cross on its Back. This is one third Part of an Inch in Length, has two short Antennae, six Legs, is all scarlet, only towards the Tail black, and some black Spots elsewhere, and a white St. Andrew's Cross going down its Back, the Belly is whitish".

"It is very often to be met with amongst Flowers".

In 1758 Linnaeus named this bug *Cimex Andreae*, referring to the work of Sloane and incorporating part of his description.

Early in the nineteenth century, four more species had been described by Linnaeus, De Geer, and Fabricius in the genus *Cimex*, but one of these proved to be a synonym, so that at the end of this period only four species were actually known. Fabricius separated from *Cimex* in 1794 the genus *Lygaeus* and included in it, among many other species, the representatives of the present genus *Dysdercus*.

The name *Dysdercus* was first used by Guérin Méneville in 1831, but it did not come into general use until 1854. In the meantime, Say, Perty, and Herrich-Schäffer had described several other species in the genera *Capsus*, *Lygaeus*, and *Pyrrhocoris*.

The list increased noticeably only after 1850 when, up to the beginning of the present century, additions were made by Stål, Walker, Distant and Ballou. In 1927 the taxonomic importance of the male parameres was first recognized by Hussey, and in 1929 the same author published a valuable catalogue of the Pyrrhocoridae. Mention should also be made of the contri-

butions by Blöte (1931, 1933, 1937) and Schmidt (1932), who independently described a number of new species, the former also discussing some structures of the male genital capsule. Another important study was made by Pearson (1932), who was the first to give clear illustrations of the parameres of a number of species.

The last publication to be mentioned is the work of Lima et al. (see above), which contains many data on Brazilian species and illustrations of several parameres (including those given by Pearson, 1932), but otherwise offers little in the way of new approaches to the taxonomy of the group.

MATERIAL

Some of the material forming the basis for this work was collected by the author in Surinam, Trinidad, and Puerto Rico, but the major part was obtained on loan from a number of museums. Several of these institutions were also visited, particularly for the study of type specimens. Of 74 nominal species and/or varieties, 65 type specimens could be located with certainty. Of these, 64 have been studied. Seven types must be considered lost, while the locations of two others are doubtful. In the course of this work 35 lectotypes and 5 neotypes have been selected.

The following list gives the names of the institutions and individuals from whom material was received on loan or as a gift, together with the abbreviations used throughout the text. Without the co-operation of all those who assisted me so wholeheartedly, the work could not have been completed. I wish to express my gratitude to all of them. I should like to extend special thanks to Mr. J. A. Grant B.Sc., London, Prof. Dr. J. van der Vecht, Mr. A. C. van Bruggen and Dr. D. C. Geijskes, all of Leiden, for their valuable criticism during the preparation of the manuscript. A research grant received from the Netherlands Foundation for the Advancement of Tropical Research, WOTRO (formerly WOSUNA) is most gratefully acknowledged here. I am also greatly indebted to the Uyttenboogaart-Eliassen Foundation in Amsterdam and the Netherlands Organisation for the Advancement of Pure Research (Z.W.O.) in The Hague, for financial support that enabled me to visit a number of museums in the United States and in Europe. In the list given below, these museums are indicated by an asterisk.

- *AMNH American Museum of Natural History, New York; † Dr. H. Ruckes.
- *BIN Koninklijk Belgisch Instituut voor Natuurwetenschappen; Mr. H. Synave.
- *BM British Museum (Natural History), London; Dr. W. E. China, Mr. J. A. Grant B.Sc., Dr. W. J. Knight.
- CAD Central Agricultural Station, Demerara; Dr. C. P. Kennard.
- CAS California Academy of Sciences, San Francisco; Dr. H. B. Leech, Mrs. L. B. O'Brien.

- CNHM Chicago Natural History Museum (Field Museum . . .); Dr. H. S. Dybas.
 DEI Deutsches Entomologisches Institut, Berlin-Friedrichshagen; Dr. G. Friese.
 ESP Escola de Agronomia "Eliseu Maciel", Pelotas, Brazil; Prof. C. M. Biezanko, Eng. Agr.
 HZM Zoologisches Staatsinstitut und Zoologisches Museum, Hamburg; Dr. H. Weidner.
 *ICTA Imperial College of Tropical Agriculture, St. Augustine, Trinidad; Dr. M. G. Emsley.
 INAM Instituto Nacional de Investigaciones Agrícolas, México; Dr. A. Ortega C.
 IOC Instituto Oswaldo Cruz, Rio de Janeiro.
 IPV Instituto de Patologia Vegetal, I.N.T.A., Buenos Aires; Sr. A. A. Pirán.
 ISU Iowa State University; Dr. J. C. Schaffner.
 IZM Instituto de Zoología Agrícola, Maracay, Venezuela, including specimens of the La Salle Museum of Natural History, Caracas (La Salle), and of the Ministry of Agriculture (MAC); Dr. F. Fernández Yépez.
 KU Kansas University, Snow Entomological Museum, Kansas; Dr. G. W. Byers.
 *LEW Laboratorium voor Entomologie, Wageningen; Ir. R. H. Cobben.
 *MA Zoologisch Museum, Amsterdam; Mr. J. P. Duffels.
 MACN Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", Buenos Aires; Prof. Dr. J. A. de Carlo, Dr. M. J. Viana.
 MB Moravské Museum, Brno; Dr. J. L. Stehlík.
 *MC Universitetets Zoologiske Museet, København; Prof. Dr. S. L. Tuxen, Mr. N. Møller Andersen.
 MCZ Museum of Comparative Zoology, Cambridge, Mass., U.S.A.; Dr. P. J. Darlington.
 MD Staatliches Museum für Tierkunde, Dresden; Dr. R. Hertel.
 *ML Rijksmuseum van Natuurlijke Historie, Leiden; Dr. H. C. Blöte.
 *MNP Muséum National d'Histoire Naturelle, Paris; Dr. J. Carayon.
 MNR Museu Nacional, Rio de Janeiro; Dr. J. C. de Melo Carvalho, Mr. J. A. Becker.
 MOL Estación Experimental Agrícola de "La Molina", Lima, Peru; Ing^o J. E. González B.
 *MU Institute of Zoology, University of Uppsala, Sweden; Dr. A. Holm.
 *MW Instytut Zoologiczny, P.A.N., Warszawa; Prof. Dr. J. Nast, Dr. H. Szelegiewicz.
 *MZH Universitetets Zoologiska Museum, Helsingfors; Dr. M. Meinander.
 MZM Museum of Zoology, University of Michigan, Ann Arbor, Michigan; Dr. Th. E. Moore.
 NMB Naturhistorisches Museum, Basel; Dr. F. Keiser.
 *NRS Naturhistoriska Riksmuseet, Stockholm; Prof. Dr. L. Z. Brundin; Dr. P. I. Persson.
 POM Pomona College, Claremont, California; Dr. Hilton.
 SMJ Science Museum, The Institute of Jamaica, Kingston; Dr. Th. H. Farr.
 TAMU Texas A & M University, Texas; Dr. J. C. Schaffner.
 UCB University of California, Berkeley; Dr. R. L. Usinger.
 UCR University of California, Riverside; Dr. S. Frommer.
 *USNM United States National Museum, Smithsonian Institution, Washington; † Dr. C. J. Drake, Dr. J. L. Herring, Dr. R. C. Froeschner.
 ZIL Zoological Institute, Academy of Sciences, Leningrad; Dr. G. S. Medvedev.
 ZMB Institut für Spezielle Zoologie und Zoologisches Museum der Humboldt-Universität zu Berlin; Dr. N. Göllner-Scheiding.

- *ZML Zoological Museum, Lund, Sweden; Dr. H. Andersson.
 ZSM Zoologische Staatssammlung, München; Dr. H. Freude.
 ZSP Departamento de Zoologia, São Paulo; Dr. H. M. Canter, Dr. M. Carrera.

Further, material and/or information were obtained from:

Padre Pio Buck, S.J., Pôrte Alegre, Brazil. Instituto Anchietano de Pesquisas; Dr. G. B. Fairschild, Gorgas Memorial Laboratory, Balboa Heights, Panama; Prof. Dr. M. A. Freiberg, Direccion General de Pesca y Conservacion de la Fauna, José C. Paz, Buenos Aires; Dr. D. C. Geijskes, formerly director of the Surinaams Museum, Paramaribo, Suriname; †Dr. H. J. Grant Jr, Academy of Natural Sciences, Philadelphia; Dr. L. Hoberlandt, Národní Muzeum, Prague; Dr. R. F. Hussey, University of Florida, Gainesville, Florida; Dr. J. A. Knoke, Instituto Interamericano de Ciencias Agricolas de la OEA, Turrialba, Costa Rica; Dr. F. C. Maa, B. P. Bishop Museum, Honolulu; Dr. J. Maldonado Capriles and Dr. J. A. Ramos, University of Puerto Rico, Mayagüez; Mr. A. Menke, University of California, Davis, California; Mr. J. R. Metcalfe, Dept. of Science and Agriculture, Barbados; Mr. D. W. Mollison, Plant Protection Div., Ministry of Agriculture and Lands, Hope, Jamaica; Dr. E. O. Pearson, Commonwealth Institute of Entomology, London; Sr. A. A. Pirán, Instituto de Patologia Vegetal, INTA, Buenos Aires; Ing. Agr. A. Ruffinelli, Div. Zool. Agric. Ministerio de Ganadera y Agricultura, Montevideo; Dr. P. Silva, Centro de Pesquisas do Cacau, Itabuna, Bahia, Brazil; Mr. W. H. T. Tams, Secretary of the Linnean Society, London; Dr. H. D. Volkart, Naturhistorisches Museum, Bern; Mr. G. van Vreden, Landbouwproefstation, Paramaribo, Suriname; Dr. H. W. Weems, State Plant Board of Florida, Gainesville, Florida.

METHODS

In most cases the characters of the terminal segment can be observed directly under moderate magnification (20-40 X). For more detailed study of the male, however, extraction of the ninth segment and the parameres is required. For this purpose it is sufficient to relax the specimen overnight or to boil it briefly, but material preserved in alcohol can be used straight away. With fine forceps the terminal segments are gently drawn out (fig. 2) and the cup-shaped ninth segment removed. It should then be

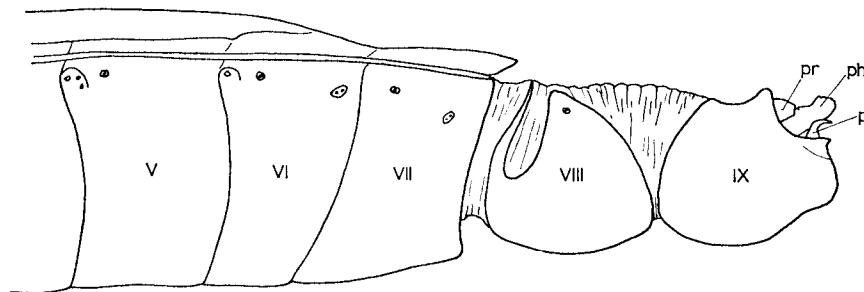


Fig. 2. Abdomen of a male *Dysdercus* with the last segments drawn out to the extreme in order to separate the genital capsule (IX). — p. = paramere; ph = phallus; pr = proctiger (anal tube); V-IX = abdominal segments five to nine.

macerated in a hot 10% KOH aqueous solution for a few minutes, after which the paramere can be extracted without difficulty.

For the examination and drawing of the ninth segment and parameres, a standard glass slide is used to which a 1.5 mm plastic or glass ring is fastened. After a film of vaseline has been applied to the bottom of the resulting cavity, it is filled with water. The material for examination is pressed against the vaseline film with fine forceps. Since chitin adheres well to vaseline, any changes required in the position of the specimen are effected with greater ease than in permanent slides.

Examination of female genitalia can usually be done directly. However, if the terminal segments are shrivelled or if the second gonocoxae are entirely covered by the first pair, it may become necessary to macerate the abdomen in boiling water.

Special attention has been given to the illustration of the genital structures because of their taxonomic importance. All drawings in this paper were done by the author with a camera lucida. For each species there are illustrations of (1) the ninth segment of the male, or "genital capsule" (Larsén, 1938; Truxal, 1952), in a lateral view to give an impression of the general shape; (2) a posterior view to demonstrate the characters of the posterior margin of the segment; (3) the right paramere of the male in lateral and posterior aspects; and (4) a posterior view of the terminal segments of the female, in which the shape of the gonocoxae is of special importance. It should be noted here that slight differences in position of the genitalia may greatly affect the apparent shape of the diverse parts. This is especially applicable to the capsular lamella, the first gonocoxae, and the length of the shaft of the paramere (because it is slightly curved). The general aspect of the female genitalia can be highly variable due to different degrees in gravidity or the state of the specimen, cf. figs. 192 and 202. In all figures except those of the parameres, surface pubescence and setation have been omitted.

Specimens shown on the plates are all depicted on the same scale, app. 4.2 X.

TAXONOMIC MORPHOLOGY

One of the most striking features of the *Dysdercus* species of the New World is the wide variety in colour patterns, which are composed of yellow, red, white, and black as well as all intermediate shades of these colours. In most cases the ground colour is yellow, in several species red, and in a few black. The head, pronotal callus, scutellum, and thoracic pleura are often red. White is almost always found on the collar, the posterior margins of the pleura, and on the epicoxal lobes. Black may occur almost anywhere. The membrane is usually black and the legs and antennae infusate. Spots

sometimes occur on the head, along the posterior margin of the pronotum, and on the corium. The anterior margins of the abdominal sternites may also be blackish. Furthermore, a suffusion of black may extend over almost all paler parts of the animal, particularly on the dorsum. This melanization, which is more or less independent of the maculation, spreads from definite areas, the so-called melanization foci.

When working with such remarkably coloured and patterned insects, one might feel tempted to assign specific value to the colour pattern. But if we classify them on this basis, we soon run into difficulties. In most of the species the pattern is highly variable. Furthermore, certain patterns may occur in more than one species, so that they are of little help for distinction of the species. Some species can be readily recognized by this feature, e.g. *D. andreae* and *D. ruficeps*, but in many other this is difficult or even impossible. In general, the pattern is of a limited taxonomic value for identification of the species, and it is, therefore, hardly surprising that its use has caused much confusion in the past.

Nevertheless, considerable attention has been paid in this study to the description of the colour patterns. This appears justified, because the patterns, apart from their biological significance, are of interest for being subject to geographic variation.

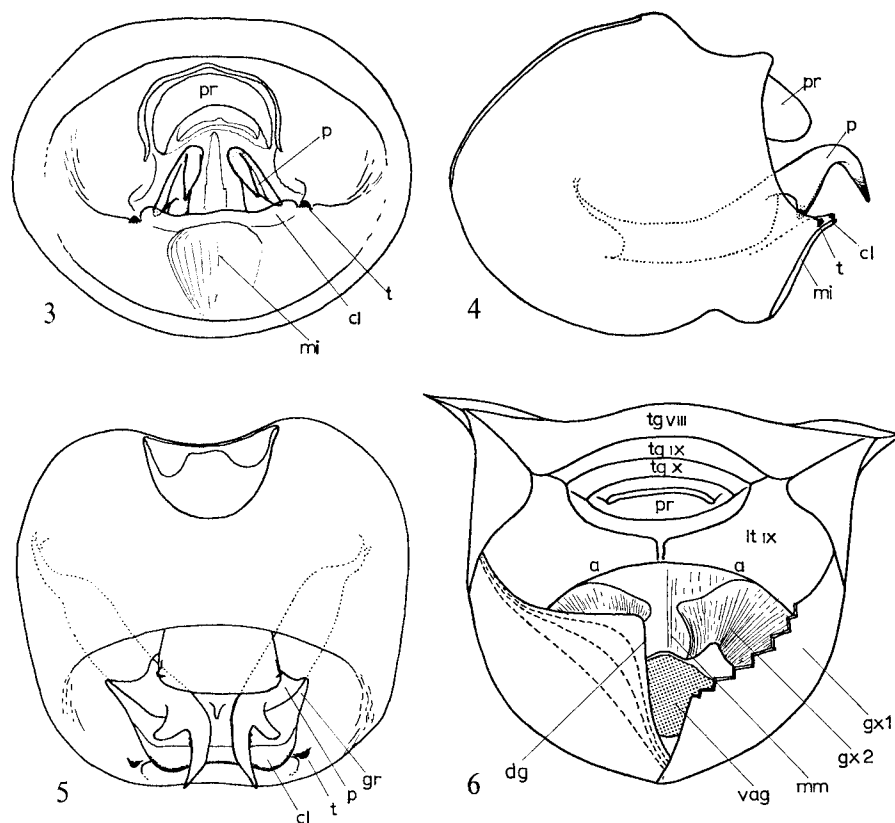
A colour feature to which attention should be paid is a white ring or annulus at the base of the fourth antennal segment of some species. Generally, this character is not subject to much variation within the species (except *D. peruvianus*), and thus has a certain diagnostic value.

Apart from the genitalia, the very uniform structure of these insects furnishes few useful taxonomic characters. Only some of the species differ in relative length of certain parts, or, for example, *D. obscuratus* can be distinguished from its congeners by the shape of the pronotum due to the absence of the raised lateral margins. But these are exceptions. Even the sculpture of the body is remarkably homogeneous, particularly in the American species. Consequently, morphological details have been omitted in the descriptions with the exception of those of the external genitalia.

The shape of these organs shows considerable variation. A study of insects taken in copula has revealed that this variation is not intraspecific. The use of characters of the genitalia therefore makes it possible to separate with certainty both sexes of highly similar species.

The taxonomic importance of the genitalia obviously warrants a brief general description and explanation of terms.

In the male the genital structures are limited to the ninth segment, which surrounds the genital chamber and is called the genital capsule (figs. 3-5).

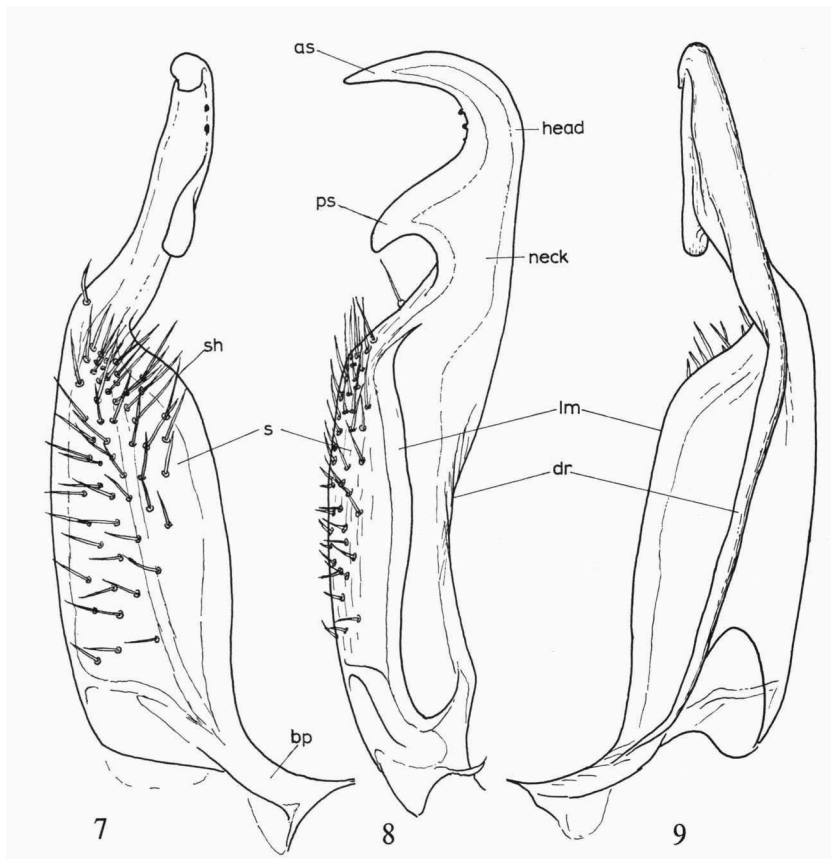


Figs. 3-6. Genitalia of *Dysdercus*. 3-5, male genital capsule in posterior, lateral, and dorsal view, respectively; 6, female external genitalia in posterior view. — a-a = see explanation on p. 14; cl = capsular lamella; dg = distal margin of first gonocoxa; broken lines: different degrees of reduction of the first gonocoxa found in *Dysdercus*; gr = groove in which the paramere is situated; gx 1 = first gonocoxa, partly cut-away to show the underlying parts; gx 2 = second gonocoxa; mi = medial excavation in the posterior margin of the capsule; mm = medial membrane connecting the second gonocoxae; lt IX = laterotergite of segment IX; p = paramere; pr = proctiger (anal tube); t = tuberculum; tg VIII-X = tergites of segments VIII-X; vag = vagina.

It is posteriorly invaginated, forming the genital cavity at the base of which is the genital opening containing the intromittent organ or phallus. Both postero-lateral margins of the genital opening show a groove running to the floor of the genital chamber, each containing a paramere which moves up and down along the groove.

The paramere (figs. 7-9) consists of a basal part to which muscles are attached (basis parameri, Dupuis, 1955), a "shaft" forming the major part

of the paramere, and the "head". The latter is attached to the shaft by means of a more or less clearly defined connecting section, the "neck" region. In postero-ventral view the shaft appears as a flat rod, often somewhat curved, with a ridge on its fronto-dorsal surface; in cross-section it is roughly T-shaped. The flat (posterior) surface is covered with setae, the number and distribution of which present characters of specific value. The neck region may merge very gradually into the shaft, but usually there is a projecting angle forming a mesial or lateral "shoulder", sometimes provided with a crest. The insertion of the neck on the shaft may be straight or oblique. The head is provided with one or two spurs which are directed posteriorly. Both spurs may be equally well developed but in some species one of them



Figs. 7-9. Right paramere of *Dysdercus fulvoviger* (De Geer). 7, posterior aspect; 8, lateral aspect; 9, anterior aspect. — bp = basis parameri; dr = dorsal ridge; as = apical or distal spur; lm = lateral margin of the shaft; ps = proximal spur; s = shaft; sh = lateral shoulder (in this species only slightly produced).

is reduced in size. Some species have only one spur, but then it is as a rule difficult to determine which of the two has disappeared. Laterally, there is often a more or less distinct ridge between the two spurs, sometimes with a number of small irregular sharp teeth. Further development of the spurs may lead to the formation of secondary spurs or teeth.

In resting position the orientation of the parameres with respect to each other and the direction of the spurs may differ widely. They may lie close together and point posteriorly (*D. maurus*, fig. 187) or be situated much further apart with the spurs directed laterally (*D. mimus*, fig. 24).

On the posterior wall of the genital cavity a median ridge will be found separating the two parameres. This ridge extends dorsally, sometimes so far that in posterior view it protrudes above the posterior margin of the genital capsule. This ridge must not be confused with a transverse median lamella (Blöte, 1931), here called the "capsular lamella", frequently present on the posterior wall of the genital cavity. In many species the structure of this margin provides important characters which are nearly always easily observed. The posterior margin may be simply arcuate (*D. ruficollis*, fig. 204) or may show a median lamella posteriorly followed by a variably developed median excavation on both sides of which there may be a small tooth. In one species the posterior margin is rather convex and sharply recurved in the middle (*D. peruvianus*, fig. 212). Not far from the posterior wall the ventral side of the capsule usually shows a transverse impression.

The external genital structures of the female (fig. 6) derive from the eighth and ninth segments and comprise the first and second pairs of gonocoxae (Scudder, 1959) = gonocoxites (Dupuis, 1951) = Gonapophysenträger (Larsén, 1938) = 1st and 2nd valvifers (Snodgrass, 1933) = 8th and 9th gonocoxites (Dupuis & Carvalho, 1956), and so forth. The first pair of gonocoxae consists of two chitinous valves inserted ventrolaterally in the seventh sternite. These valves project beyond the posterior margin of this sternite, covering the genital opening and the second pair of gonocoxae to a variable extent. They may be large, with their distal margin forming roughly a right angle, or they may be smaller and rounded distally, in extreme cases even with almost straight distal margins (*D. mimus*, fig. 27). The sclerites of the second gonocoxae are situated in the membrane connecting the vulva with the laterotergites of the ninth segment and are movably inserted at the anterior margin of that segment. They are more or less sclerotized and offer reliable specific characters in size, shape, and orientation. They may be partially or entirely fused together.

It is understandable that shape and position of the gonocoxae and the structure of the essential parts of the male genitalia are co-adapted. During

copulation the male genital segment is placed inverted on the last segments of the female. The genital lamella or, if absent, the posterior edge of the genital capsule, thus comes to rest in the groove formed by the anterior margins of the laterotergites of the ninth segment (fig. 6, a-a) of the female. At the same time, the spurs of the parameres each pull one of the second gonocoxae in a dorsal direction, thus causing the vulva to be exposed and the entrance into the vagina to expand in order to permit the penetration of the phallic organ. In this process each of the parameres attaches itself behind the raised folds of the corresponding gonocoxal sclerite. When the raised ridges of the gonocoxae are relatively far apart, there is either a greater distance between the parameres (*D. bimaculatus*), or the spurs are longer and directed far outwards (*D. mimus*), or the head of the paramere makes a pronounced angle with the shaft (*D. bloetei*). The parameres finally pull the gonocoxae into the genital cavity. If the second gonocoxal sclerites hinge more sideways than upward, their position during copulation is markedly lateral (*D. fulvoniger*). If, on the other hand, their insertion is more medial, they slide inwards between the parameres and the posterior margin, i.e. over the floor of the genital cavity (*D. fernaldi*). This also occurs when the second gonocoxae are fused, at least in the group of *D. mimus*. The latter procedure appears to be impossible in species such as *D. immarginatus* and *urbahni*. Particularly in the latter, with its high capsular lamella, the lateral folds of the second gonocoxae will probably be pulled inwards on both sides of the lamella. Unfortunately, this has so far not been observed. Further investigations on this complex mechanism are indeed highly desirable.

TAXONOMY

Dysdercus Guérin Méneville, 1831

Freeman (1947), in his revision of the Old World *Dysdercus*, attempted to date the genus and determine its type, rejecting the view that the genus was first established by Amyot & Serville (1843). Freeman gave precedence to Boisduval (Serville MS, 1835), who described three species, and he designated one of these, *Dysdercus decussatus* Boisduval, 1835, as the type of the genus. But he apparently overlooked the publication in 1831 of Guérin Méneville's insect plates in Duperrey's atlas of the "Voyage autour du monde... sur... la Coquille... Histoire Naturelle, Zoologie" (Dupuis, 1952: 450; 1955: 264). On plate 12 fig. 16, published May 29, 1831 (Guérin Méneville, 1838: 271, footnote), a member of this genus is depicted and is provided with the name "*Dysdercus peruvianus* Guér.". Since this

name is valid according to articles 12 and 16 (vii) of the International Code of Zoological Nomenclature and since it antedates Boisduval, 1835, the genus *Dysdercus* must be attributed to Guérin Méneville and consequently *Dysdercus peruvianus* Guérin Méneville, 1831, is the type species of the genus by monotypy.

Regarding the literature pertaining to the genus *Dysdercus*, I refer to the citations given by Freeman (1947: 374-375), with the following additions:

Dysdercus Guérin Méneville, 1831, Voy. Coquille, Atlas, pl. 12 fig. 16. — Ballou, 1906, West Indian Bull. 7: 64-85. — Freeman, 1947, Trans. R. Ent. Soc. London 98: 373-424. — Dupuis, 1952, Bull. Soc. Zool. Fr. 77: 447-454. — China, 1954, Ent. Mon. Mag. 90: 188-189. — Miller, 1956, Biol. Heter.: 15, 65. — Lima et al., 1962, Mem. Inst. Osw. Cruz. 60: 21-57. — Schaefer, 1964, Ann. Ent. Soc. Amer. 57: 677, 679. — Stehlik, 1965, Čas. Moravsk. Mus. 50: 212-216, 254-268.

Dysderus Stål, 1854, Öfvers. Kongl. Sv. Vetén.-Akad. Förh. 11: 236.

Disderus Valdés Ragués, 1910, An. Acad. Ci. Habana 44, 433; Mis Trab.: 203.

Dyadercus Anon., 1931, J. Econ. Ent. 24: 1325.

Diagnosis. — Medium-sized Pyrrhocoridae; eyes small; third antennal segment shorter than second; length of pronotal callosity less than half the length of pronotal disc (all measured along the median); pronotal collar ventrally complete; distal corial corner acute; hamus of hind wing absent (Freeman, 1947); sixth and seventh sternites of equal length (measured in the median).

Description. — Medium-sized (8-18 mm) bugs of elongated oval shape, dorsum flattened.

Head horizontal, prorect, rounded and anteriorly conically produced. Eyes small, hemispheric, subpedunculate, touching anterior pronotal corners. Antenniferous tubercle large, situated immediately anterior to eye, its opening directed forward. Jugum (= paraclypeus = mandibular plate) short, somewhat swollen towards rounded apex, extending to centre of anteclypeus. Tylus (= clypeus): anteclypeus not very distinctly separated from postclypeus by a transverse sulcus; basal half somewhat elevated and slightly compressed laterally, anterior part flattened, apically obtuse. Maxillary plate (= lorum) elongate, separated from the latter by a fine groove. Intercalary plate very small, triangular, often inconspicuous. Buccula narrow, parallel, posteriorly gradually sloping. Rostrum slender, usually extending as far as the posterior margin of third abdominal segment, but in some species extremely prolonged, sometimes beyond tip of abdomen. Labrum as long as first labial segment, exposed, gradually tapering to its point. Labium with four segments, which are usually laterally ridged, at least on proximal part; segment 1 narrowed towards apical half but swollen at double-rimmed apex. Antenna long, slender, about 0.6-0.7 times body length; segment 2

shorter than or subequal to 1; 3 much shorter than 2; 4 about as long as 1.

Thorax. Pronotum trapezoidal, wider than long, sides usually slightly sinuate, anterior margin concave, posterior margin slightly convex; lateral margin carinate, reflected; callus well separated from collar and disc by transverse sulci, the posterior one nearly straight; disc large, convex. Scutellum triangular, as long as wide, convex, with shallow anterior and posterior transverse grooves. Hemelytra large, extending beyond apex of abdomen; costal margin raised, especially towards base. Corium with well developed median plate proximally, acute distally; six veins usually visible: subcosta and radius not far from costal margin (costa indistinct), medius along the medial fracture (= corial cleft) well developed, cubitus near claval suture; postcubital and anal on clavus, the latter vein making the inner margin of the wing. Corial veins posteriorly closed by an indistinct oblique vein near apical margin. Membranal veins originating from this oblique vein and alternating with corial veins, probably representing radius, radius-sector, medius, and cubitus; the last three forming two closed cells: a lateral one, slightly longer than wide, and a mesial one, much longer than wide. Seven or eight secondary veins, some of them forked, originate from these cells. It should be noted, however, that opinions differ about the possible homologies of the wing veins in Heteroptera (Poisson, 1951: 1667-1670).

Ventral surface. Prothoracic collar well developed, ventrally not interrupted, separated from rest of segment by a transverse sulcus; pronotal epipleuron distinct. Pleura convex, separated from the plate-like posterior pleural margins by a groove; epicoxal lobes large, posteriorly fused with posterior pleural margins, those of pro- and mesothorax bilobate. Prosternum small, trapezoid, with indistinct median carina and small intercoxal posterior lobe; meso- and metasternum each with distinct median carina; ostiole of metasternal scent gland distinct, situated between meso- and metacoxa; ostiolar peritremes laterally extended, compressed, halfway between sternum and pleuron. Legs long and slender, without sexual differences; fore femora bear ventrally a more or less distinct double row of spines, only the distal one or two of which are strongly developed.

Abdomen. Tergites II-VI fused; orifices of dorsal scent glands at posterior margin of tergites III-V, slit-like, peritremes constricted in the median, resulting in paired orifices; median part of posterior margin of tergite V, including orifice of gland, posteriorly strongly extended into VI. Sternites normally developed, separate; trichobothrial arrangement as in other Pyrrhocoridae. — Male. Posterior margin of tergite VII concave, medially overlapped by almost semicircular, flat, dorsal fold, which is directed backwards and covers the genital cavity of segment IX. Sternite VI

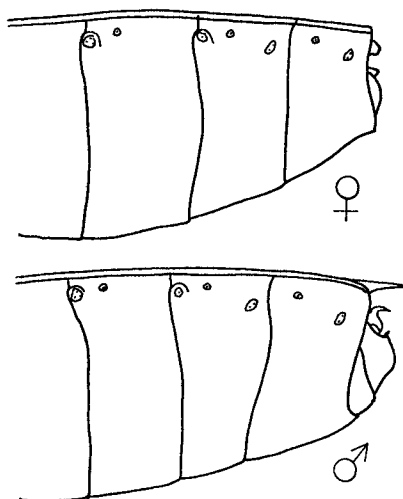


Fig. 10. Abdominal apices of male and female *Dysdercus* to show the difference in shape of the segments VI-VII, often accentuated by differences in coloration.

remarkably narrowed towards the middle (fig. 10). Segment VIII represented only by a hemispheric, ring-like sternite, dorsally membranous with tergal sclerites absent; anterior opening small, posterior opening very large, containing genital capsule; lateral margin with a deep, mesially directed indentation near the anterior margin (fig. 2). Segment IX (genital capsule) spheric, closed dorsally; with small anterior entrance and large posterior opening; posterior margin of capsule simple to markedly elongate distally; parameres well developed, symmetric, of variable shape; phallic organ mostly membranous with three pairs of conjunctiva appendages (Singh-Pruthi, 1925) = processus conjunctivae (Dupuis, 1955). — Female. Genitalia of plate-shaped type (Dupuis & Carvalho, 1956); first pair of gonocoxae convex, plate-like, more or less covering vulvar area depending on degree of reduction (fig. 6); second pair dorsal to vulva, sclerites separate or more or less fused.

Sculpture. Dorsum usually dull due to a microscopic sculpture of the integument; exceptions: *D. obscuratus* Distant with shiny head and callus, and *D. mimuloides* Blöte with polished head, pronotum, and scutellum. Collar and disc finely, sparsely punctate; corium sometimes more densely and deeply punctate. Ventral surface: all parts usually glossy; collar, posterior pleural borders, and epicoxal lobes more or less distinctly punctate.

Pubescence. Body as a rule bare or with some microscopic hairs on head or ventral surface, somewhat more obvious in *D. rusticus* Stål; some longer

hairs on postero-lateral part of sternum VII. In the male, segments VIII, IX densely covered with fine hairs; in the female, postero-lateral apices of tergites VIII, IX and the first pair of gonocoxae pilose. Antenna, rostrum, and legs covered with short, fine hairs, antennal segment 4 densely so, rostrum sparsely covered with hairs. Tibiae and tarsi with microspines in longitudinal rows.

Dysdercus may be distinguished from the closely related Old World genus *Dindymus* Stål by the following characters:

<i>Dysdercus</i>	<i>Dindymus</i>
eyes small, length less than 0.2 times length of head	eyes large, about 0.33 times length of head
third antennal segment 0.5-0.6 of second segment	third antennal segment about as long as second
collar ventrally continuous	collar ventrally interrupted
length of pronotal callus about half length of disc (median)	length of pronotal callus more than half length of disc
head including eyes as wide as anterior border of pronotum	head including eyes much wider than anterior border of pronotum
pronotum without large, deep punctures	pronotum with such punctures on callus or in posterior callosal groove
raised pronotal lateral borders narrow	raised pronotal lateral borders wide
distal corial corner acute	distal corial corner rounded
sternites VI, VII in male equal in length (median)	sternite VII in male longer than VI

The subgenus *Megadysdercus* Breddin, 1900, which only contains the Oriental species *M. mesiostigma* Distant, 1888, is mainly distinguished from *Dysdercus* s. str. by a fine adpressed pubescence on the head, callus, and virtually the entire underside of the body. In addition, the anterior corners of the pronotum are lobular. As far as genitalia are concerned this species fits completely into the group of *D. decussatus* Boisduval, 1835, which Freeman (1947) distinguished among the Oriental species.

This purely taxonomic chapter treats the American species and subspecies of *Dysdercus*. Literature references already given by Hussey (1929) have been restricted as much as possible. Synonyms have been included only if they are somehow of importance or when the author's views differ from

those of Hussey. After reference to the original description, the present location of the type specimen, when known, is indicated; an exclamation mark indicates that the present author has seen this type material.

There are various degrees of relationship among the species, enabling one to arrange them in more or less distinct groups; this is discussed in the chapter on "infrageneric relationships". In anticipation of this chapter the species have been treated in a sequence such as to allow expression of apparent relationships. For practical reasons the sequence of the circular diagram (fig. 268) is followed to begin with *Dysdercus collaris* Blöte, and treating first the species groups without a white antennal annulus. Species not included in any of the groups distinguished are provided with an asterisk.

Key to the American species of the genus *Dysdercus*

1. Proximal part of antennal segment 4 white 2
- Antennal segment 4 entirely black 27
2. Corium black with a white spot near the middle 3
- Ground colour of corium not black 4
3. Collar black, femora red, anterior part of abdomen white
- *albofasciatus* Berg
- Collar red, femora black, anterior part of abdomen orange
- *albomaculatus* n. sp.
4. Rostrum extending beyond middle of abdominal segment V
- *longirostris* Stål
- Rostrum not or not far extending beyond abdominal segment III 5
5. Male 6
- Female 17
6. Posterior margin of genital capsule with sharp edge 7
- Posterior margin of genital capsule with rounded edge 8
7. Posterior margin of genital capsule smoothly curved *ruficollis* (L.)
- Posterior margin of genital capsule interrupted medially
- *peruvianus* Guérin
8. Distal spur of paramere roundly obtuse, cowl-shaped 9
- Distal spur of paramere acute 12
9. Height of capsular lamella more than $\frac{1}{3}$ width 10
- Height of capsular lamella less than $\frac{1}{3}$ width 11
10. Capsular lamella ratio about 1:3 (fig. 235) . . . *immarginatus* Blöte
- Capsular lamella ratio about 1:2 (fig. 244) . . . *urbahni* Schmidt
11. Capsular lamella with sharp corners (fig. 249) . . . *fernaldi* Ballou
- Capsular lamella without sharp corners (fig. 261) *basialbus* Schmidt

12. Distal spur of paramere long and acute (fig. 161) *fulvoniger* (De Geer)
 — Distal spur of paramere short (fig. 188) 13
13. Capsular lamella well developed 14
 — Capsular lamella not well defined *goyanus* n. sp.
14. Lateral margin of genital capsule deeply concave (fig. 186) . . . 15
 — Lateral margin of genital capsule almost straight (fig. 167) . . . 16
15. Dorsal edge of capsular lamella concave; lateral margin of pronotum red; tibiae usually blackened distally *maurus* Distant
 — Dorsal edge of capsular lamella convex; lateral margin of pronotum and distal parts of tibiae yellow *chaquensis* Freiberg
16. Capsular lamella triangulate (fig. 168); pronotum with a posterior blackish fascia *honestus* Blöte
 — Capsular lamella large, rounded apically (fig. 153); pronotum without a blackish posterior fascia *wilhelminae* n. sp.
17. Sclerites of second gonocoxae fused medially, forming one plate . . . 18
 — Sclerites of second gonocoxae not fused 21
18. Second gonocoxal plate strongly produced laterally 19
 — Not as above 20
19. Width of medio-dorsal part of second gonocoxae usually more than 0.50 mm; colour of corium usually pale yellow . . . *immarginatus* Blöte
 — Width of medio-dorsal part of second gonocoxae less than 0.50 mm; colour of corium usually deep yellow *urbahni* Schmidt
20. White annulus of antennal segment 4 only 1/10 of length of segment; scutellum blackened; corium usually with a black spot *basialbus* Schmidt
 — White annulus of antennal segment 4 about 1/6 of length of segment; corium never with a black spot *fernaldi* Ballou
21. First gonocoxa rounded distally (fig. 164) 22
 — First gonocoxa angularly produced distally (fig. 157) 24
22. Sclerites of second gonocoxae closely juxtaposed 23
 — Sclerites of second gonocoxae well separated . . . *fulvoniger* (De Geer)
23. Abdominal segment VII prolonged ventrally; sclerite of second gonocoxa with a medio-dorsal indentation (fig. 215) *peruvianus* Guérin
 — Abdominal segment VII not prolonged ventrally; sclerite of second gonocoxa with a deep, medio-ventral indentation (fig. 207) *ruficollis* (L.)
24. Sclerites of second gonocoxae conically curved 25
 — Sclerites of second gonocoxae not conically curved, extended medio-dorsally by a small, plate-like structure 26
25. Sclerites of second gonocoxae close together (fig. 173); pronotum with a blackish posterior fascia *honestus* Blöte

- Sclerites of second gonocoxae well separated (fig. 157); pronotum without a blackish posterior fascia *wilhelminae* n. sp.
26. Lateral margin of pronotum red; tibiae usually blackened distally
 *maurus* Distant
- Lateral margin of pronotum and distal parts of tibiae usually yellow
 *chaquensis* Freiberg
27. Ground colour of body and corium bright red 28
 — Ground colour not red 31
28. Hemelytra with a white cruciform marking (pl. 4 fig. 3) *andreae* (L.)
 — Hemelytra without such marking 29
29. Scutellum black; rostrum reaching abdominal segment V
 *sanguinarius* Stål
- Scutellum red; rostrum shorter 30
30. A rounded spot on clavus and the dorsal part of the metapleura black; length 10.5-15 mm *jamaicensis* Walker
 — Clavus entirely red or suffused with black, without a black rounded spot; dorsal part of metapleura not black; length 9.5-12.5 mm *ocreatus* (Say)
31. Lateral margin of pronotum simple, not reflected. *obscuratus* Distant
 — Lateral margin of pronotum normally crested and reflected 32
32. Body and corium black; pronotal disc yellowish white *ruficeps* (Perty)
 — Not as above 33
33. Posterior margin of the brownish pronotal disc with a fairly broad (as broad as the collar) white fascia; abdominal segments red with white posterior margins *mimuloides* Blöte
 — Not as above 34
34. Posterior margin of pronotum red *collaris* Blöte
 — Posterior margin of pronotum not red. 35
35. Upper surface pale brownish grey with pale membrane and with a small, transverse, black corial spot, often reduced to a small dot near inner margin of corium 36
 — Not as above 39
36. Male 37
 — Female 38
37. Posterior margin of genital capsule deeply concave (fig. 112) paramere with two spurs of about equal size (fig. 113) *obliquus* (H.-S.)
 — Posterior margin of capsule almost not concave (fig. 100); paramere flattened laterally, with one spur and a smaller tooth distally (fig. 101) *bimaculatus* (Stål)
38. Sclerites of second gonocoxae situated dorso-laterally, close together (fig. 115) *obliquus* (H.-S.)

- Sclerites of second gonocoxae situated laterally, far apart (fig. 103)
 *bimaculatus* (Stål)
39. Rostrum long, extending beyond middle of abdominal segment V 40
 — Rostrum shorter, usually not extending beyond middle of segment III 41
40. Corium with a black spot near middle *chiriquinus* Distant
 — Corium without a black spot *rusticus* Stål
41. Male 42
 — Female 51
42. Paramere with one spur *lunulatus* Uhler
 — Paramere with two spurs 43
43. Capsular lamella large, bilobate (fig. 181) *cordillerensis* n. sp.
 — Capsular lamella smaller, not bilobate 44
44. Spurs of paramere both small (fig. 148); small species, 7-11 mm . . .
 *mimulus* Hussey
 — At least proximal spur large 45
45. Proximal spur large, distal spur very small 46
 — Spurs of paramere both large 47
46. Proximal spur hooked, distal spur obtuse (fig. 91, 94) *concinus* Stål
 — Proximal spur plate-like, distal spur slender (fig. 40) *bloetei* n. sp.
47. Proximal spur with a ventral plate-like extension 48
 — Proximal spur hooked 49
48. Proximal spur with a secondary tooth subapically (fig. 25)
 *mimus* (Say)
 — Ventral extension of proximal spur triangular (fig. 19)
 *imitator* Blöte
49. Distal spur with a secondary tooth laterally (figs. 130, 131)
 *suturellus* H.-S.
 — Distal spur without a secondary tooth 50
50. Corium with a black spot near middle *flavolimbatus* Stål
 — Corium entirely yellowish *peruvianus* Guérin
51. Sclerites of second gonocoxae fused medially 52
 — Sclerites of second gonocoxae separated 54
52. First gonocoxa distinctly curved distally 53
 — First gonocoxa only slightly curved distally (fig. 27) *mimus* (Say)
53. Second gonocoxal plate carinate medially (fig. 21) *imitator* Blöte
 — Second gonocoxal plate smooth medially (fig. 42) *bloetei* n. sp.
54. Corium entirely yellow, head red 55
 — Corium black or head black 56
55. Distal margin of first gonocoxa rounded; sclerites of second gonocoxae close together (fig. 215) *peruvianus* Guérin

- Distal margin of first gonocoxa right-angled; sclerites of second gonocoxae separated (fig. 185) *cordillerensis* n. sp.
56. Corium with a broad (1 mm) lateral yellow margin *flavolimbatus* Stål
- Yellow lateral margin of corium narrower ($\frac{1}{4}$ mm) or interrupted by a black corial spot 57
57. Corium grey to blackish, narrowly edged with yellow or white *suturellus* (H.-S.)
- Corium yellow with a black spot 58
58. Abdominal segments red with white or yellow posterior margins *concinus* Stål
- Abdominal segments entirely reddish, often with dark fasciae *lunulatus* Uhler

The *Dysdercus mimus* group

***Dysdercus collaris* Blöte**

(figs 11-16; pl. 1 figs. 1, 2)

Dysdercus collaris Blöte, 1931, Zool. Meded. **14**: 119, 134; type locality: Muzo, Colombia; holotype ♂, ML! — Lima et al., 1962, Mem. Inst. Osw. Cruz **60**: 22, 24, 33. — Szumkowski & Fernández Yépez, 1963, Agron. Tropic., Maracay **13**: 85.

Small to medium-sized (9-15 mm) species; antenna without a white annulus at fourth segment; posterior margin of pronotum red. Coloration of this species extremely variable. The type described by Blöte (1931) is a fairly dark, intermediate specimen. The darkest forms are usually found in Colombia together with the most yellowish ones. In Venezuela intermediates are common.

Description of the most pallid form:

Head. — Colour red; antenna black with red base; rostrum red with last segment blackish.

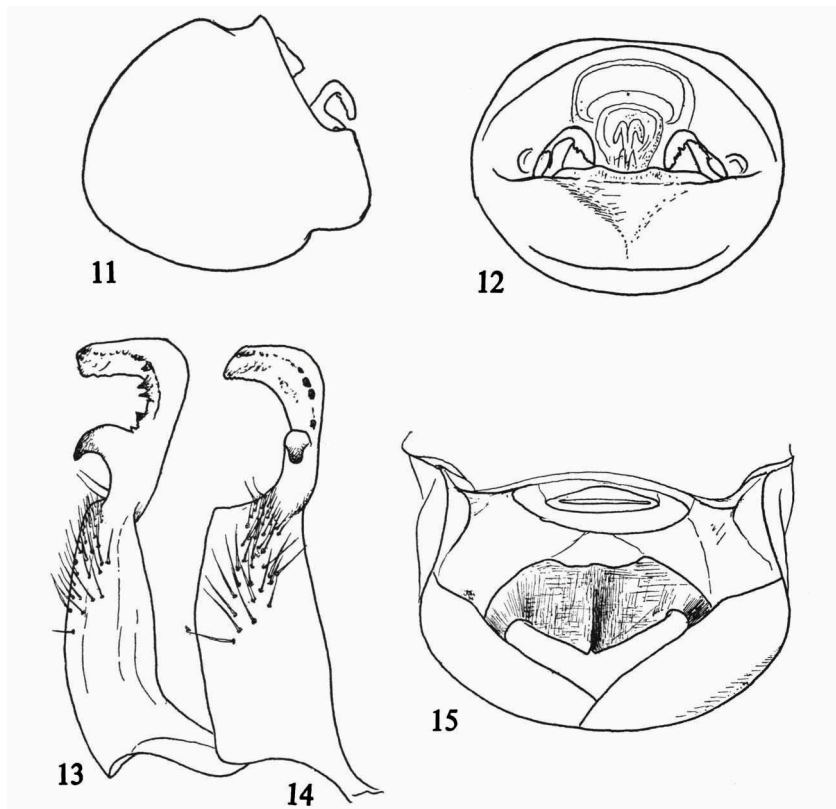
Thorax. — Pronotal collar white; sulcus posterior to collar brownish; callus, lateral and posterior margins broadly red. Scutellum orange. Corium yellow and membrane blackish. Ventral surface: collar, posterior pleural flanges, and epicoxal lobes white. Sterna, pleura, coxae, trochanters, and femora orange; the latter with blackened apices; proximal parts of tibiae reddish; rest of tibiae and tarsi blackish. Ostiolar peritremes yellowish white.

Abdomen. — Sternites yellowish with red laterally; anterior parts of segments tinged with orange. — Male: anterior parts of segments VI, VII broadly red, especially towards lateral margin; segment VIII white; genital capsule reddish brown. Excavation in posterior margin of genital capsule (fig. 11, 12) dorsally limited by a narrow, transverse, erect capsular lamella.

Paramere (figs. 13, 14) with a short, somewhat trapezoidal shaft, scantily pilose, with a sharp, mesial shoulder, a short, curved neck; head with two spurs; proximal spur recurved, directed posteriorly; distal spur large, hook-shaped, blunt, and strongly mesially directed; along lateral ridge between apical and proximal spurs, some small, darkly sclerotized teeth. — Female (fig. 15): first gonocoxa greatly reduced, distal margin almost straight, leaving a great part of ninth segment uncovered; second pair of gonocoxae forming one large, heavily sclerotized shield with a distinct median ridge; posterior margin of this sclerite bisinuate.

Darkest forms: upper surface of head, antenna, callus, including the adjacent lateral margin, scutellum, corium, pleura, and legs black; rostrum, genital capsule, and ventral surface of head dark brown.

Length of male 9-12 mm; length of female 11-15 mm.



Figs. 11-15. *Dysdercus collaris* Blöte. 11-14, male, holotype; 11-12, genital capsule in lateral and posterior view resp.; 13-14, right paramere in lateral and posterior view resp. 15, female from Venezuela, genitalia in posterior view.



Fig. 16. Distribution of *Dysdercus collaris* Blöte.

Material (distribution: fig. 16).

Colombia. — "Colom", 1 ♀ (MCZ). "Colum", 66.12. 1 ♀ (BM). "Columbia", 1 ♂, 2 ♀ (Taeuber det.) (Breddin Coll., DEI). "Columbia", 3 ♂, 2 ♀ (NRS). — Cauca. Matagang, ob. Caucathal, 1000 m, Fassel, 1 ♀ (*D. imitator* Blöte var. *pseudo-annulus* Blöte det. Blöte) (ML). El Tambo, Papayan, 1700 m, 15.x.1932, K. v. Sneidern, 1 ♂ (ZML). — Tolima. Coyaima, xi.1944, R. A. Stirton, 1 ♀; Ibaque, 10 mi E, 790 m, 9.iii.1955, E. J. Schlinger c.s., 1 ♀ (CAS). Honda, O. Bürger, 1 ♂ (HZM). — Valle del Cauca. Cali, 96-68 (allotype *D. collaris* Blöte; abdomen missing) (BM). Cali, W. F. H. Rosenberg, 3 ♀ (MCZ). Mark, S fr. Cali, 6.vi.1948, E. M. Poulsen, 1 ♀ (MC). — Cundinamarca. Bogotá, 1 ♀ (Distant Coll., 1911-383 BM). La Unión, ii.1897, 2 ♂, 2 ♀, Pacho, ii.1897, 1 ♂, 1 ♀, Fusagasuga, 2 ♂, O. Bürger (HZM). Anolaima, 1917, 1 ♀, Pacho, 1915, 1 ♀, Hno Apolinar-Maria (CAS). Bogotá, Lindig, 1 ♀, (7394 MZH). Bogotá, 1 ♀ (ML). Pirardot 360 m, 7.i.1957, 1 ♀, Monterredondo, 1420 m, 15.i.1957, 1 ♂, 1.i.1959, 1 ♀, 29.12.1956, 1 ♀, J. Foerster (MB). — Meta. Villavicencio, O. Bürger, 1 ♂ (HZM). Quatiquia R., Villavicencio, 400 ft, xi-xii.1944, A. Balfour, 1 ♂ (BM). — Boyaca. Muzo, 1 ♂, holotype of *Dysdercus collaris* Blöte (Cat. No. 1, ML). — Antioquia. Medellín, 10.iii.1937, G. Dahl, 1 ♂ (ZML). La Estrella, Romeral, 2500 m, 20.ii.1959, A. Medellín, 1 ♂, 1 ♀ (MB). Pablo, 1 ♂, O. Bürger (HZM). W. Colombia, 1 ♂ (Schmidt det.) (Breddin Coll.); Aguacatal, 1800 m, x.1908, 2 ♂, 2 ♀ (Taeuber det.), xi.1908, 1 ♂, 2 ♀, Fassel (DEI). Aguacatal, 1 ♂, S. Antonio, 1 ♀ (det. H. C. Blöte) (ML). — Magdalena. Santa Martha Mts, Mt San Lorenzo, 5600 ft,

14.vi.1921, F. M. Gaige, 1 ♀ (MZM). — Not located: Purnio, 1 ♂, 1 ♀, Tandia, 4 ♂, Tegundavia, 1 ♂, 1 ♀, Sto. San Bartolo y Volcan, 1936, 1 ♀, Athen (ZML). Hac. Pehlke iv-vi.1908, vi.1920, 1921, 10 ♂, 11 ♀, 1 cop., Rio Magdalena, 1914, 1 ♂, E. Pehlke (MW).

Venezuela. — "Venezuela", 1 ♀ (Schmidt det.) (Breddin Coll., DEI). — Zulia. Maracaibo, 1 ♀, 1 ♂ (MC). — Merida. Bocino, 5000 ft, J. Hamburg, 1 ♀ (BM). Merida, 2 ♂, 4 ♀ (NRS). Near Merida, 1350 m, 8.iv.1949, H. E. Box, 1 ♀ (IZM). — Trujillo. Cerca de la Mesa, 2300 m, 14.iii.1947, H. E. Box, 1 ♀; Hda Buenos Aires, Cr. Carmania, 13.iv.1954, N. Angeles, 2 ♂, 1 ♀; Hda Venadito, Escuque, 13.v.1961, N. Angeles & R. Vega, 1 ♀ (very dark); La Cabrera, cerca Duri, 22.ix.1954, 1 ♀ (IZM). — Lara. Sanare, 1350 m, viii.1953, R. Prieto, 3 ♂; Cubiros, 2020 m, 3.i.1954, F. Fernández Y. & C. J. Rosales, 1 ♂; Sanare, 3.ii.1948, S. Labrador, 1 ♂ (IZM). — Falcon. Churuguara, 800 m, 24.ii.(sic!).1951, 3 ♂, 1 ♀, 25.viii.1951, 1 ♀ "en Sida", F. Fernández Y. — Distrito Federal. El Valle, 14.xi.1945, "en algodón", 1 ♀, 17.i.1950, 1 cop., "en cayena", 4.iii.1950, 1 ♂, 10.iii.1950, "en maiz", 1 ♂, 14.iv.1950, 1 cop., 24.iv.1950, "en cayena", 1 ♂, 1 ♀ (det. R. I. Sailer), F. Fernández Y.; El Valle, 16.ii.1950, C. Prado, 1 ♂, La Vega, 19.iv.1950, C. J. Rosales, 1 cop.; Serrania, El Avila, 1500 m, "los venados", 16.vii.1950, F. Fernández Y., 2 ♀ (IZM). El Valle, 29.ix.1943, on *Sida* sp., E. McC. Callan, 2 ♂, 1 ♀ (ICTA). El Valle, 23.v.1938, on *Malvastrum coromandelianum*, C. H. Ballou 131, 1 ♂ (USNM). El Valle, 29.vi.1931, 1 ♀ (CAS). Antimano, 12.vi.1926, H. E. Box, 1 ♀ (BM). Caracas, 1 ♀ (MC). — Miranda. Los Chorros, 8.v.1950, C. J. Rosales, 2 ♀ (very pale specimens); Quebrada, Los Chorros, 1300 m, 19.iv.1950, F. Fernández Y. (IZM).

Locality doubtful. — Trinidad, Port of Spain, O. Bürger, 1 ♂, 2 ♀ (HZM). Maroni, G[u]yane, Clermont Vend., 1 ♀ (ZIL).

Dysdercus imitator Blöte

(figs. 17-22, pl. I figs. 3, 4)

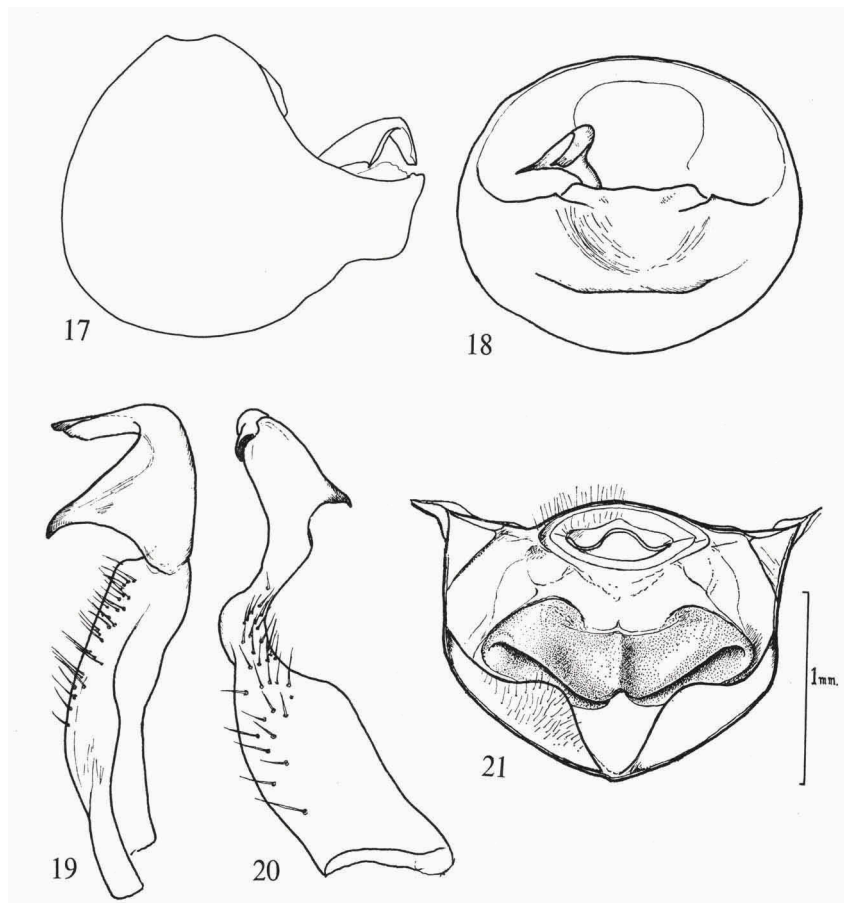
Dysdercus imitator Blöte, 1931, Zool. Meded. 14: 123, 135, 136; type locality: Pachitea, Peru; holotype ♂, ML!; var. *pseudoannulus* Blöte, ibid.: 123, 135, fig. 6a (male genital capsule); type locality: Yungas, Bolivia; holotype ♂, ML!; var. *pseudoruficollis* Blöte, ibid.: 123; type locality: Upper Peru; holotype ♂, ML!. — Wille, 1951, Ent. Agric. Peru: 31. — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 22, 39.

Small species (8.3-12.2 mm); variably coloured, usually with a corial spot; antennal segment 4 entirely black.

Head. — Ground colour red, sometimes with blackish markings on neck, vertex, antenniferous tubercle, clypeus, jugum, lorum, and gena, or even almost entirely black above; narrow margin around eye, clypeal tip, lower loral and genal suture, and median streak on ventral surface, red. Antenna dark brown to blackish, proximal part of first segment red, often only to a very limited extent. Rostrum dark brown, with apices of segments darkening to black, bases of first and second segments red.

Thorax. — Pronotal collar dirty white, often with a blackish streak behind middle, and narrowly red posteriorly; callus red; disc yellow with orange lateral margin, and black streak of varying width along yellowish posterior

margin; lateral margin varying from red to black. Scutellum orange, often with a V-shaped black spot or even almost entirely blackish, except for very apex. Corium yellow to orange-yellow, distal half black or with a black spot in distal half (f. *pseudoannulus* Blöte); in specimens from Venezuela and upper Peru this spot is absent (f. *pseudoruficollis* Blöte). Ventral surface: collar, epicoxal lobes, posterior margins of segments, and meso- and metasternal median carina, yellowish white; sternal and pleural parts, and anterodorsal part of posterior propleural margins orange; ostiolar peritremes yellowish; basal parts of legs orange to brownish, femora darkening distally; tibiae and tarsi brown to blackish.



Figs. 17-21. *Dysdercus imitator* Blöte. 17-20, male holotype; 17-18, genital capsule in lateral and posterior view resp.; 19-20, right paramere in lateral and posterior view resp. 21, female from Venezuela, genitalia in posterior view.

Abdomen. — Sternites yellowish white with anterior and lateral margins orange to reddish. — Male: sternite V usually yellowish to orange, sternite VI orange to red, often with a dark transverse band anteriorly; sternite VII anteriorly broadly red with the posterior margin whitish; segments VIII, IX yellowish to brownish, often with dark markings. Genital opening very broad, lateral margin concave (fig. 17), each ending posteriorly in a tooth-like tubercle on both sides of the deep and broad excavation in the produced posterior margin (fig. 18); capsular lamella straight, somewhat protruding into the genital cavity. Paramere (figs. 19, 20) with a slender shaft without a well defined shoulder, a curved neck, and head with two spurs; proximal spur large, somewhat triangular, flattened, and sharply toothed; distal spur straight and gouge-shaped. — Female (fig. 21): abdominal sternites with dark red to blackish anterior fasciae; these fasciae enlarged at sides of sternites VI, VII and extended posteriorly in the mid-line; first gonocoxa

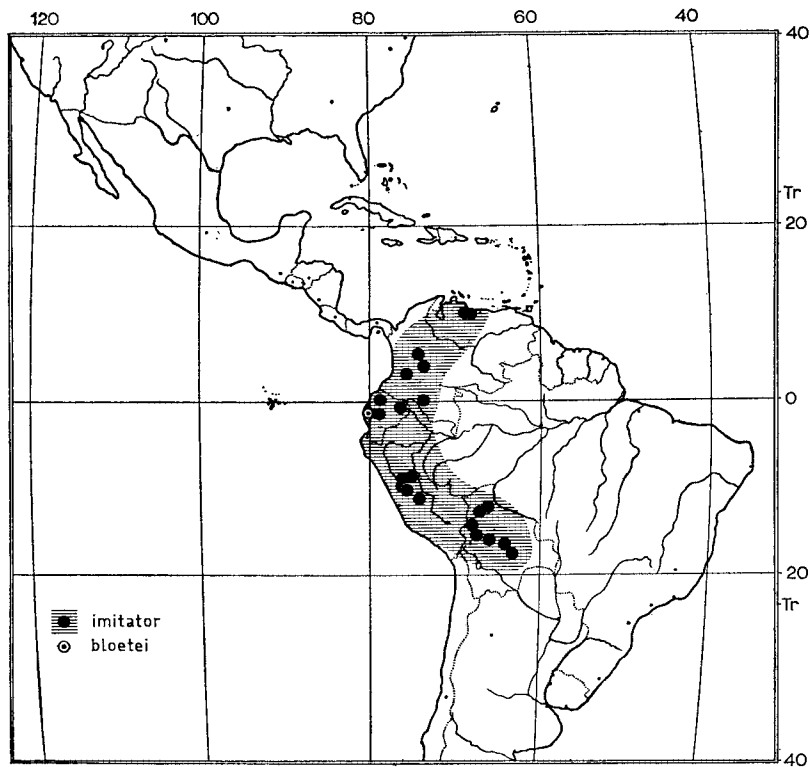


Fig. 22. Distribution of *Dysdercus imitator* Blöte and *D. bloetei* nov. sp.

red to dark brown or even blackish, produced to a certain extent at distal margin; sclerites of second pair of gonocoxae fused, forming one broad, flat plate, produced and somewhat bilobate in middle of distal margin, concave and raised laterally.

Length of male 8.3-10.7 mm; length of female 8.9-12.2 mm.

Material (distribution: fig. 22).

Colombia. — Villavicencio, O. Bürger, 1 ♂ (HZM). Cundinamarca, 1420 m, Monterredondo, 12.xii.1958, 1 ♂, 1 ♀, 15.i.1959, 8 ♂, 9 ♀, idem, 1100 m, 21.ii.1957, 1 ♂, 1 ♀, J. Foerster (MB). Rio Cagueta, vii.1926, Woronow, 3 ♂, 2 ♀ (ZIL). 3 mi W Villavicencio, Meta, 920 m, 11.iii.1955, E. I. Schlinger & E. S. Ross, 1 ♂ (CAS). "Columbien", Natagaima, E. Pehlke, 1 ♀ (MW). Villavicencio, Meta, 9-14.vii.1938, F. W. Furry & H. S. Dybas, 2 ♂, 1 ♀ (CNHM).

Venezuela. — Aragua. Maracay, Rancho Grande, 1100 m, 15.xi.1959, P. H. van Doesburg Jr, 2 ♂, 3 ♀, 1 cop. (ML). Rancho Grande, 20.ii.1949, 1 ♀ (very small, 8 mm), 3.i.1950, 1 ♂, 5 ♀, 1 cop., 21.ii.1950, "en Bidens", 1 ♀, 23.viii.1950, 2 ♂, 1.xi.1950, 1 ♂, 1 ♀, 5.v.1951, 1 ♂, F. Fernández Y. (IZM). — Carabobo. Carabobo, C. Tacarigua, 30.iv.1951, "en caña azúcar", F. Fernández Y.; Aq. Chirgua, 29.iii.1950, "follage maiz", Penalver (IZM).

Ecuador. — 1 mi W Santo Domingo de los Colorados Pichincha, 23.ii.1955, E. I. Schlinger & E. S. Ross, 1 ♀ (CAS). Napo, 1 ♀, 2 cop. (ML). Chimbo, 1000 ft, viii.1897, Rosenberg, 1 ♀ (BM).

Peru. — Pozuzo, 2 ♀; Huanuco, 1 ♀, (det. Taeuber) (Breddin Coll., DEI). Satipo, 6.v.1941 and 6.vi.1941, Paprzycki, 2 ♂ (J. R. de la Torre-Bueno Coll., KU). Pachitea, 5 ♂, 7 ♀; Marcapata, 2 ♂; Cumbase, 1 ♀; Hoch Peru, 1 ♂ (MD). Pachitea, 5 ♂, 4 ♀ (holotype ♂, allotype and paratypes of *Dysdercus imitator* Blöte), Hoch Peru, 1 ♂, 2 ♀ (paratypes); Pachitea, 2 ♂, 2 ♀, Cumbase, 1 ♂ (paratypes of *Dysdercus imitator* var. *pseudoannulus* Blöte); Hoch Peru, 1 ♂, 1 ♀ (holotype ♂ and allotype of *Dysdercus imitator* var. *pseudoruficollis* Blöte), Cumbase, 1 ♀ (paratype); Pachitea, 1 ♀ (ML). Satipo, vii-viii.1940, P. Paprzycki, 1 ♀ (ML). Monson Valley, Tingo Maria, 18.ix.-2.xii.1954, E. I. Schlinger & E. S. Ross, 15 ♂, 12 ♀; 10 mi SW Las Palmas, Huanuco, 1000 m, 17.ix.1954., E. I. Schlinger & E. S. Ross, 2 ♂, 1 ♀; Dept. Huanuco, Churubamba Heda Edito, 1150 m, Mrs. Y. Mexia, 2 ♂, 2 ♀; 13 mi E Yarac., Huanuco, 29.ix.1954, E. I. Schlinger & E. S. Ross, 1 ♂ (CAS). Pachitea, 2 ♂, 2 ♀ (ZSM). Mont Philippi, 1932, 1 ♀ (*D. ruficollis*, det. Kuhlgtatz) (ZMB).

Bolivia. — "Bolivia", J. Steinbach, 8 ♂, 9 ♀ (BM). Yungas de la Paz, 1000 m, H. Rolle, 1 ♂ (Breddin Coll., DEI), 1 ♀ (ZMB). Yungas, 4 ♂, 5 ♀; Mapiri, 2 ♂; Coroico, 1 ♂ (Muche-Radeberg Ank., MD). Majos, N. Holmgren, 1 cop.; Yungas, 1 ♀ (NRS). Santa Cruz, Montero, A. Martinez, 1 ♀ (*D. ruficollis*, det. Stehlik); Quatro ojos, ix.1917, 1 ♀; Yungas, Coroico, A. Martinez, 3 ♂; Huachi, Beni, W. M. Mann, ix., Mulford Biol. Exped. 1921/22 (det. Stehlik); Santa Cruz, Bueno Vista, ii.1950, A. Martinez, 1 ♂, 1 ♀ (det. Stehlik); Rosario Lake, Rogagua, W. M. Mann, 23.x.-9.xi.1921, Mulford Biol. Exped., 1 ♂ (det. R. I. Sailer) (MB). Santa Cruz, Steinbach, 1926, 6 ♂, 6 ♀ (ZIL). Prov. Sara, Steinbach, 2 ♂, 2 ♀ (MW). Yungas, 3 ♂, 1 ♀ (paratypes of *Dysdercus imitator* Blöte); Yungas, 1 ♂, 1 ♀ (holotype ♂ and allotype of *Dysdercus imitator* var. *pseudoannulus* Blöte); Mapiri, 1 ♀ (paratype); Chipiriri, 350 m, Chapare, Cochabamba, Steinbach, 20 ♂, 15 ♀; Cristal Mayu, Cochabamba, Steinbach, 3 ♀; Bueno Vista, 400 m, Ichilo, Santa Cruz, 17 ♂, 13 ♀; Chapare, Zischka, 1 ♂, 1 ♀ (ML). Yungas de Palmar, km 114, 700 m, W. Forster, 22.x.1953, 3 ♂, 3 ♀ (ZSM).

Dysdercus mimus (Say)

Small to medium-sized (8.5-14.0 mm); variably coloured; antennal segment 4 entirely black; scutellum usually black; spurs of paramere long; first gonocoxa strongly reduced; sclerites of second fused.

Dysdercus m. mimus (Say)

(figs. 23-27, 37; pl. 2 fig. 1)

Capsus mimus Say, 1832 (excl. vars.), Heter. N. America: 20; type locality: Mexico; type lost, neotype ♂, San Luis Potosi, Mexico, KU1.

Dysdercus mimus; Hussey, 1929, Gen. Catal. Hem. 3: 95, 109. — Blöte, 1931, Zool. Meded. 14: 128-129, 136. — Calderon, 1931, Insect Pest Surv. Bull. Washington 11 (10): 686-688. — Schmidt, 1932, Wien. Ent. Ztg. 49: 265 (pro parte: 3 ♂ from Colombia belong to *D. basialbus* Schmidt). — Pearson, 1932, Psyche 39: 119-123, 125, pl. 4 fig. 9-12 (paramere). — Blöte, 1933, Ann. Mag. Nat. Hist. (10) 11: 600 (ab *quadrisignatus* Blöte). — Anonymus, 1936, Mem. Est. Exp. Minist. Fom. Peru 8: 388, ill. — Anonymus, 1937, Mem. Est. Exp. Minist. Fom. Peru 9: 253, ill. — Hambleton & Sauer, 1938, Arq. Inst. Biol. São Paulo 9: 328. — Torre-Bueno, 1940, Bull. Brooklyn. Ent. Soc. 35: 12. — Torre-Bueno, 1941, Ent. Amer. (n. s.) 21: 118. — Vivas-Berthier, 1941, Bol. Soc. Venezol. Cienc. Nat. 7: 117-118. — Callan, 1947, Bull. Ent. Res. 37: 389-391. Hargreaves, 1948, List Cotton Insects: 30 (= *D. albidiventris* Stål). — Wille, 1951, Ent. Agric. Peru: 16. — Berry, 1951, Rev. Ent., Rio de Janeiro 22: 329. — Proctor, 1958, Emp. Cotton Grow. Rev. 35: 107. — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 22, 43, pl. 2 fig. 9-12 (paramere, after Pearson, 1932); pl. 4 fig. 2 (paramere).

Dysdercus albidiventris Stål, 1854, Öfvers. Kongl. Sv. Vetén.-Akad. Förh. 11: 236; type locality: Mexico; lectotype ♀, NRS!

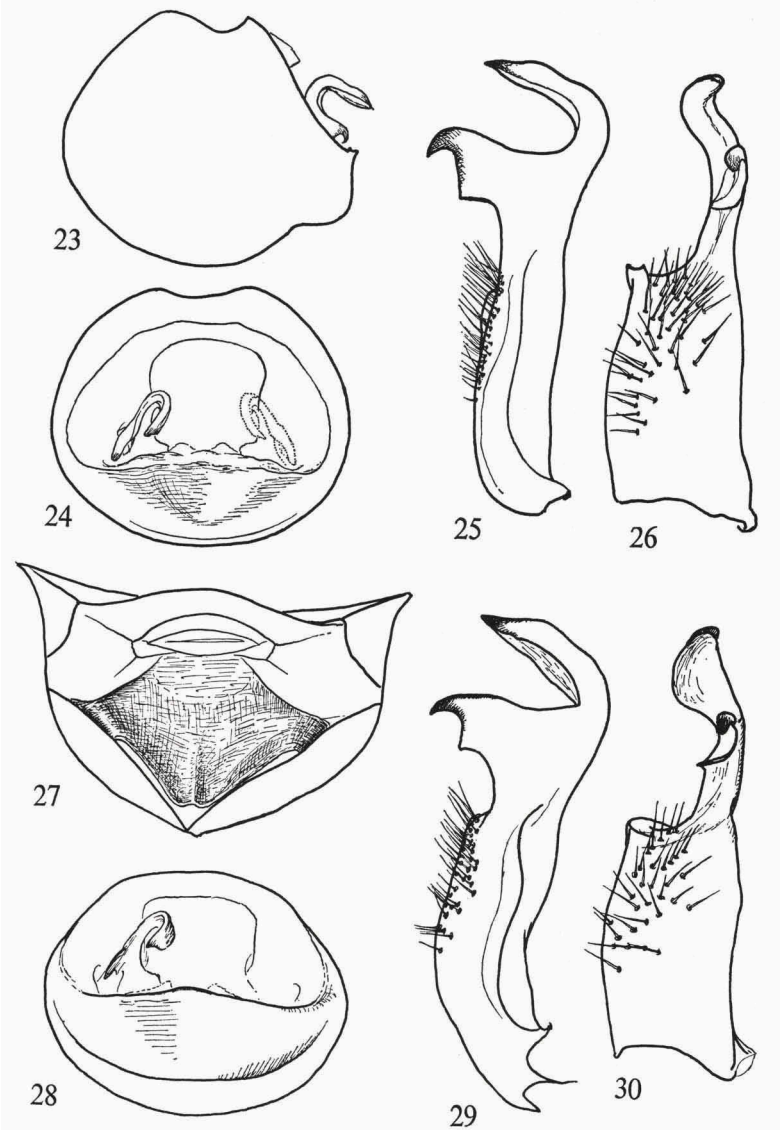
Dysdercus splendidus; Hussey, 1927, Bull. Brooklyn Ent. Soc. 22: 235. — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 44.

Dysdercus oncopeltus; Schmidt, 1932, Wien. Ent. Ztg. 49: 256.

Head. — Upper surface, side, and antennal base orange-red; rarely slightly blackened dorsally and sometimes with two small, sub-medial, dark spots near neck region; ventral surface and basal part of rostrum yellowish orange; antenna black.

Thorax. — Pronotal collar white; sulcus anterior to callus blackish; callus orange-red; lateral margin and disc yellow except for a more or less extended, crescentic, black spot near posterior margin. Scutellum black, its very apex yellow. Corium pale yellow, anterior part of costal margin yellow; a more or less triangular spot near middle and sometimes at the very apex, black; clavus in some specimens with a sub-marginal dark suffusion against scutellar margin. Membrane black, apical margin grey. Ventral surface: pronotal collar, posterior pleural margins, and epicoxal lobes white; pronotal epipleuron, pleura, and sterna yellowish brown; ostiolar peritremes not blackened. Coxae, trochanters, and femora orange-red to yellowish brown, the latter becoming darker distally; remaining parts dark brown to blackish.

Abdomen. — Sternites white or yellowish white, lateral margins yellowish (anteriorly) to red (posteriorly); anterior margins yellowish-red to blackish, enlarged in sternites V-VII. — Male: sternite VI almost entirely red, often



Figs. 23-30. *Dysdercus mimus* (Say). 23-26, male, neotype; 23-24, genital capsule in lateral and posterior view resp.; 25-26, right paramere in lateral and posterior view resp. 27, female from Mexico, genitalia in posterior view. 28-30, *D. m. distanti* Blöte, male, holotype; 28, genital capsule in posterior view; 29-30, right paramere in lateral and posterior view resp.

suffused with black; posterior margin of genital capsule (fig. 23, 24) with a deep, triangular, median excavation, limited dorsally by a narrow capsular lamella; lateral margin of genital cavity concave. Paramere (figs. 25, 26): shaft broad, with a well-developed, crested mesial shoulder, moderately pilose; head laterally inserted with two, postero-laterally directed long spurs, the proximal one with a secondary tooth proximally from its apical hook; distal spur nearly straight, tapering to a somewhat flattened point. — Female (fig. 27): first gonocoxa pale red, strongly reduced, distal margin nearly straight; second pair of gonocoxae forming one broad, sclerotized plate; its distal margin raised laterally.

Length of male 8.5-11.5 mm; length of female 9.0-13.0 mm.

In Mexico this nominate subspecies is very uniform in appearance except for specimens from the States of Sinaloa, Nayarit, and Colima; in these the light parts of the pattern are a deep yellow.

Neotype designation of *Capsus mimus* Say. — It is generally accepted at present that Say's collection was destroyed long ago. According to Uhler (1878), the only collection which at that time still contained authentic types of Hemiptera described by Say and other early American entomologists is that of Dr. Harris. Uhler carefully examined every specimen in Harris' collection. The list comprises a total of 163 species, but not a single Pyrrhocorid is included. This proves that type specimens of *Capsus mimus* Say no longer exist, an opinion shared by Dr. Hussey (in litt.).

Say's description of *Capsus mimus*, type locality "Mexico", is very brief and fits several similar species that are only distinguishable with certainty by their genitalia. Moreover, Say's 'vars' apparently belong to another species (Hussey, 1929, and author's opinion). It is clear that a neotype designation is urgently required in the interests of a stable nomenclature. The name of the species is in general use, and the identity as fixed by Blöte (1931) and Pearson (1932) has been generally accepted.

The chosen neotype specimen of *Capsus mimus* Say, 1832, is a male from a series collected by L. J. Lipovsky at Huichihuayan, San Luis Potosi, Mexico, 25-27.ix.1938. This specimen fully agrees with Say's original description; the genitalia are shown in figs. 23-26. Essential characters are listed and illustrated above. The neotype specimen is the property of the Snow Entomological Museum, University of California, Berkeley.

Lectotype designation of *Dysderus albidiventris* Stål. — The type series in the Naturhistoriska Riksmuseet, Stockholm, consists of four male and four female specimens, all belonging to *Dysdercus mimus* (Say); they are

labelled "Mexico Hagberg" and have the status of syntypes. A female specimen with Stål's identification label and also labelled "typus", is herewith designated as the lectotype of *Dysderus albidiventris* Stål, 1854.

Material (distribution: fig. 37).

Mexico. — "Mexico", 43.13, 1 ♂, 1 ♀, "*D. albidiventris*, Walker's Catal."; "Mexico", Sallé, 1 ♂, Distant Coll. (BM). "Mexico", ii.1897, C. P. Gillette, Univ. of Kan. Lot 925, 1 ♂, 1 ♀ (besides, this female bears the following labels: "*Dysdercus albidiventris*, sec. Colo. Ex. Sta.", "*Dysdercus mimus* Say, R. F. H. [Hussey] 1931, specimen described for synopsis", "Plesiotype, J. R. T.-B. 1941" (J. R. de la Torre-Bueno Coll., KU). "Mexico", Stål & Sallé, resp. MZH 7406 and 7404, 2 ♂ (MZH); "Mexico", 1 ♂ (ML) "Mexico", 1 cop.; "Mexico", Hagberg, 4 ♂, 4 ♀ (type series of *Dysderus albidiventris* Stål) (NRS); "Mex." 1785, 1 ♀ (Baker Coll., MB). "Mex." 2145, "*D. albidiventris* Stål", 2 ♂ (E. P. Van Duzee Coll., CAS). Córdoba, 3 mi E, 1.1.1940, G. E. Bohart, 1 ♂ (CAS). Córdoba, San Lorenzo, M. Trujillo, 1 ♀ (BM). — Sinaloa. Mazatlán, 40 mi N, 27.vii.1952, at light, J. D. Lattin, 1 ♂ (UCR). — Nayarit. San Blas, 15.vi.1955, B. Malkin, 1 ♂, 2 ♀ (yellowish) (UCR). — Colima. Manzanillo Hwy, 5 mi W, 100, 21.vii.1956, R. E. Beer & Party, 1 ♂, 3 ♀, 5 mi S, 1 ♂ (yellow form of *mimus mimus*) (KU). Manzanillo, 9.vi.1955, B. Malkin, 1 ♂ (yellow) (UCR). — Michoacan, xii.1924, 1 ♂ (KU). — San Luis Potosi. Huichihuayan, 25-27.ix.1938, L. J. Lipovsky, 33 ♂, 19 ♀ (neotype series of *Capsus mimus* Say); Tamanzunchale, 21 mi N, 23.vii.1954, Univ. Kans. Mex. Exped., 2 ♂ (KU). Tamuin, 14 mi NE, 17.viii.1959, R. F. Smith, 1 ♂ (UCR). Tamanzunchale, 1.iv.1941, G. E. Bohart, 5 ♀ (CAS). — Vera Cruz. San Rafael, Ticaltepec, 31.iii.1896, 1 ♂, iii.1896, 3 ♂, 2 ♀, vi.1896, 1 ♀ (ISU). San Andrés Tuxtla, 17 mi NW, 900 ft, 24.vi.1961, Univ. Kans. Mex. Exped., 1 ♀; Antón Lizardo, 1 mi W, 22.vi.1961, at light near sea level, G. W. Byers, 1 ♀; Tecolutla, 1 mi N, 12.vi.1961, Univ. Kans. Mex. Exped., 1 ♂ (KU). Acayucan, 18 mi S, 18.vii.1963, W. A. Forster, 1 ♀; Puerto Mexico, 4 mi W, 18.iv.1953, R. C. Bechtel c.s., 1 ♂; Cotaxtla Exp. Sta., 25.vi.1962, D. H. Jansen, 2 ♂, 1 ♀ (UCR). Orizaba, H. H. Smith & F. D. Godman, xii.1887, 2 ♂, 1 ♀ (MD), 2 ♂, 1 ♀ (BM), xii.1887, 1 ♂, 1 ♀ (NRS). Ojapa, 19.vi.1958, 6 ♂, 3 ♀, Acayucan, 10 mi NW, 18-22.vi.1958, 1 ♂, 2 ♀, Catemaco, 10 mi E, 4.xii.1955, 3 ♂, 2 ♀, J. C. Schaffner (Schaffner). Acayucan, 30 mi S, F. D. Parker & L. A. Stange, 21.iv.1962, 2 ♂, 1 ♀; Alazan, 15.viii.1959, L. A. Stange & A. Menke, 1 ♂, 1 ♀; Vera Cruz, 20 mi S, 16.vi.1961, J. H. Legue, 4 ♀; Santa Rosa, 3 mi S, 17.viii.1959, A. Menke & L. A. Stange, 1 ♂; Tinajas, 28.iv.1962, F. D. Parker & L. A. Stange, 2 ♂ (Menke, ML). — Guerrero. Acapulco, 20 mi E, 11.viii.1962, Univ. Kans. Mex. Exped., 1 ♀ (KU). Acapulco, 1.ii.1948, M. Marquis, 4 ♂, 7 ♀ (CAS). — Oaxaca. Juchitán, 16 mi N, 6.vii.1955, R. E. Beer c.s., 2 ♂, 1 ♀ (KU); Tuxtepec, vi.1934, J. Camelo G., No 1062, 1 ♀ (USNM). La Ventosa, 50 mi N, 14.xii.1955, 6 ♂, 4 ♀, Tapanatepec, 3 mi N, 21, 22 & 31.xii.1955, 6 ♂, 6 ♀, M. Romero, 44 mi N, 15-22.vi.1958, 6 ♂, 7 ♀, J. C. Schaffner (Schaffner). — Chiapas. "Chiapas", div. dates between 6.v. and 15.xi.1907, L. Conradt, 38 specimens (MW). Ocosingo, 4 mi NW, 8.iii.1953, R. F. Smith, 1 ♂, 1 ♀ (UCR). Mapastepec, 1.xi.1945, A. J. Sharp c.s., 1 ♂ (INAM). — Tabasco. Cardenas, 5 km E, 9.viii.1962, J. K. Drew, on *Cucurbita moschata*, 2 ♂ (UCR). Teapa, ii.[1888], H. H. Smith, 1 ♀ (NRS), 1 ♂, 1 ♀ (BM). Frontera, i.[1888], H. H. Smith, 1 ♂ (BM).

British Honduras. — Punta Gorda, viii.1934 "purchd of Parish", 1 ♀ (KU). Punta Gorda, iii.1931, J. J. White, 1 ♂, 1 ♀; Rio Grande, ix.1931, J. J. White, 1 ♀ (*D. concinnus* Stål, det. J. C. Lutz) (J. C. Lutz Coll., USNM). San Antonio, v.1931, J. J. White, 2 ♀ (MB). Punta Gorda, 1956, C. J. Drake, 1 ♀ (ML).

Guatemala. — El Naranjo, Coloniba (Quezaltenango), 850 m, vii.1925, E. le Moul,

23 ♂, 22 ♀ (one specimen without black spot on corium); Panzos, 5 ♀ (ML). Secanquin, Alta Vera Cruz, 12.iv.1905, A. Mac Lachlan, cotton fields, 1 ♀ (*D. mimus* Say, det. Stehlík) (MB). San José, 20.viii.1954, E. S. Ross, 1 ♂, 1 ♀; San José, 11.iv.1951, E. S. Ross & A. E. Michelbacher, 7 ♂, 5 ♀ (hybrid forms); Nueva Concepción, 50 ft, 17.vii.1963, D. Q. Cavagnaro & M. E. Irwin, 2 ♀ (1 hybrid) (CAS). Zapote, G. C. Champion, 2 ♂, 2 ♀ (BM).

San Salvador. — S. Calderon, Parshley Coll., 1 ♀ (CAS). Quezaltepec, 12 and 29.vii.1961, M. E. Irwin, 2 ♀ (Menke).

Honduras. — Progreso, 80 ft, "on low scrub in mule pasture, 50 yds. from small river", 21.vi.1956, K. A. Gillmore, 1 ♂ (BM). "Honduras", 1 ♀, *Dysdercus albidiventris* (Breddin Coll., DEI). Copan, 16.ii.1937, Chester Roys, 3 ♂, 1 ♀ (*Dysdercus mimus* Say, det. H. G. Barber, the males almost without markings on corium) (KU). Danlí, Chichicaste, Paraiso, 6.vii.1948, W. D. Clarke, 5 ♂, 2 ♀ (hybrid series) (CAS).

Nicaragua. — Chinandega, Coll. Baker, Univ. of Kansas, Lot. no. 947, ♂ and ♀ (with faint markings) (KU). Chontals, Distant Coll., 1 ♂ (with faint markings), 1 ♂ (with double markings: ab. *quadrisignatus* Blöte, holotype) (BM). Consequina Slope, 8.vii.1932, M. Willows Jr, Templeton-Crocker Exped. 1932, 1 ♂ (CAS).

Costa Rica. — "Costa Rica", 1 ♂, 1 ♀ (*D. oncopeltus* Dist., det. H. Schmidt) (MW). Suretka, 4.iii.1917, C. B. Williams, 1 ♂; San Carlos, 1 ♀ (Schild-Burgdorf Coll., BM). "Farm Hamburg am Reventazon", 24.iii.1929, 1 ♂, 27.vii.1930, 1 ♀, F. Nevermann (HZM). T. Limon, 1 ♀ (*Dysdercus mimus* Say, det. Tauber) (Breddin Coll., DEI). Talamanca, 1 ♀; Talamanca, Bovallius, 1 ♀ (NRS). Santa Clara prov., Colombiana Farm, iii-iv.1924, H. W. Atkinson, 2 ♂, 1 ♀ (one ♂ det. R.I.S. [Sailer]) (MB), 1 ♂ (BM). Guacimo, vi.1903, "from Barber", 1 ♂ (Parshley Coll., CAS). San Carlos, 1 ♀ (Schild-Burgdorf Coll., BM).

Panama. — Boca del Toro, 22.ii.1917, 1 ♂, 1 ♀ (♀ with small dots), Chiriquicito, 11.iii.1917, 1 ♀, C. B. Williams (BM).

Dysdercus mimus *distanti* Blöte

(figs. 28-30, 37; pl. 2 fig. 3)

Dysdercus mimus var. *distanti* Blöte, 1931, Zool. Meded. **14**: 128, 129, 135, fig. 6g (male genital capsule); type locality: Trinidad; holotype ♂, ML!. — Lima et al., 1962, Mem. Inst. Osw. Cruz **60**: 44.

Dysdercus ruficollis; Distant, 1883 (nec Linnaeus; pro parte), Biol. Centr. Amer., Ins. **1**: 233.

Dysdercus montanus Schmidt, 1932, Wien. Ent. Ztg. **49**: 273; type locality: Colombia, Rio Magdalena; lectotype ♂, MW!

Dysdercus mimus; Szumkowski & Fernández Yépez, 1963, Agron. Tropic., Maracay **13**: 85.

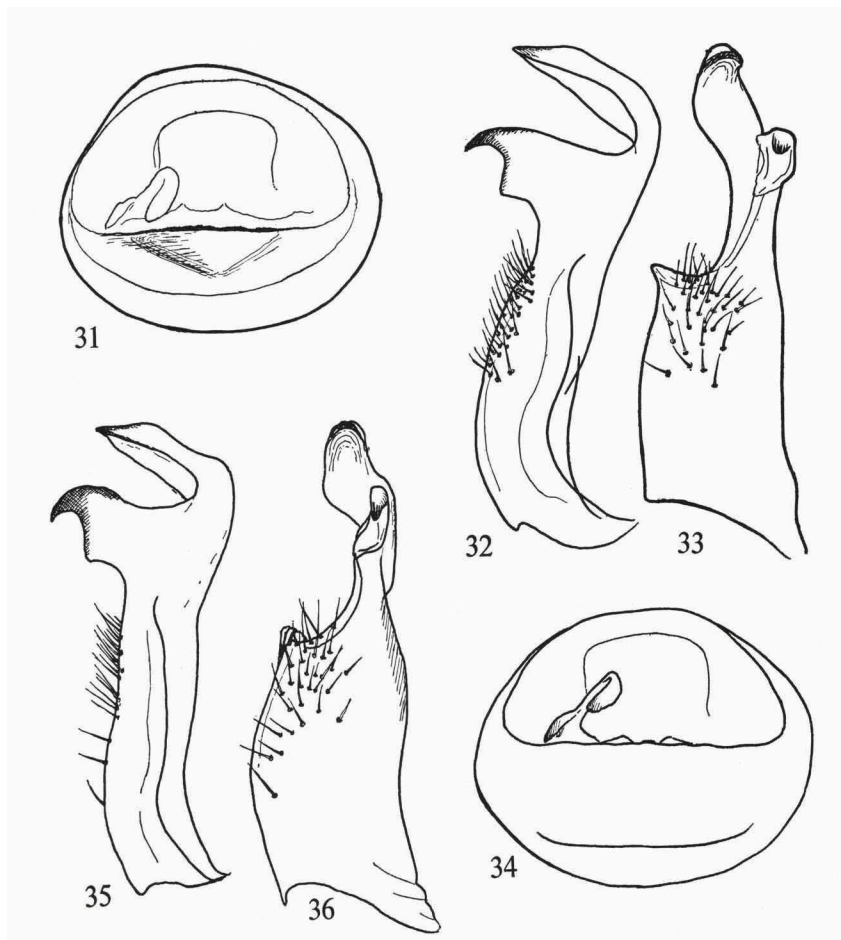
Dysdercus wrichi Harland, 1936, Trop. Agric. **13**: 256 (nomen nudum).

Specimens of *Dysdercus mimus* (Say) from Panama, Colombia, Venezuela, Trinidad and Brazil, are markedly yellow, usually with a black scutellum but without any markings on the corium. Originally this form was described by Blöte as a variety of *D. mimus*, but the author prefers to regard it as a subspecies because in a large part of the distribution area it is the only form present. From Panama to Guatemala this subspecies is sympatric with the nominate subspecies and various intermediates.

Some specimens from Venezuela and Colombia are remarkably large (13-

14 mm) and more brightly coloured (*Dysdercus montanus* Schmidt). Specimens from Trinidad are usually smaller and somewhat darker dorsally.

Lectotype designation of *Dysdercus montanus* Schmidt. — Schmidt's type series of *Dysdercus montanus* in the collection of the Instytut Zoologiczny, Warsaw, consists of eight male and eight female syntypes. A male specimen from "Columbia Pehlke", bearing a red type label is here designated as the lectotype of *Dysdercus montanus* Schmidt, 1932. The genitalia of this specimen are shown in figs. 31-33.



Figs. 31-36. *Dysdercus mimus* (Say). 31-33, *D. montanus* Schmidt, male, lectotype; 31, genital capsule in posterior view; 32-33, right paramere in lateral and posterior view resp. 34-36. *D. infuscatus* Blöte, male, holotype; 34, genital capsule in posterior view; 35-36, right paramere in lateral and posterior view resp.

Material (distribution: fig. 37).

Honduras. — BM. 1921-503, 1 ♂, 1 ♀ (BM).

Guatemala. — San José, E. S. Ross, 1 ♂ (CAS).

Nicaragua. — Managua, 1 ♀ (Baker Coll., KU). Chontales, Janson, 3 ♂, 2 ♀, "D. ruficollis BCA-Hem. I"; San Marcos, Baker, 1 ♂ (BM). Consequina slope, 8.vii.1932, M. Willows Jr, 1 ♂ (CAS).

Costa Rica. — Esparta, 18.ii.1934, T. Aitken, 1 ♂ (CAS).

Panama. — Panama City, C.Z., 3.ii.1921, J. G. Sanders, 1 ♀ (J. R. de la Torre-Bueno Coll., KU). Panama, 13.viii.1934, L. J. Rozeboom, 1 ♀ (Drake). Lino, 1 ♀ (Muche-Radeberg Ank., MD). La Chorrera, 23.v.1944, 2 ♀, Cham Field, 1.ix.1944, 1 ♀, K. E. Frick; Ascon, C.Z., viii.1937, Lucil & Cook, 2 ♂, (Van Dyke Coll., CAS). Perlas Is., Isla del Rey, 1 ♂, 1 ♀, Taboga I., 11.ix.1924, 1 ♂, Pearl I., 27.vi.1924, 1 ♂, L. E. Cheesman, St. George's Exped.; V. de Chiriqui, 2-3000 ft, G. C. Champion, 1 ♀ (BM).

Venezuela. — Zulia. Rio Escalante a 30 km de Sta Cruz, 26.ix.1951, L. A. Salas, 1 ♀ (IZM). — Tachira. Tariba, 9.v.1949, "en *Sida* sp.", F. Fernández Y., 1 ♂ (IZM). — Mérida. El Vigia, 24.ix.1951, "en gamelote", L. A. Salas, 1 ♂, 1 ♀ (IZM). — Portuguesa. Colonia Turen, 15.vi.1950, P. Fenjives, 3 ♀; Hda El Castaño Carrt. Snt. Teresa Aparradero, 2.vi.1958, W. Szumkovski, 2 ♀ (IZM). — Falcón. Cerro Mirimire, 22.viii.1951, 1 ♂ (IZM). — Lara. Duaca, 24.ii.1949, "en caña de azúcar", H. C. James, 1 ♂; Cubito, 3.i.1950, F. Fernández Y. & C. J. Rosales, 1 ♀ (IZM). — Yáracuy. Chivacoa, 12.vi.1951, J. W., 1 ♂ (IZM). Chivacoa, 7.vii.1951, "en *Sida*", W. Whitcomb, 1 ♂, 1 ♀ (MAC). — Cojedes. El Pao, 15.viii.1949, 1 ♀, El Tinaco, 29.v.1948, 2 ♀, F. Fernández Y. (IZM). Tinaco, 27-31.v.1937, Th. L. J. Vreugde, 5 ♂, 10 ♀ (EMA). — Carabobo. Montalban, 18.viii.1951, 1 ♂, 1 ♀, Aquirre, 14.xi.1947, 1 ♂, 1 ♀, Mariaria, 30.vi.1949, "en algodón", 2 ♀, F. Fernández Y.; Güigüe, 22.vii.1949, "en *Cordia* sp.", F. Fernández Y. & F. Aponte, 3 ♂, 5 ♀; Güigüe, 2.vii.1949, F. Foler, 1 ♀; Los Guayos, 3.ix.1945, "en algodón", 2 ♂, Tocuyito, 6.vii.1945, 2 ♂, F. Fernández Y. & R. Labrador; Cr. Aguerre, 23.xi.1951, F. Fernández Y. & C. J. Rosales, 1 ♂, 1 ♀, 1 cop. (IZM). Puerto Cabello, 241, 1 ♀ (MC). — Aragua. Maracay, 450 m, 30.viii.1954, C. Arismendi, 1 ♂, 3 ♀; Maracay, 22.v.1963, E. Osuna, "en luz", 1 ♀; Maracay, 11.vi.1945, J. R. Labrador, "en la luz", 1 ♀; Maracay, 2.v.1948, 1 ♀, El Castaño Cr., Maracay, 500 m, 20.vi.1957, 3 ♂, 2 ♀, El Limon, 450 m, 30.v.1965, 1 ♂, F. Fernández Y.; El Limon, 16.v.1963, "en luz", E. Osuna, 2 ♂; El Limon, 27.xi.1950, P. Fenjives, 1 ♂; El Limon, 21.vii.1945, "en algodón", 1 ♂, Saman de Güere, 6.ix.1945, "en algodón", F. Fernández Y. & R. Labrador, 1 ♂; Tasajeras, 450 m, 21.vii.1949, "en flores de *Mimosa*", F. Fernández Y. & F. Aponte, 2 ♂, 3 ♀; Tasajeras, 10.vii.1949, 1 ♂, 4 ♀, Boca de Rio, Maracay, 8.vi.1945, "en algodón", 1 ♀, 9.x.1945, "en la luz", 1 ♂, F. Fernández Y.; Boca de Rio, 10.vii.1945, "en frijol", 1 ♀, La Trinidad, Maracay, 21.vi.1945, "en maiz", 1 ♂, F. Fernández Y. & R. Labrador; Rancho Grande, 16.vi.1949, "en la luz", F. Fernández Y. & P. Fenjives, 6 ♀; Rancho Grande, 1100 m, 26.vi.1958, E. Vogelsang, 1 ♀ (IZM). El Potrero, 5.ix.1945, Diaz & R. Labrador, 5 ♂, 8 ♀ (ML). Rancho Grande, 24.vi.1945, 1 ♀; El Limon, 8½ km near Maracay, 2.viii.1945, 1 ♀ (AMNH). — Guárico. Hato las Lajas, Cr. Calabozo, 1.vii.1961, F. Fernández Y. & A. Dascoli, 6 ♂, 7 ♀; Paya, 12.v.1955, J. Laggiodice, 1 ♂ (IZM). — Distrito Federal. Caracas, 11.ii.1934, C. G. Salazar, 1 ♂, 1 ♀; El Valle, 4.ii.1950, F. Fernández Y., 3 ♂, 1 ♀, 1 cop. (IZM). — Sucre. Cumanacoa, 25.vii.1953, C. J. Rosales & J. R. Requena, 1 ♂ (IZM). — Monagas. Caripe, 19.vii.1953, C. J. Rosales, 2 ♂, 3 ♀ (IZM). Caripito, vii.1937, P. J. Andure, 2 ♂, 1 ♀ (CAS). — Tasajeras, Ma(?), 1.vii.1949, C. Garcia B., "en maiz", 1 ♂ (IZM).

Trinidad. — Siparia, 26.vii.1929, D. C. Geijskes, 3 ♂, 1 ♀ (holotype ♂, allotype, and paratypes of *Dysdercus mimus* var. *distanti* Blöte); Manzanilla Bay, on *Sida* sp., 6.viii.1963, 10 ♂, 7 ♀, P. H. v. Doesburg Jr (ML). St. Augustine, 5.v.1924, C. L.

Withycombe, 8 ♂, 12 ♀, 2 cop.; "Trinidad", 8.iv.1932, A. M. Gwynn, 1 ♂, 1 ♀; "Trinidad", Miss Cheesman, 1 ♂, 3 ♀; Morau Pool Road, i-ii.1931, A. K. Totton, 1 ♂, 1 ♀ (BM). St. Augustine, ix.1956, R. H. Cobben, 1 ♂, 1 ♀ (LEW). Trinidad, W.I., 14.v.1902, 2 ♀, 8-14.ix.1902, 2 ♂, 1 ♀, 10.x.1902, 1 ♂, 1 ♀, Chipman (E. P. Van Duzee Coll., CAS). St. Augustine, 11.v.1919, N. A. Weber, 1 ♂, 1 ♀ (MCZ).

Cayenne. — Maroni, Guyane, 1 ♀ (ZIL).

Brazil. — Amapá. S. do Navio, iv-vi.1960, Bicelli (J. Lane Coll.), 2 ♀ (ZSP). Porto Santana ICOMI, ii-vi.1961., J. C. M. Carvalho, 2 ♂, 2 ♀ (MNR). — Pará. Marabá, 5.v.1959, Alvarengo, 1 ♂, 1 ♀; Benevideo, 30.xii.1960, 1 ♂, Belém, IAN, 10.xii.1960, J. Bechyně, 1 ♂, 1 ♀ (MNR). Pará, 15 and 26.ii.1893, 2 ♂, 2 ♀ (MW). — Amazon. Manáos, xii.1914-v.1915, 1 ♀, Rio Autaz, viii-xi.1914, A. Roman, 1 ♂ (NRS).

Colombia. — Rio Magdalena, Hac. Pehlke, iv-vi.1908, E. Pehlke, 8 ♂, 8 ♀ (type series of *Dysdercus montanus* Schmidt) (MW). Soledad, 1 ♀ (J. R. de la Torre-Bueno Coll., KU). "Colombia", 2 ♂ (NRS). Fundacion, 11.vi.1925, 1 ♂; Rio Frio, 19.v.1925, 1 ♀ (Drake). Presidio, Rio Magdalena, 8.v.1926, Woronow, 1 ♂, 1 ♀, 26.iv-5.v.1926, 2 ♀ (ZIL). "Columbia S.A.", vii.1914, Bruce Martia, 2 ♂, 4 ♀ (CAS). Magdalena Valley, El Branco, C. Allen, 2 ♂ (BM).

Peru. — "Peru", 15.iii.1937, E. G. Smyth, 1 ♀ (J. R. de la Torre-Bueno Coll., KU). Pachitea, Muche-Radeberg Ank., 1 ♀; Piura, viii.1944, Bosq, 1 ♂, 1 ♀ (MB). Lino, 2 ♀ (ML).

Ecuador. — Puna I., 9.xi.1950, A. E. Michelbacher, 1 ♀ (CAS).

Bolivia. — Coroico, 4 ♂, 2 ♀ (one specimen identified by Blöte); Yungas, 2 ♀ (Muche-Radeberg Ank., MD). Santa Cruz, Steinbach, 1926, 1 ♂ (ZIL). Coroico, 2 ♀, Yungas, 2 ♀ (ZSM). Prov. Sara, Steinbach, *Dysdercus montanus* Schmidt (MW). "Bolivia", J. Steinbach, 1 ♂ (BM, 1904-311).

Dysdercus mimus infuscatus Blöte

(figs. 34-37; pl. 2 fig. 4)

Dysdercus infuscatus Blöte, 1931, Zool. Meded. 14: 126, 136; type, locality: Suriname; holotype ♂, ML! — Doesburg Jr, 1960, Meded. Landb. proefst. Suriname 22: 88. — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 22, 40.

Dysdercus mimus; Vreden, 1964, Meded. Landb. proefst. Suriname 34: 70. — Doesburg Jr, 1966, Stud. Fauna Suriname Guyanas 9: 52-55, figs. 48-51.

A dark form occurring in the Guyanas.

Head. — Colour red, sometimes with vague blackish markings above; ventral surface orange; antenna dark brown to black with a reddish base; rostrum orange-red, segment 3 less blackened, segment 4 strongly so.

Thorax. — Collar white, posterior part including adjacent pre-callar sulcus blackish; this black area often extends on both sides into lateral sulci and anterior angles of pronotum; callus and posterior sulcus red; lateral margin near callus reddish, remainder of lateral margin and disc ochraceous yellow. Disc along posterior border with broad, black band usually vaguely defined anteriorly, but sometimes enlarged to cover almost whole disc, other times hardly visible; outermost posterior edge of pronotum yellowish. Scutellum usually black with a dirty yellow apex; sometimes anterior part and sides

also reddish, leaving only central part black. Corium ranging from dirty yellow to blackish with a more or less broad, dirty yellow band along claval suture; a more or less distinct black spot behind middle part of each corium, usually with darker streak along corial cleft. Membrane blackish brown with paler border. Ventral surface of thorax orange-red, alternating with white. Ostiolar peritremes yellowish brown to blackish. Coxae, trochanters, and proximal part of femora orange-red; the latter blackened distally; tibiae brown, tarsi blackish towards tips.

Abdomen. — Colour yellowish white with reddish borders and dark fasciae along anterior border of segments. Genital characters (figs. 34-36) as in nominate form.

Length of male 9.9-11.0 mm; length of female 10.4-12.3 mm.

Material (distribution: fig. 37).

British Guiana. — Demerara, 63-85, 1 ♀ (BM).

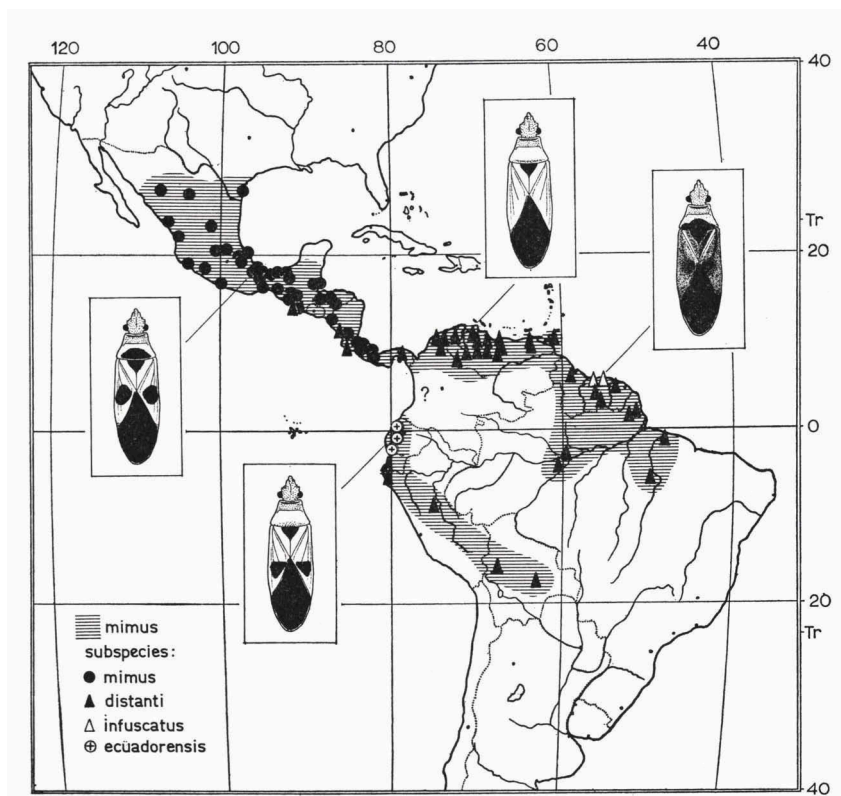


Fig. 37. Distribution of *Dysdercus mimus* (Say).

Suriname — "Surin. Endr." [Endrulat], 1 ♂ (MW). Paramaribo, 1900, H. v. Cappel, 1 ♂, 1 ♀ (holo- and allotype respectively of *D. infuscatus* Blöte, Cat. Nos. 1 and 2); Paramaribo, 1911, W. C. van Heurn, 3 ♂, 1 ♀ (paratypes); Paramaribo, Botanical Garden, on seeds (on the ground) of *Sterculia carthaginensis* Cav., 18.iv.1959, on *Hibiscus cannabinus* (kenaf), 24.vi.1959, common; Estate De Morgenstond, 7.v.1959, 1 ♂, 1 ♀, on *Sida rhombifolia* L., sucking seed pods, 25.ii.1959, many specimens with nymphs, on *Hibiscus abelmoschus*, 2.ii.1959 and 28.ii.1960, several specimens underneath a "kankan tree" (*Ceiba pentandra*), 6.vi.1960, several specimens; Commewijne River, Pl. Katwijk, on *Sida* sp., 22.vi.1959; Suriname River, Estate Domburg, on flowers of *Asclepias curassavica* L., 30.i.1959, 1 ♀ with pollinia at the front claws; Upper Suriname River, Djoemoe, 27-31.x.1962, 1 ♂ on light; Coronie, back dam, on various Malvaceae (*Sida* spp.), 24.iii.1960, many specimens with nymphs; Morico Kreek (E-W highway), on *Sida* sp., 24.v.1963, 2 ♂, 1 ♀; Albina, Marowijne River, on native cotton, 26.vi.1963, 1 ♂, P. H. v. Doesburg Jr; Paloemeu, v-vii.1961, Mohmin, 5 ♂, 3 ♀ (ML).

***Dysdercus mimus ecuadorensis* nov. subsp.**

(fig 37; pl. 2 fig. 2)

Head and callus dark red; pronotal collar dirty white; disc and lateral margin yellow, sometimes partly or wholly suffused with black. Scutellum varying from orange to black. Corium dirty yellowish white, lateral margin yellow towards humerus, with a more or less triangular black spot near middle; in a few specimens posterior half entirely blackish. Pleura, especially metapleuron, dark mahogany. Abdomen yellowish white with black lateral margin. Anterior margins of sternites blackish; sternite V with a dark, triangular anterior spot on middle; sternites VI, VII with broad, blackish anterior fascia. Antenna and legs dark red to piceous. Sometimes, especially in the females, the markings on the corium are almost invisible or absent.

Material (distribution: fig. 37).

Ecuador. — Prov. Esmeraldas, Parroquia, San Mateo, 50 m, 1.xi.1956, J. Foerster, holotype ♂, allotype, and 22 male and 18 female paratypes, one nymph (MB).

The following specimens are regarded as to belong to this subspecies but are not included in the type series. Guayaquil, v-vi.1913, C. T. Brues, 4 ♂, 1 ♀ (one male labelled: *D. mimus* Say, Var., det. Hussey) (J. R. de la Torre-Bueno Coll., KU), 1 ♀ (*D. rufic.* det. Bueno) (Parshley Coll., CAS). These are pale specimens, almost without black pigmentation; corial spot faint but triangular shape of the spot distinct; head, proximal part of rostrum, pronotal callus and legs bright red; meso- and metasternum and the pleura orange; abdominal markings red to blackish-red. Chimbo, 1000 ft, viii.1897, Rosenberg, 1 ♂, 2 ♀ (BM).

***Dysdercus bloetei* nov. sp.**

(figs. 22, 38-42; pl. 3 fig. 1)

Small species (9.7-11 mm), closely related to *Dysdercus imitator* Blöte;

colour generally paler, anterior margin of black spot on corium more produced anteriorly.

Head. — Ground colour pale brown; clypeal suture and rim of antenniferous tubercle dark brown; antenna dark brown to black with a paler base; labrum yellowish brown with a darker base; rostrum brown, segments 1, 2, 4 distally, and segment 3 proximally darkened.

Thorax. — Pronotum: anterior part of pronotal collar greyish, posterior part dark brown; callus, lateral margin, anterior margin, and outermost posterior margin of disc yellowish brown; central part of disc brownish back. Scutellum dark brown. Corium pale dirty yellow, with a brownish black transverse spot just behind middle and dark brown posterior angle. Membrane dark brown, very narrowly bordered with grey distally. Ventral surface: anterior part of collar, posterior pleural margins, and epicoxal lobes whitish; pronotal epipleuron, pleura and sterna, including ostiolar peritremes, light brown; posterior part of collar, anterior margin of mesopleuron, ventral part of metapleuron, and proximal parts of epicoxal lobes dark brown. Coxae light brown; trochanters and extreme bases of femora brown; remaining parts of legs dark brown to piceous.

Abdomen. — Sternites II-V pale brown with lighter posterior margins; remaining segments brown, except for almost white posterior margin of segment VII. — Male: posterior margin of genital capsule (figs. 38, 39) with a tooth at each side of a deep median excavation, the latter limited dorsally by a low, almost straight capsular lamella. This lamella continuing laterally to a point anterior the latero-posterior teeth. Paramere (figs. 40, 41) with a short shaft, apically very sparsely setose, mesial shoulder with a sharp crest; neck obliquely inserted; head large, flat, triangular, curved with a mesial concavity; proximal spur small, tooth-like, recurved; distal spur slender and sharp. — Female (fig. 42): first gonocoxa brown with darker margins, somewhat produced distally. Second pair of gonocoxae forming one broad subhyaline plate; distal margin prominent and slightly bilobate medially, somewhat raised laterally.

Measurements (in mm):

	Holotype ♀	paratype ♂	allotype ♀	paratype ♀
length of specimen	11.1	9.7	10.6	10.5
width of specimen	3.45	3.37	3.68	—
width of head across eyes	1.70	1.63	1.84	1.85
length of pronotum	1.89	1.86	1.93	1.93
width of pronotum	2.76	2.56	2.76	2.76

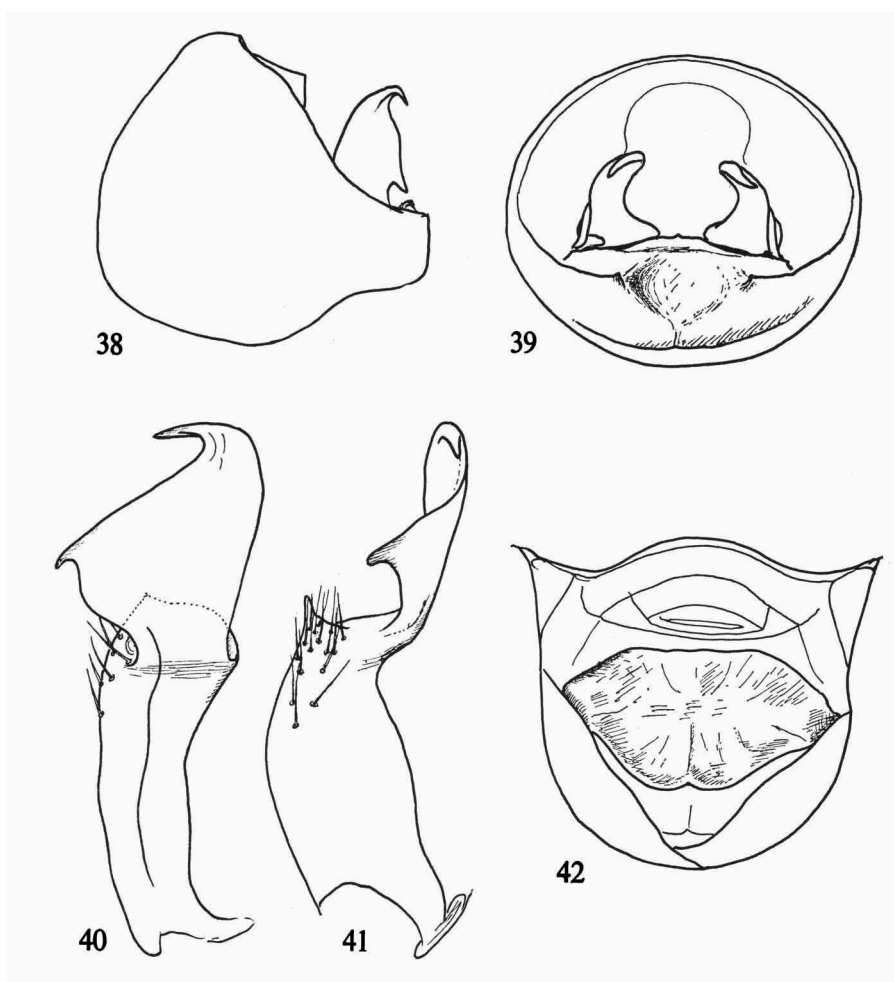
Antennal segments of holotype: (1) 2.39; (2) 1.89; (3) 1.06; (4) 2.71.

Material (distribution: only known from the type locality, Cachabé, fig. 22).

Ecuador. — Cachabé, "low c." [country?], xii.96 [1896], Rosenberg, BM 99-104, 2 ♂ (holo- and paratype), 1 ♀ (allotype) (BM), 1 ♂ (paratype) (ML).

All four specimens are in a rather poor condition.

This new species is named for Dr. H. C. Blöte in recognition of his valuable work on Hemiptera.



Figs. 38-42. *Dysdercus bloetei* nov. sp. 38-41, male, holotype; 38-39, genital capsule in lateral and posterior view resp.; 40-41, right paramere in lateral and posterior view resp. 42, female, allotype, genitalia in posterior view.

The *Dysdercus jamaicensis* group*Dysdercus jamaicensis* Walker

(figs. 43-48; pl. 3 fig. 2)

Dysdercus jamaicensis Walker, 1872, Catal. Het. 5: 182; type locality: Jamaica; lectotype ♀, BM!. — Hussey, 1929, Gen. Catal. Hem. 3: 92, 102 (pro parte). — Blöte, 1931, Zool. Meded. 14: 128, 133. — Wolcott, 1933, Econ. Ent. West Indies: 289. — Squire, 1939, Bull. Ent. Res. 30: 289, fig. 1. — Callan, 1947, Bull. Ent. Res. 37: 389, 390. — Hargreaves, 1948, List Cotton Insects: 30. — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 51-52 (pro parte).

A medium-sized (10.5-15 mm) red species with red scutellum and black markings on corium; rostrum reaching abdominal segment IV.

Head. — Ground colour red; antenna, except for its red base, and the rostral segments 3, 4, black; rostral segment 2 and pre-apical part of segment 1 blackened.

Thorax. — Colour red; posterior part of pronotum, except for extreme posterior border with a black, variably extended, crescentic spot, sometimes without any black; lateral margin in some specimens narrowly blackish. Scutellum and hemelytron red, with a roundish spot near inner angle of clavus, a more or less transversely ovate spot behind middle, and the distal angle black. Membrane black with a white border. Dorsal part of metapleuron, occasionally also of mesopleuron blackish; in a few specimens metapleuron almost entirely black; ostiolar peritremes yellowish red. Legs red, femora darkened to blackish on dorsal surface, especially distally; tibiae and tarsi dark brown to black.

Abdomen. — Segments red; sternites IV-VI with a blackish dot laterally. — Male: posterior margin of segment IX (figs. 43, 44) gradually rounded, with a broad, semi-circular median excavation against posterior edge of genital cavity. This edge with a low crest medially. Paramere (figs. 45, 46): shaft with a mesial shoulder and a slightly obliquely placed head bearing two spurs. Proximal spur small, slender, recurved; distal spur large, slightly recurved, obliquely truncate at apex. — Female (fig. 47): first gonocoxa gradually rounded at distal margin; sclerites of second gonocoxae pale brown, conically curved, dorso-laterally inserted, and medio-dorsally united with each other by a moderately sclerotized, triangular area.

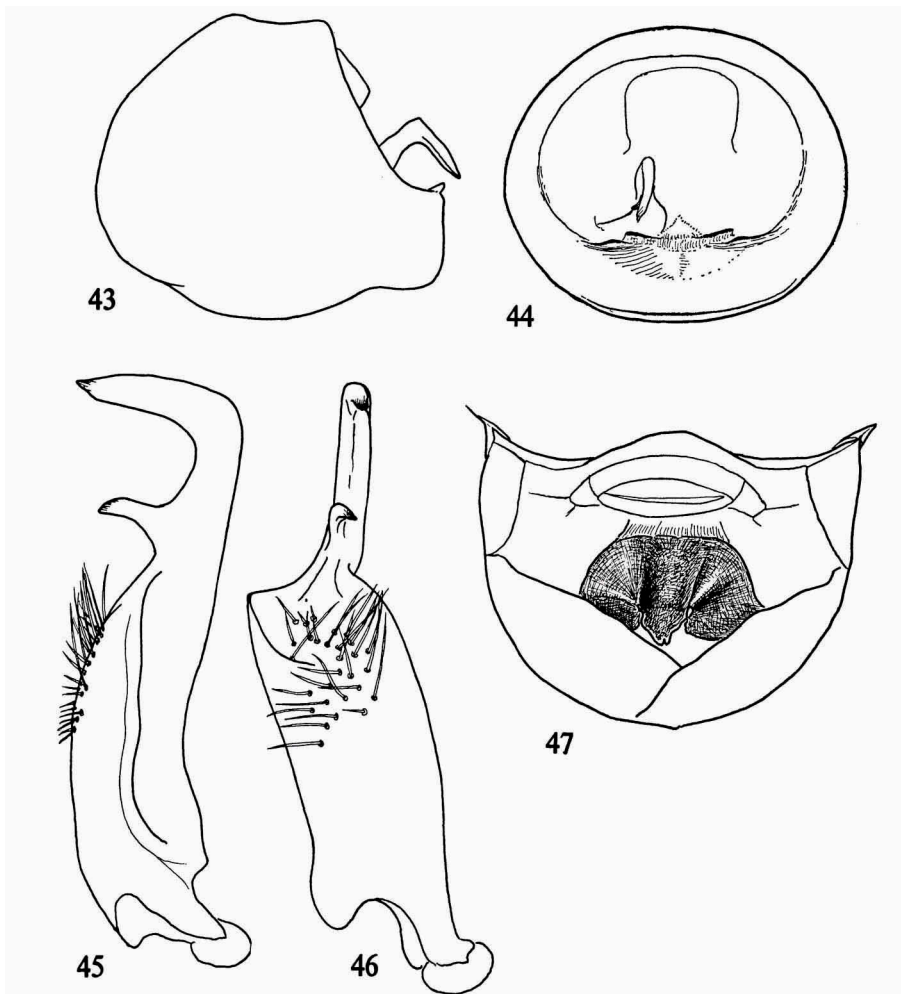
Length of male 10.5-13 mm; length of female 11-15 mm.

Lectotype designation of *Dysdercus jamaicensis* Walker. — Walker's description (1872) mentions three specimens: "a. Jamaica. Presented by W. W. Saunders, Esq.; c, d. Jamaica. From Mr. Gosse's collection". In the British Museum collection the present author found the specimens belonging

to the type series (syntypes). A female labelled "Jam. Gosse, Saunders, 65-13", bearing a red type label obviously added at some later date, is here designated as the lectotype of *Dysdercus jamaicensis* Walker, 1872.

Material (distribution: fig. 48).

Jamaica. — "Jamaica", Gosse, Type, 1 ♀ (lectotype); "Jamaica", 47/62, 1 ♀, "Jam.", Gosse, 1 ♂, "Jamaica", 45/110, 1 ♂, "*Dysdercus jamaicensis* Walker's Catal." (syntypes); "Jamaica", Mrs. Swainson, 97-200, 1 ♂; "Jamaica", Distant Coll., 1 ♀; "Jamaica", F. W. Jackson, 1913-208, 1 ♀; Hill Gardens, 14.iv.1921, C. C. Gowdey, 1 ♂, 1 ♀ (det.



Figs. 43-47. *Dysdercus jamaicensis* Walker. 43-46, male from Jamaica; 43-44, genital capsule in lateral and posterior view resp.; 45-46, right paramere in lateral and posterior view resp. 47, female from Jamaica, genitalia in posterior view.

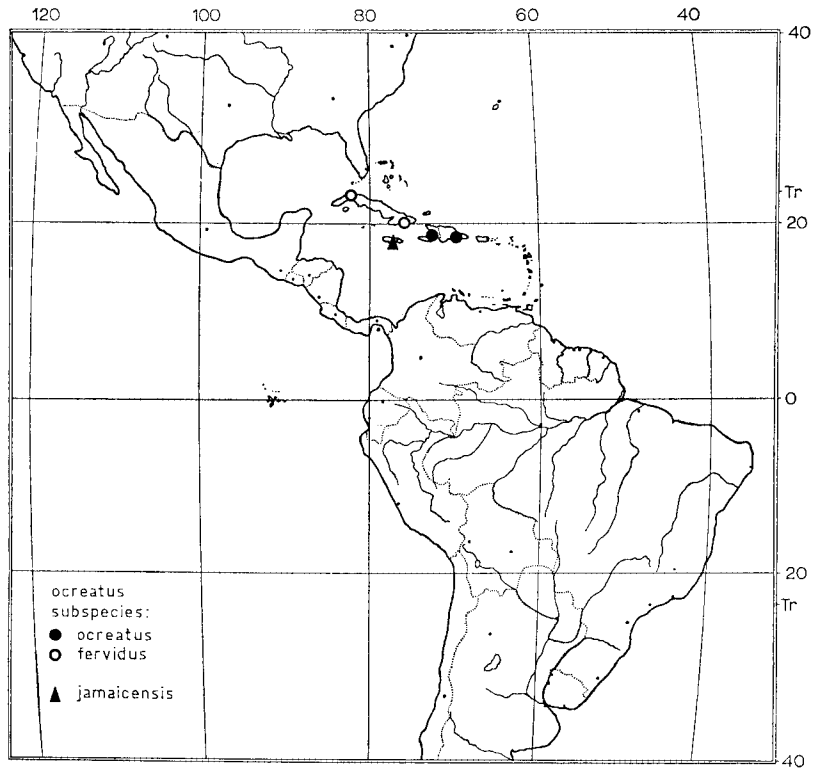


Fig. 48. Distribution of *Dysdercus jamaicensis* Walker and *D. ocreatus* (Say).

Uvarov); Mandeville, L. J. Bertram, 1923-536, 1 ♀; Kingston, 1932, 1 ♂; N. Coast, sea level, 15.iii.1961 and 8.vi.1961, G. Newman, 2 ♂ (BM). Baron Hill Trelawny, 16-30.iii.1931, E. L. Bell, 1 ♂ (det. J. L. Stehlik) (MB). Troy, 14.iii.1909, A. E. Wight, 13 ♂, 8 ♀; Mouth Bog River, 22.ii.1906, 2 ♂, 11-15.iv.1906, 4 ♂, 1 ♀, A. E. Wight; Port Antonio, A. E. Wight, 1 ♂; Mandeville, Th. Barbour, 1 ♀ (MCZ). Manchester, Mandeville, v.1958, F. Seal Coon, 1 ♀; St. Andrew, Clydesdale, 27.viii.1942, T. C. Jury, 2 ♀; St. Andrew, Marcos Gap, 8.viii.1959, T. H. Farr, 1 ♀; St. James, 1 mi S Sweetwater, 2100 ft, 23.v.1953, G. R. Proctor, 1 ♀; St. James, Montego Bay, v.1952, H. V. Southly, 1 ♂; St. Thomas, Corn Puss Gap, 9.viii.1953, R. P. Bengry, 1 ♂, 1 ♀; St. Thomas, Corn Puss Gap, "ex *Urena lobata*", 29.v.1949, C. B. Lewis & G. B. Fairchild, 3 ♂; Trelawny, 12 mi S Falmouth Windsor Estate, 12.v.1956, T. H. Farr, 1 ♀; Portland Hardwar Gap, 27.vi.1954, T. H. Farr, 1 ♀; Portland, Port Antonio, 26.xi.1951, G. R. Proctor & R. L. Hoffman, 1 ♂; Port Antonio, 22.iv.1956, T. H. Farr, 1 ♂; St. Elizabeth, 5 mi N Quickstep, 3-4.iii.1950, G. R. Proctor, 1 ♂ (SMJ). Claremont Baron Hill Trelawny, 4.iii.1928, L. G. Perkins, 14 ♂, 22 ♀ (det. H. G. Barber), 24.xii.1928, 3 ♀; Bath, St. Thomas, 1.iv.1937, Chester Roys, 4 ♂, 4 ♀ (KU). Swarton, 11 ♂, 2 ♀ (Parshley Coll. No. 104, CAS). Kingston, iv.1906, E. P. Van Duzee, 2 ♂, 4 ♀ (E. P. Van Duzee Coll., CAS).

?Cuba. — Havana, 10.vii.1920, 1 ♀; 19.vii.1924, 1 ♂, J. C. Lutz (USNM).

Dysdercus ocreatus (Say)

Small to medium-sized (9.5-12.5 mm); ground colour red; posterior and lateral margins of pronotum, and a transverse fascia on hemelytra usually black; abdomen concolorous red. The genitalia suggest a close relationship to *D. jamaicensis* Walker.

Dysdercus o. ocreatus (Say)

(figs. 48-52; pl. 3 fig. 3)

Capsus ocreatus Say, 1832, Heter. N. America: 19; type locality: "Georgia"; type lost; neotype ♀; type locality: Dominican Republic, MCZ! — Stål, 1870, Enum. Hem. 1: 124.

Dysdercus ocreatus; Uhler, 1886, Check list Hem.: 17 (*acreatus*). — Van Duzee, 1917, Catal. Hem.: 209. — Hussey, 1929, Gen. Catal. Hem. 3: 97. — Blöte, 1931, Zool. Meded. 14: 133. — Torre-Bueno, 1940, Bull. Brooklyn Ent. Soc. 35: 12. — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 23, 45.

Dysdercus fervens Walker, 1872, Catal. Heter. 5: 182; type locality: Santo Domingo; lectotype ♂, BM!. — Hussey, 1929, Gen. Catal. Hem. 3: 90. — Blöte, 1931, Zool. Meded. 14: 133. — Squire, 1939, Bull. Ent. Res. 30: 289, fig. 1. — Callan, 1947, Bull. Ent. Res. 37: 389, 390. — Hargreaves, 1948, List Cotton Insects: 30. — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 22, 36.

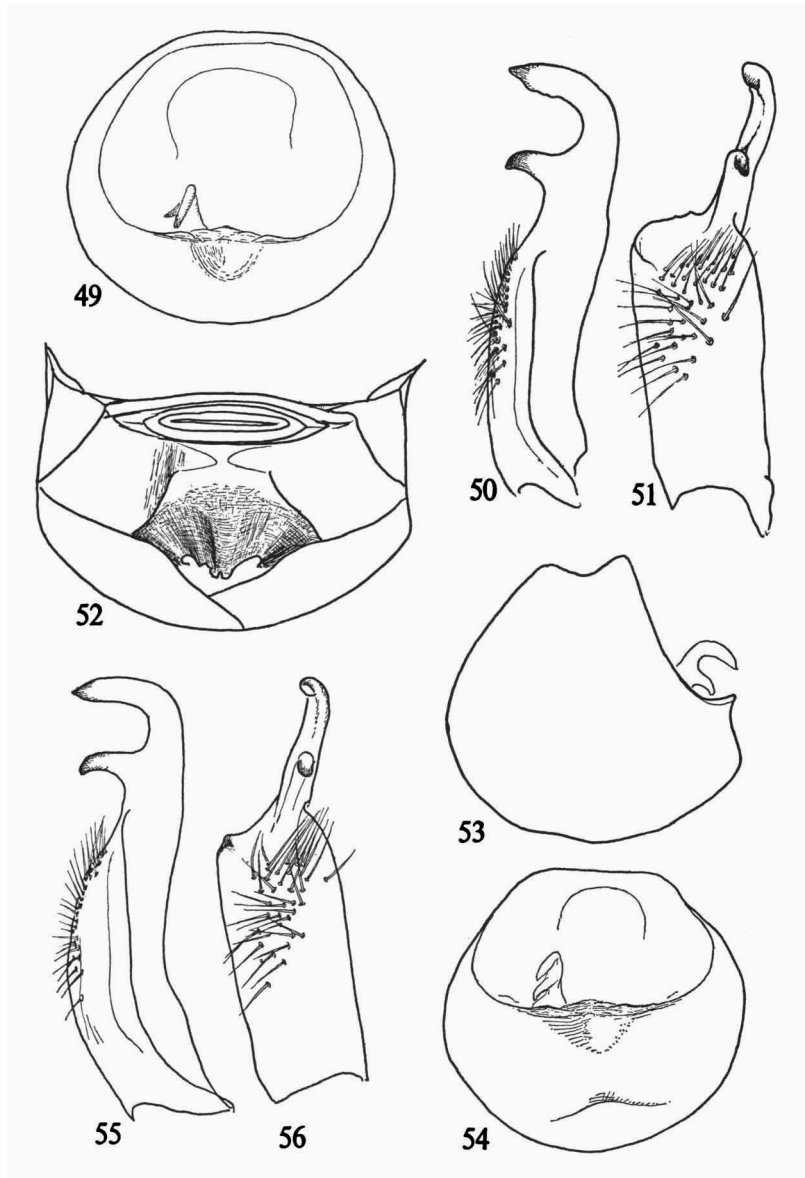
Head. — Colour a little more orange-red than in *D. jamaicensis*; antenna blackish except for extreme base; rostrum blackened from apex of segment 2 to tip.

Thorax. — Lateral pronotal edge and internal claval corner sometimes blackish; in distal half of corium a black, transverse fascia not touching inner or outer edge of corium; this fascia often less distinct or absent, sometimes broken into two small dots. Membrane, including extreme distal angle of corium black. Ostiolar peritremes pale red to red. Legs red, blackened from tibiae towards apices.

Abdomen. — Male genital characters similar to those of *D. jamaicensis* Walker; posterior margin of genital capsule (fig. 49) less produced; median excavation in posterior margin and transverse furrow ventrally of it, flatter; capsular lamella nearly straight. Paramere (figs. 50, 51) smaller, distal spur shorter and less slender. — Female genital characters (fig. 52) almost identical to those of *D. jamaicensis*.

Length of male 9.5-12 mm; length of female 11.0-12.5 mm.

Neotype designation of *Capsus ocreatus* Say. — As for the other *Capsus* species of Say, the type specimen of *C. ocreatus* must be regarded as having been lost long ago (see p. 32); the identity of this species long remained a puzzle. It was placed by Uhler (1886: 17) in *Dysdercus*, and Blatchley



Figs. 49-56. *Dysdercus ocreatus* (Say). 49-51, male, lectotype of *D. fervens* Walker; 49, genital capsule in posterior view; 50-51, right paramere in lateral and posterior view resp. 52, female from Hispaniola, genitalia in posterior view. 53-56, *D. o. fervidus* Bergroth, male, lectotype of *D. fervidus* Bergroth; 53-54, genital capsule in lateral and posterior view resp.; 55-56, right paramere in lateral and posterior view resp.

(1926: 442), without further discussion, proposed synonymy with *Dysdercus andreae* (L.). But because in his description Say stated: "beneath immaculate", Torre-Bueno (1940: 12) correctly argued that this claim cannot be correct; however, he gave no other suggestion. Moreover, Say did not mention the white collar and white cross on the fore-wings, which are so characteristic for *D. andreae*. It is almost certain that Say's description refers to the species from Hispaniola described by Walker as *Dysdercus fervens*. To establish this new synonymy, a neotype designation for *Capsus ocreatus* is necessary. Neotype is a female specimen from Dominica and property of the Museum of Comparative Zoology, Cambridge Mass., labelled: "Constanza 21 Aug. '38 Dom. Rep. 3-4000 ft. Darlington"; its length is 11.0 mm. The original type locality "Georgia" may be an error, but it is also possible that the specimen presented to Say by Mr. Oemler had been accidentally imported from Hispaniola together with cotton(seed).

Lectotype designation of *Dysdercus fervens* Walker. — In the British Museum (Natural History) two specimens of this species, a male and a female labelled "St. Dom. 55.1", are obviously the type specimens (syntypes) mentioned by Walker as a and b respectively. The male, which is also provided with a type label, is here designated as the lectotype of *Dysdercus fervens* Walker, 1872. The genitalia of this specimen are shown in the figures 49-51.

Material (distribution: fig. 48).

Hispaniola. — Haïti. Haïti, 4 ♂, 1 ♀ (ZIL). Port au Prince, 1 ♂ (Distant Coll., BM). Petionville, 10.vi.1930, O. Fulda, 1 ♀ (J. R. de la Torre-Bueno Coll., KU). NE foothills, La Hotte, 2000-4000 ft, 10-24.x.1934, P. J. Darlington, 1 ♀ (MCZ). — Dominica. San Francisco Mounts, iv.1905, A. Busck, 1 cop. (USNM). Porto Plata, Hurst, 4 ♂, 6 ♀; Constanza, 3000-4000 ft, 21.viii.1938, P. J. Darlington, 1 ♂, 1 ♀ (neotype of *Capsus ocreatus* Say) (MCZ). St. Domingo, 55.1, 1 ♂, 1 ♀, *D. fervens*, Walker's Catal. (syntypes, BM).

Lesser Antilles. — St. Kitts, on herbs, 6.xii.1938, Boston, 1 ♂ (USNM).

Dysdercus ocreatus fervidus Bergroth

(figs. 48, 53-56; pl. 3 fig. 4)

Dysdercus fervidus Bergroth, 1914, Psyche 21: 73; type locality: Havana, Cuba; lectotype ♂, POM!. — Hussey, 1929, Gen. Catal. Hem. 3: 90. — Blöte, 1931, Zool. Meded. 14: 133. — Schmidt, 1932, Wien. Ent. Ztg. 49: 271. — Squire, 1939, Bull. Ent. Res. 30: 289, fig. 1. — Callan, 1947, Bull. Ent. Res. 37: 389, 390. — Hargreaves, 1948, List Cotton Insects: 30. — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 22, 37.

Somewhat smaller than the nominate subspecies; antenna black; lateral pronotal margin and a transverse fascia near posterior margin black; corial

fascia well developed, often reaching costal margin which is blackened in this region too. Legs dark piceous, blackish towards apices. Genital characters (fig. 53-56) very similar to those of nominate subspecies.

Length of male 9.5-10.7 mm; length of female 10.7-11.3 mm.

Lectotype designation of *Dysdercus fervidus* Bergroth. — Through the kindness of Dr. S. Frommer, University of California, Riverside, and Dr. Hilton, Pomona College, California, the author was able to study the *Dysdercus* specimens of the Pomona College collection, among which was found a series of a Cuban species labelled "Havana Baker", one of them provided with Bergroth's identification label: "*Dysdercus fervidus* Bergr.". There is no doubt that this is the type series (syntypes) studied by Bergroth from F. C. Baker's collection, which came into the possession of Pomona College in 1908 (Horn & Kahle, 1935: 10). The male specimen bearing the original identification label is here designated as the lectotype of *Dysdercus fervidus* Bergroth, 1914. This specimen exactly fits Bergroth's description; its length is 9.6 mm. The specimen is well preserved and complete but for the right hind leg, developed only to a rudimentary stump. The genitalia of this specimen are shown in figs. 53-56.

Material (distribution. fig. 48).

Cuba. Havana, Baker, 2 ♂, 4 ♀, type series (POM). Havana, F. Z. Cervera, 1 ♂ (J. R. de la Torre-Bueno Coll., KU). "Cuba", Franck, 2 ♀ (E. P. Van Duzee Coll., CAS). Guantanamo, E. le Moul, 1 ♀ (ML). "Cuba", 1 ♂, 1 ♀ (*Dysdercus fervidus*, det. Edm. Schmidt) (MW).

Dysdercus sanguinarius Stål

A medium-sized to large (9.5-16 mm), scarlet species with scutellum, a spot on clavus, and a spot on corium, black.

Dysdercus s. sanguinarius Stål

(figs. 57-61, 65; pl. 4 fig. 1)

Dysdercus sanguinarius Stål, 1870, Enum. Hem. 1: 122; type locality: Cuba: lectotype ♀, NRS!. — Myers, 1927, Ann. Ent. Soc. Amer. 20: 297. — Hussey, 1929, Gen. Catal. Hem. 3: 102, 111. — Blöte, 1931, Zool. Meded. 14: 132, 133. — Rodriguez, 1933, Arch. Puerto Rico Est. Exp. Insul., Rio Piedras 102: 1-33, 13 figs, map. — Squire, 1939, Bull. Ent. Res. 30: 289, fig. — Fife, 1939, Bull. Puerto Rico Exp. Sta., Mayagües 39: 7-8. — Barber, 1939, Science Surv. Porto Rico Virgin Islands 14 (3): 366. — Wolcott, 1941, J. Agric. Univ. Puerto Rico 25: 71. — Callan, 1943, Trop. Agric., Trinidad 20: 113-115. — Bartlett, 1943, Rep. Puerto Rico (fed.) Exp. Sta. 1942: 15-16 (*ruficollis*, lapsus for *sanguinarius*). — Callan, 1947, Bull. Ent. Res. 37: 389, 390 (synonymized with

D. jamaicensis Walker). — Hargreaves, 1948, List Cotton Insects: 30 (synonymized with *D. jamaicensis* Walker and *D. neglectus* Uhler). — Wolcott, 1950, J. Agric. Univ. Puerto Rico **32**: 206 (synonymized with *D. jamaicensis* Walker and *D. neglectus* Uhler). — Berry, 1951, Rev. Ent., Rio de Janeiro **22**: 337. — Lima et al., 1962, Mem. Inst. Osw. Cruz **60**: 23, 51 (pro parte), pl. 4 fig. 10 (paramere).

Dysdercus Konowi Puton, 1887, Rev. d'Ent. **4**: 98; type locality: Minden [? Münden], (Hannover), Germany, erratic; holotype ♀, MNP!. — Hussey, 1929, Gen. Catal. Hem. **3**: 93.

Astemma sanguinaria; Kirkaldy & Edwards, 1902, Wien. Ent. Ztg. **21**: 172.

Disderus sanguineus; Valdés Ragués, 1910, An. Acad. Ci. Habana **44**: 433, Mis Trab. Acad., Habana: 203.

Scarlet to red except for the following parts:

Head. — Antenna with base brown, segment 4 black, remainder dark; labial segments 3, 4, black; rostrum long, reaching anterior limits (♂) or centre (♀) of sternite V.

Thorax. — Anterior margin of collar pink; collar sometimes blackened posteriorly; disc of pronotum with a narrow, blackish, transverse fascia near white posterior margin. Scutellum black, often with two, more or less united, longitudinal markings; in some specimens central area and apex reddish. Corium near scutellum with a streak on clavus, a roundish spot just behind middle, and distal corner black. Membrane greyish black. Posterior pleural borders and epicoxal lobes often with brownish to blackish markings and narrow white margins. Femora except proximally and ventrally, tibiae, and tarsi, brownish black. Ostiolar peritremes yellowish.

Abdomen. — Sternite II, often sternite V, sometimes others too, with a blackish spot laterally. — Male: posterior margin of segment IX (figs. 57, 58) rounded and with black tubercle on either side of a faint medial excavation near genital cavity. Paramere (figs. 59, 60) small, with slender shaft, long neck, and head with two spurs. Proximal spur large, tooth-like and recurved; distal spur very small, hook-shaped. — Female (fig. 61): first gonocoxa slightly reduced and rounded at distal margin; sclerites of second gonocoxae concave, dorso-laterally inserted, only narrowly fused in the median and with a small median carina, distal margin of second gonocoxae membranous medially.

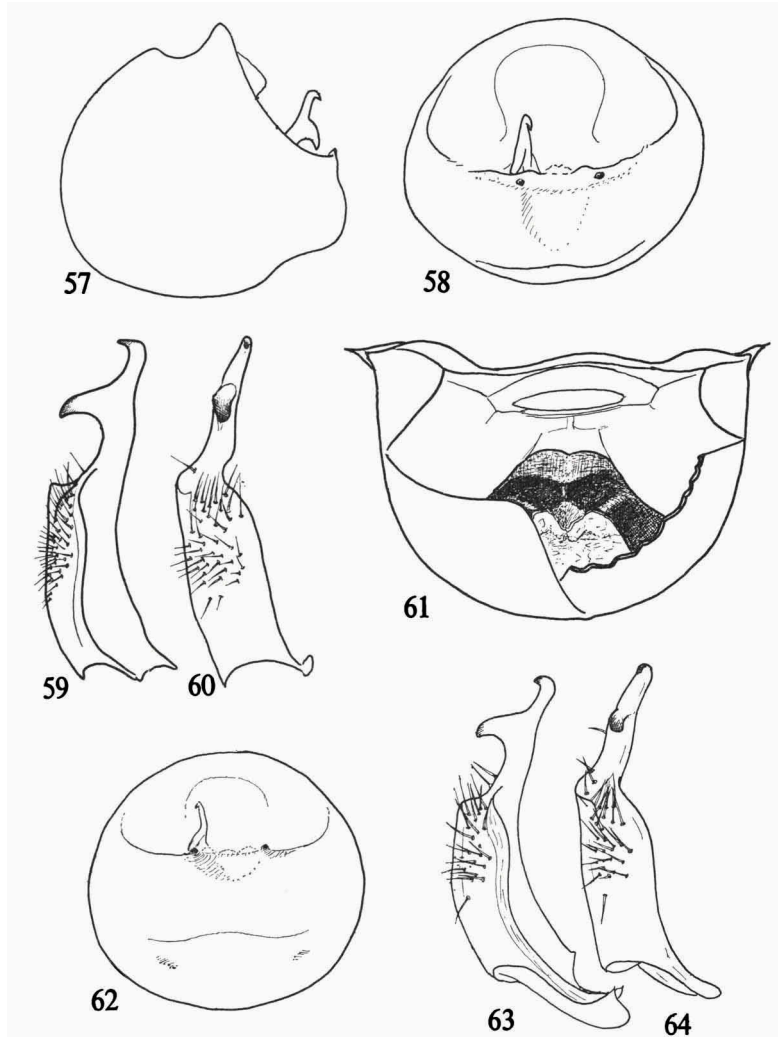
Specimens from Hispaniola are somewhat more variable in colour; often scutellum and clavus without any black and the corial markings small.

Length of male 11-13 mm; length of female 13-16 mm.

Lectotype designation of *Dysdercus sanguinarius* Stål. — The two female specimens in the Stockholm collection, representing Stål's syntypes of *Dysdercus sanguinarius* and labelled "Cuba Stål", are also provided with the labels "Type" and "Paratype", obviously by a later curator of the collection. The specimen indicated as "Type", bearing Stål's identification

label is here designated as the lectotype of *Dysdercus sanguinarius* Stål, 1870.

The type of *Dysdercus konowi* Puton. — During a recent visit to the Muséum Nationale d'Histoire Naturelle, Paris, the present author had the pleasure of finding Puton's holotype specimen in a box near the Puton collection. It proved to be a female of *Dysdercus sanguinarius* Stål, 1870,



Figs. 57-64. *Dysdercus sanguinarius* Stål. 57-60, male from Cuba, genital capsule in lateral and posterior view resp. 59-60, right paramere in lateral and posterior view resp. 61, female from Cuba, genitalia in posterior view. 62-64, *D. s. neglectus* nov. subsp., male, paratype, from Puerto Rico; 62, genital capsule in posterior view; 63-64, right paramere in lateral and posterior view resp.

set with the wings spread out, and bearing the following labels: "Münden, Hann.", and "Dysdercus Konowi Put.". The specimen, provided by the present author with a holotype label, has been placed in the general collection. According to Puton, this insect was collected alive at Minden (Hannover), near the Porta Westphalica — but this must be an error (see above) — and it seems quite certain that it was imported from Cuba, presumably with cotton(seed).

Material (distribution: fig. 65).

Cuba. — "Cuba", Stål, 2 ♀ (syntypes of *D. sanguinarius* Stål) (NRS). Habana, 1 ♂ (ML). Habana, F. Z. Cervera, 4 ♂, 11 ♀ (J. R. de la Torre-Bueno Coll., KU). Santiago de las Vegas, S. C. Bruner & L. Cardenas, "on *Partitium elatum*", 6 ♂, 7 ♀; "Cuba", 1897, 1 ♀ (det. J. R. de la Torre-Bueno, 1914) (KU). "Cuba", 2 ♂, 1 ♀ (MZH). Cayamas, 30.v, Schwarz, 1 ♀ (BM). Cayamas, 28.v, E. A. Schwarz, 1 ♂; El Guama, Pinar del Rio, Palmer & Riley, 1 ♀ (USNM). San Diego de los Banos, 15.iv.1900, Palmer & Riley, 1 ♂ (MB). Güines, 18.vi.1925, J. G. Myers, 1 ♂ (MCZ).

Hispaniola. — Haïti. Desbarriere, Massif La Hotte, 4000 ft, 12-14.x.1934, 1 ♂, 1 ♀, Kenskoff, 4000-6000 ft, 2.ix.1934, 1 ♂, P. J. Darlington; St Marc, Mann, 1 ♀ (MCZ).

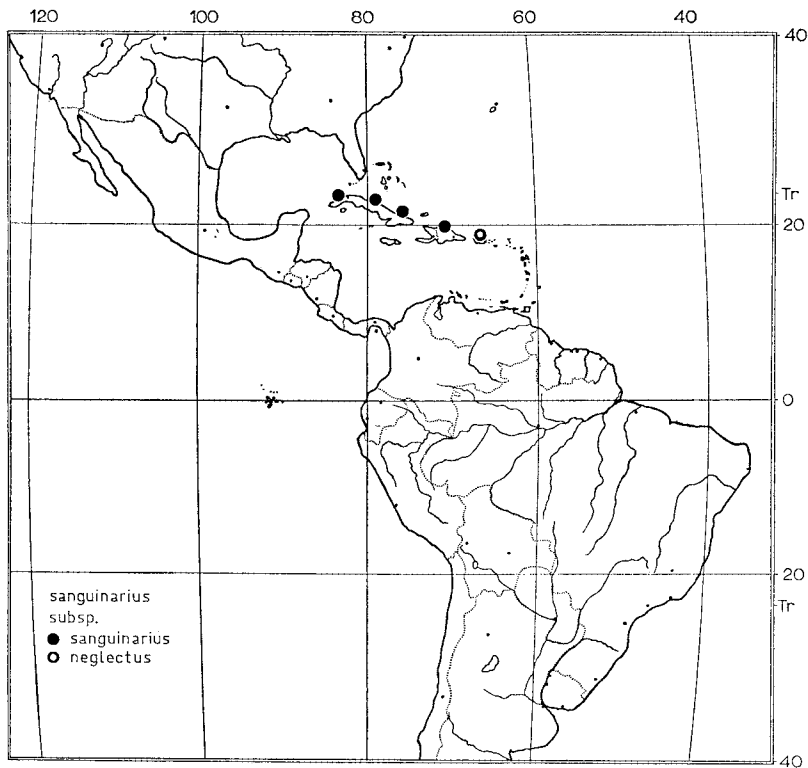


Fig. 65. Distribution of *Dysdercus sanguinarius* Stål.

Port au Prince, ii.1928, A. Andant, 1 ♀ (BM). — Dominica. Sánchez, i.vi.1915, 1 ♀, 7-12.vi.1915, 1 ♂, H. G. Barber (USNM). Ciudad Trujillo, 6 km W, 16-20.xii.1955, 3 ♀, Jimenoa, i.iv.1953, 1 ♀, J. Maldonado C. (ML). Mt Diego de Ocampo, 3000-4000 ft, vii.1938, P. J. Darlington, 1 ♀; Trujillo City, 13.ii.1941, C. T. Parsons, 1 ♀ (MCZ).

***Dysdercus sanguinarius neglectus* nov. subsp.**

(figs. 62-65; pl. 4 fig. 2)

Dysdercus neglectus; Wolcott, 1924a, J. Dept. Agr. Porto Rico 7: 249 (nomen nudum). — Wolcott, 1924b, Bol. Porto Rico (ins.) Estac. Exp., Rio Piedras 32: 64. — Leonard, 1931, Ann. Rep. Porto Rico (ins.) Exp. Sta., Rio Piedras 1929-1930: 120. — Wolcott, 1936, J. Agric. Univ. Puerto Rico 20: 164 ("det. W. L. McAtee = *D. sanguinarius* Stahl — det H. G. Barber."). — Squire, 1939, Bull. Ent. Res. 30: 289-291, fig. 1 (distribution). — Barber, 1939, Science Surv. Porto Rico & Virgin Is. 14 (3): 366. — Bartlett, 1944, Rep. Puerto Rico (fed.) Exp. Sta., Mayagüez 1943: 24. — Callan, 1947, Bull. Ent. Res. 37: 390. — Hargreaves, 1948, List Cotton Insects: 30. — Wolcott, 1955, Bol. Estac. Exp. Agric. 125: 78.

Differs from nominate form by following characters: size smaller, colour somewhat paler, posterior part of corium more orange, anterior margin of collar white, its posterior part black; this black being more or less extended backwards onto central part of callus; black fascia near posterior discal border often wider; scutellum wholly black and corial spot more transversely ovate; anterior part of abdomen yellowish. Genital characters (figs. 62-64) same as in nominate form.

Length of male 9.5-12 mm; length of female 12-13 mm.

The name *neglectus* is not new; it was first used by Wolcott (1924: 249) with reference to Uhler, apparently as a manuscript name, but as far as the author has been able to trace, it has remained a nomen nudum until now. With the above description and type designation, this name is validated.

Material (distribution: fig. 65).

Puerto Rico. — Mayagüez, at light, 9.viii.1963, P. H. van Doesburg Jr, 2 ♂ (holo- and paratype), 2 ♀ (allo- and paratype) (ML). "Portorico", xi.1874, Krug, 4 ♂, 3 ♀ (ZMB). San German, v.1933, F. Tió, 1 ♂; Maricao insular forest, light trap, 30.iv.1953, 1 ♂, Mayagüez, at light, 3/4.viii.1955, 1 ♀, J. A. Ramos; Mayagüez, 2.i.1938, E. Alvarez, 1 ♂; Mayagüez, iv.1939, G. Bernardini, 2 ♂; Mayagüez, 5.v.1940, S. Altiery, 1 ♂; Hatillo, 21.iii.1935, J. Brunet, 1 ♂ (ML). (paratypes).

Excluded as paratype: an aberrant specimen from Barranquitas, xii.1920, R. Colón, 1 ♂, length 9.3 mm, yellowish; black of clavus extended laterally onto endocorium; median anterior extension of pronotal basal black fascia united with black of collar (USNM).

***Dysdercus andreae** (Linnaeus)

(figs. 1, 66-71; pl. 4 fig. 3)

Sloane, 1725, Nat. Hist. Jamaica 2: 203, pl. 237 fig. 29, 30.

Cimex andreae Linnaeus, 1758, Syst. Nat. (ed. 10) 1: 448. (Based on Sloane's description and figures; original specimens from Jamaica in Sloane's collection are lost); lectotype: Sloane's figures 29, 30.*Astemma andreae*; Kirkaldy & Edwards, 1902, Wien. Ent. Ztg. 21: 172.*Dysdercus andreae*; Stål, 1866, Berlin. Ent. Zeitschr. 10: 382. — Ballou, 1906, West Indian Bull. 7: 54. — May, 1906, Bull. Off. Exp. Sta. U.S.D.A. 171: 11. — Van Duzee, 1907, Bull. Buffalo Soc. Nat. Sc. 7: 18 (*andreae*). — Wilson, 1923, Bull. Virgin Islands Agr. Exp. Sta., St. Croix 3: 15. — Barber, 1923a, Univ. Iowa Stud. Nat. Hist. 10 (3): 24. — Wolcott, 1927, Bull. Ent. Res. 18: 80. — Wolcott, 1927a, Ent. Haïti: 182, 379. — Wolcott, 1929, Bull. Ent. Res. 20: 227. — Hussey, 1929, Gen. Catal. Hem. 3: 85, 109-113. — Blöte, 1931, Zool. Meded. 14: 117, 133. — Leonard, 1931, Ann. Rep. Puerto Rico Ins. Exp. Sta., Rio Piedras 1929-30: 120. — Schmidt, 1932, Wien. Ent. Ztg. 49: 272. — Wolcott, 1933, Econ. Ent. West Indies: 288, 293. — Wolcott, 1936, J. Agric. Univ. Puerto Rico 20: 164. — Squire, 1939, Bull. Ent. Res. 30: 289-291, fig. 1. — Darlington, 1938, Trans. R. Ent. Soc. London 87: 685. — Barber, 1939, New York Acad. Sci. Survey Porto Rico & Virgin Islands 14: 366. — Fife, 1939, Bull. Puerto Rico Exp. Sta., Mayagüez 39: 14. — Parsons, 1940, Psyche 47: 3. — Torre-Bueno, 1940, Bull. Brooklyn Ent. Soc. 35: 12. — Torre-Bueno, 1941, Ent. Amer. (n.s.) 21: 47. — Wolcott, 1941, J. Agric. Univ. Puerto Rico 25: 71. — Callan, 1943, Trop. Agric., Trinidad 20: 113-115. — Bartlett, 1943, Rep. Puerto Rico (fed.) Exp. Sta. 1942: 15. — Bartlett, 1944, Rep. Puerto Rico (fed.) Exp. Sta. 1943: 24. — Plank, 1946, Rep. Puerto Rico (fed.) Exp. Sta. 1946: 23. — Callan, 1947, Bull. Ent. Res. 37: 389, 390. — Rainey, 1947, Bull. Ent. Res. 38: 308. — Wolcott, 1950, J. Agric. Univ. Puerto Rico 32: 206 (= *suturellus*; Barret, 1905, nec Herrich-Schäffer). — Berry, 1951, Rev. Ent., Rio de Janeiro 22: 337. — Wolcott, 1955, Ent. Econ. Puert.: 78. — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 22, 30, pl. 3 fig. 2 (paramere).*Cimex suturalis* Fabricius, 1775, Syst. Ent.: 721; type locality: "America"; lectotype ♂, Kiel collection, MC! — Fabricius, 1787, Mant. Ins.: 301 No. 215 (*suturalis*). — Zimsen, 1964, Type Fabr.: 327 No. 857.*Lygaeus suturalis*; Fabricius, 1794, Ent. Syst. 4: 159 No. 82. — Fabricius, 1803, Syst. Rhyng.: 225 No. 102.*Astemma suturalis*; Laporte, 1832, Essai Class. Hém.: 37.*Pyrrhocoris suturalis*; Burmeister, 1835, Handb. Ent. 2: 285.*Dysdercus suturalis*; Herrich-Schäffer, 1850, Wanz. Ins., Verzeichn.: 192.*Dysdercus suturellus*; Barret, 1905, Ann. Rep. Puerto Rico Agric. Exp. Sta. 1904: 396.*Disderus andreae*; Valdés Ragués, 1910, An. Acad. Ci. Habana 44: 433, Mis Trab. Acad., Habana: 203.

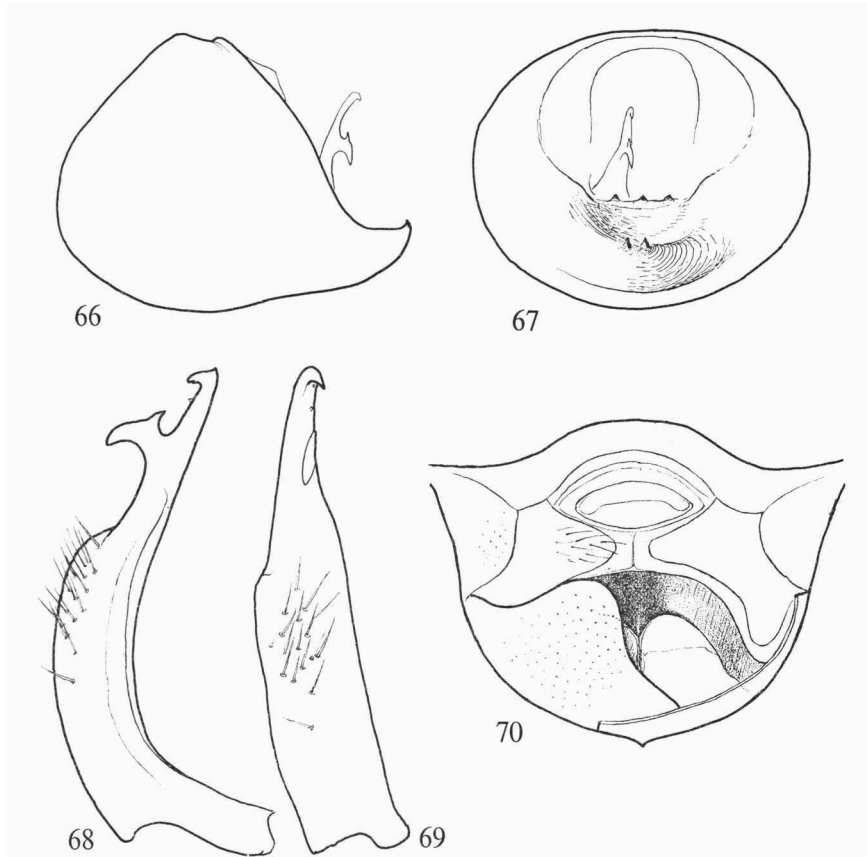
Small to medium-sized species (7.0-13.6 mm); red with black markings and with a white St. Andrew's cross on the fore wings.

Head. — Head red; antenna darkened to black, with a more or less distinct reddish base; rostrum red; last two segments blackish; labrum blackened.

Thorax. — Pronotal collar yellowish white, usually blackish posteriorly; callus and disc red, posteriorly with a black transverse band and a white posterior border; lateral margin blackish. Scutellum red, anteriorly blackish. Clavus red, faintly tinged with black to almost entirely black, but as a rule

with a reddish base; claval suture and distal margin of corium whitish, together forming a white cross on fore wings; rest of corium red, except for an area along (white) claval suture, a spot behind middle and apex black; shape of black spot on corium very variable, usually somewhat triangular and tending to separate a small dot laterally; costal margin often blackish. Membrane black with a faint bluish lustre, distal border narrowly white. Ventral surface red; collar, posterior margins of segments, and epicoxal lobes white, bordered towards red parts with blackish streaks; anterior margins of meso- and metathorax blackened; ostiolar peritremes orange-red. Coxae, trochanters, and basal parts of femora red; remaining parts of legs more or less blackish.

Abdomen. — Segments red; posterior margins white; sternites III-VI



Figs. 66-70. *Dysdercus andreae* (Linnaeus). 66-69, male from Jamaica; 66-67, genital capsule in lateral and posterior view resp.; 68-69, right paramere in lateral and posterior view resp. 70, female from Jamaica, genitalia in posterior view.

usually bordered with black anteriorly; extension of this black very variable. — Male: segment V as a rule almost entirely blackish; segment VI concave posteriorly and, like segment VIII, usually without a white border. Segment IX (genital capsule, figs. 66, 67) conically produced and curved upwards posteriorly, with two black, projecting teeth; lateral margin of capsule broadly rounded; inner margin medially with a narrow, erect, tridentate, darkened capsular lamella, or only with three small teeth. Paramere (figs. 68, 69) small, with a flat, curved shaft and a slender head with two spurs; proximal spur sharp, strongly recurved and dorsally also extended into a sharp tooth; distal spur very small and blunt. — Female (fig. 70): lateral parts of posterior margin of segment VII somewhat produced posteriorly. Distal margin of first gonocoxa only slightly reduced, angularly produced, covering segment IX almost entirely; second gonocoxae forming one sclerotized plate, the distal margin of which is sharply produced medially and deeply concave on both sides.

Length of male 7.0-11.3 mm; length of female 8.6-13.6 mm.

Lectotype designations of *Cimex andreae* Linnaeus and *Cimex suturalis* Fabricius. — Linnaeus' *Cimex andreae* (1758) was based on the description and figures of a Jamaican specimen published by Sloane (1725: 203), and it is fairly certain that Linnaeus never saw an actual specimen of this species. Through the kindness of Dr. Å. Holm, the present author was able to study the specimen kept under this name in the Linnaeus collection at Uppsala. It does not fit Linnaeus' description and proved to be a specimen of *Dysdercus cruciatus* Montrouzier from Ambon. It is not known who placed this specimen in Linnaeus' collection, but Stål (1866: 382) already noticed: "Exemplum, quod in Museo Upsaliensi sub hoc nomine est asservatum, cum descriptione Linnaei haud congruit et ad speciem novam *Dysderci* est referendum". Sloane's specimens should therefore be regarded as syntypes. Unfortunately, only Sloane's illustrations survived, all specimens of this species in his collection — the remnants of which are kept in the British Museum (Natural History) — having been lost long ago (Dr. W. E. China, in litt.). These illustrations (Sloane, figs. 29, 30), here reproduced in fig. 1, obviously pertain to one of these syntypes; they are here designated as the lectotype of *Cimex andreae* Linnaeus, 1758. Since there is no doubt about the identity of Sloane's description and illustrations, there is no need for a neotype designation.

Cimex suturalis Fabricius. In the Kiel collection, temporarily deposited in the Copenhagen Zoological Museum, there are two specimens that have been regarded as (syn-)types of Fabricius' *Cimex suturalis* (Zimsen, 1964:

327 No. 857). Through the kindness of Mr. N. Møller Andersen, the author was able to study these specimens, both of which unmistakably belong to *D. andreae* (L.). One of them, a male, is in a reasonable condition, although it is without segments 2, 3, 4 of the left antenna, both mid legs, and the left hind leg. This specimen bears a label "suturalis" in Fabricius' typical hand writing, and is here designated as the lectotype of *Cimex suturalis* Fabricius, 1775.

The other specimen, a female, is less well preserved and lacks both antennae, the fore wings, the right middle leg, and the hind legs. It bears only a label "Jamaika".

Material (distribution: fig. 71).

Florida. — Key West, 7.xii.1960, C. A. Bennet, 3 ♂, 4 ♀ (ML). Key West, 3.xii.1933, C. E. Rainwater, 1 ♂ (USNM), 2 ♀ (det. J. L. Stehlik) (MB). Key West, 3.iv.1939, E. A. Back, 3 ♂ (USNM), 1 ♂ (MB).

Bahamas. — Long Island, Clarendtown, 24.vii, 1 ♂, 3 ♀; Nassau, 2.vii.1935, 2 ♂, 2 ♀, W. J. Clench (MCZ).

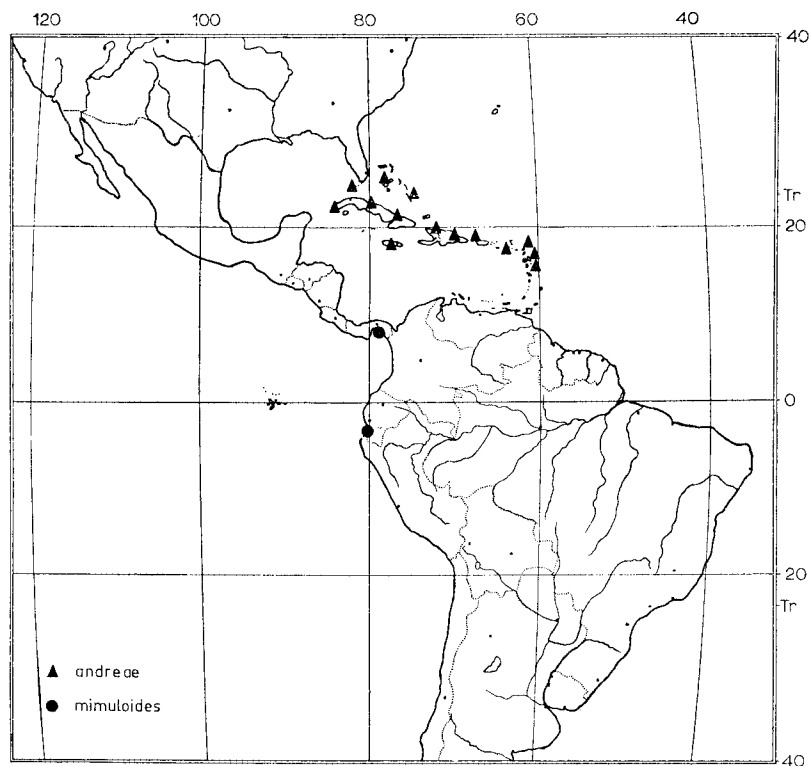


Fig. 71. Distribution of *Dysdercus andreae* (Linnaeus) and *D. mimuloides* Blöte.

Cuba. — Jaruco M., 31.iii.1958, J. Acuña G., 1 ♂; Las Tanas, Holguín, Oriente, 80 m, ii-iii.1939, L. Rutten, great numbers; Majagua, Camaguay, 50 m, i.i.1939, L. Rutten, 2 ♂, 4 ♀; Guantanamo, E. le Moul, 12 ♂, 13 ♀ (ML). Havana, 7.xi.1922, W. H. Hoffmann, 1 ♂, 3 ♀ (DEI). Havana, Baker, Cat. 947, 2 ♂, 2 ♀; Havana, F. Z. Cervera, 9 ♂, 12 ♀ (J. R. de la Torre-Bueno Coll.); "Cuba", 4 ♀ (J. R. de la Torre-Bueno Coll.); Havana, F. Z. Cervera, "*Dysdercus andreae* L., R. F. H. [Hussey] det., 1931", "Plesiotype ♀ in synopsis", "paraplesiotypes ♂ and ♀" (KU). Cayamas, 23.ii, E. A. Schwarz, 1 ♂; Soledad, 31.vii.1929, J. G. Myers, 4 ♂, 1 ♀ (MB). Pinar del Rio, 16-19.v.1933, 7 ♂, 5 ♀; Hormiguero, "on *Achras sapota* trees with sooty webs on leaves", 10-28.ii.1933, 8 ♂, 8 ♀; Hormiguero, Santa Clara 11.ii.1933, 15 ♂, 9 ♀; Camaguay, 21.iv-5.v.1944, 2 ♂, 2 ♀; San Blas, 1-9.iii.1933, 3 ♂, 5 ♀, 1 nymph; Santa Clara, Sta. Cl., 15.iii-21.iv.1933, 4 ♂, 7 ♀; San Cristobal, 11-29.vi.1933, 1 ♀, H. J. Mac Gillavry (MA). Holguín, Franck, 1 ♀ (CAS). "Cuba", A. Dohrn, 1 ♂ (NRS). Coast below Pico Turquino, 26-30.vi.1936, 1 ♂, Soledad, Cienfuegos, vi.1929, 1 ♀, 2-12.viii.1934, 1 ♂, P. J. Darlington; Soledad, Sta. Clara, vi.1939, 2 ♂, San Blas, Sta Clara, 12.viii.1932, 3 ♂, Bates & Fairchild; Central Soledad, i-vii.1932, B. B. Leavitt, 5 ♂, 8 ♀; Soledad, near Cienfuegos, 6-20.viii., N. Banks and N. A. Weber, 6 ♀; San Blas, vi, E. C. Rowe, 1 ♀; Central Jaronú, 21.iv.1930, 1 ♂, 3 ♀, Rio Canto, on *Sida urens*, 24.xi.1930, 2 ♂, 2 ♀, V. C. Loftin; Jobabo, on sugar cane, 30.xii.1924, C. F. Stahl, 4 ♂, 1 ♀; Rio Tana, 1913, S. Ramon, 1 ♂, 3 ♀ (MCZ). Marti, Camaguay, 2-15.viii.1931, A. Greenhall, 3 ♂, 6 ♀ (MZM).

Jamaica. — St. Andrew, Clydesdale, 3.viii.1941, C. B. Lewis, 1 ♀; Maryfield, 17.i.1952, F. A. Mc Dermott, 1 ♀; Upper Mtn. View, 19.xii.1946, G. B. Thompson, 1 ♂; Upper Mnt. View, 18.iii.1947, G. B. Lewis, 1 ♂; Ferry, ix.1952, Carlton, 1 ♂; Golden Spring, 16.ii.1947, G. B. Thompson, 1 ♂; Westmoreland, Negril, 19.vii.1954, T. H. Farr, 1 ♀; Trelawny, Windsor, 30.viii.1956, R. P. Bengry, 1 ♀; 2 mi W Duncans, 28.ii.1958, T. H. Farr, 1 ♀; 12 mi S Falmouth, Windsor Estate, 12.v.1956, T. H. Farr, 1 ♂; Catherine, Linstead, 7.vi.1932, G. R. Proctor, 1 ♀; Guanaboa Vale, 7.ii.1960, T. H. Farr, 1 ♂, 1 ♀; St. Thomas, Hordley, near Bath, 12.vii.1950, R. P. Bengry, 1 ♀ (SMJ). Blue Hole, Portland, on *Thespesia populnea* fruits, 2.iii.1960, D. W. Mollison, 5 ♂, 7 ♀ (ML). Kingston, 1 ♂ (ISU). Bath, "This species injures cotton", Mrs. E. M. Swainson, 1 ♀; "Jamaica", 1 ♀ (Breddin Coll., DEI). Claremont Baron Hill Trelawny, 4.iii.1928, 21 ♂, 33 ♀, 24.xii.1928, 9 ♂, 12 ♀, undated, 4 ♂, 6 ♀, L. G. Perkins; Bath, St. Thomas Surrey, 4.i.1939, Chester Roys, 3 ♂, 1 ♀; Buff Bay, 18.iii.1937, 1 ♂, 1 ♀; "Jamaica", H. G. Klagen, *Astemma andreae* (L.) (det. Kirk. [Kirkaldy], 1902) (J. R. de la Torre-Bueno Coll., KU). "Jamaica", 1 ♀, MZH 7405 (MZH). N Coast, sea level, 8.iv.1961, G. Newman, "dark hours", 1 ♀; "Jamaica", Crawford Exped. 1904-1956, 2 ♀; Mandeville, 3.ix.1920, 1 ♀, Hill Gardens, 20.iv.1921, 1 ♂, C. C. Gowdey (det. Uvarov); "Jamaica", 1905, C. A. Wray, 7 ♂, 11 ♀ (BM). Hope Bay, 13.iv.1906, 1 ♂, 2 ♀, Rock Flat, 25.iii.1906, 7 ♂, 8 ♀, Kingston, 4 ♂, 1 ♀, Port Antonio, iv.1906, 1 ♀, Mandeville, iv.1906, 1 ♂, 1 nymph, Kingston and Montego Bay, iv.1906, 4 ♂, 5 ♀, E. P. Van Duzee; "Jamaica", Parshley Coll., 1 ♀ (CAS). "Jamaica", 1 ♂, 1 ♀ (NRS). Port Antonio, A. E. Wight, 2 ♂, 2 ♀ (MCZ).

Hispaniola. — Haïti. Lac Aznei, 23.vi.1938, J. A. Ramos, 2 ♀; Port au Prince, 1 ♀; Cap Haïtien, E. le Moul, 1 ♂; Cap Haïtien, Bertin, R. Oberthür, 1 ♂ (ML). Port au Prince, Ehrenberg, 1 ♀ (HSM). "Haïti", 1 ♀, (Taeuber det.) (Breddin Coll., DEI). Gonaives, 10.ii.1908, M. Cameron, 1 ♀ (BM). Ennery, 1000 ft, 11.ix.1934, 1 ♂, Poste Terre Rouge, 2000 ft, 5.x.1934, 1 ♂, P. J. Darlington; St. Marc, Mann, 3 ♂, 6 ♀; Grand Anse, P. R. Uhler, 4 ♂, 4 ♀ (MCZ). Petionville, 5 and 10.vi.1930, O. Fulda, 2 ♂ (J. R. de la Torre Bueno Coll.); Kenskoff, 5.iii.1937, C. Roys, 16 specimens (KU). — Dominica. Santo Domingo City, 5.x.1937, C. Roys, 4 specimens (KU). Santo Domingo, 1934-1935, C. Wehlburg, 14 ♂, 7 ♀ (MA). Santiago, vii.1925, 1 ♀ (BM). Santiago, 5.iii.1919, F. Jackson, H. B. Sherman, 5 ♂, 2 ♀ (MZM). Sosua, Clench, 1 ♂; foot

hills Cordilleras Central, S of Santiago, vi.1938, 1 ♂, San José de las Matas, 1000-2000 ft, vi. 1938, 2 ♂, 2 ♀, P. J. Darlington; Pto Plata, Hurst, 2 ♂, 2 ♀ (MCZ).

Puerto Rico. — Guayanilla, iii.1960, J. Maldonado C., 4 ♂, 3 ♀; Salinas, 7.iv.1939, J. Gonzalez, 1 ♀; Marlacao, ix.1948, 1? (ML). Aguirre, 28.iv.1925, H. E. Box, 2 ♂, 1 ♀; Santa Rita, 17.v.1914, E. G. Smith, 1 ♂ (BM).

Virgin Is. — St. Thomas, 1 ♂, 1 ♀ (NRS). St. Thomas, iii.1873, Chell, 1 ♀ (BM). St. Thomas, Klug, 3 ♂, 1 ♀; St. Thomas, M. Berol., 1 ♂; St. Thomas, C. Eggert, acq 1898, 2 ♀ (ML).

Lesser Antilles. — St. Barthélemy, 1 ♂, 1 ♀ (NRS). — St. Maarten, Rijgersma, 1 ♂; Saba, St. John, on herbs, 5.vii.1965, Mrs. E. Geijskes (new record) (ML). — St. Eustatius, 27.vi.1965, Crater Quill, forest floor, Mrs. E. Geijskes (new record) (ML). — St. Kitts, J. J. Quelch, 2 ♀ (BM, 1912-207). — Antigua, Beach Hotel, limestone hill, 11.vi.1965, Mrs. E. Geijskes (ML). Antigua, English Harbor, 25.x.1911, Geddes, 2 ♀ (J. R. de la Torre-Bueno Coll., KU). Antigua, B. W. I., 8-13.iii.1934, H. R. Totton, 1 ♀ (immature); Antigua, 26.i.1932, A. D. Torlesse, 1 ♂, 4 ♀; St. John's, 1 ♀, Walker's Catal. (BM). — Montserrat, W. I., 10/4, 1 ♂ (ISU). Montserrat, 13.ii.1904, A. Jordan, 1 ♀; 15.ii.1931, A. D. Torlesse, 1 cop. (BM). — Guadeloupe, Cosur, 22.vii.1938, S. T. Danforth, 1 ♂ (ML). Guadeloupe, 1 ♀; Guadeloupe, C. O. Lovin, 1 ♂ (NRS). Guadeloupe, 2.x.1925, L. E. Cheesman, 1 ♂ (BM). — Grande Terre, St. Anne, seacoast, on *Hibiscus tiliaceus*, 7.vi.1965, D. C. Geijskes (ML). — Dominica, Porthmouth beach, 2.vi.1965, Mrs. E. Geijskes; Dominica, Springfield Estate, on shrubs along road, 28.v.1965, Mrs. E. Geijskes (new record) (ML).

Locality doubtful. — Suriname, J. W. v. d. W., 122, 1 ♀ (ML).

**Dysdercus mimuloides* Blöte

(figs. 71-76; pl. 4 fig. 4)

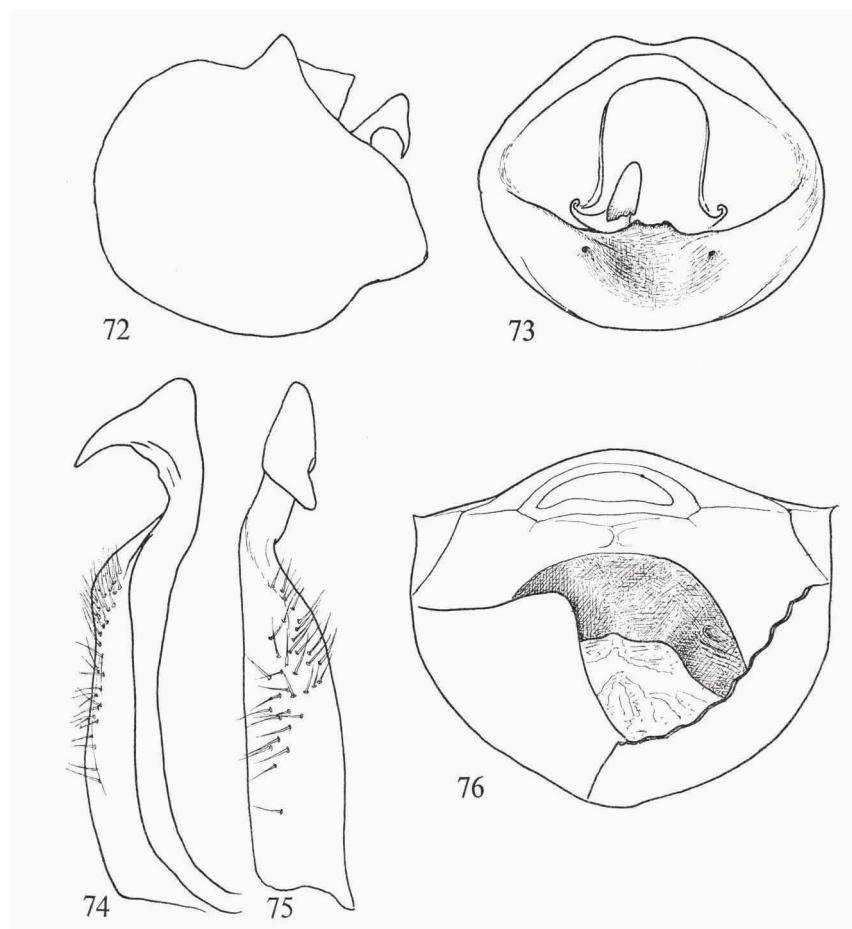
Dysdercus mimuloides Blöte, 1933, Ann. Mag. Nat. Hist. (10) 11: 599, 600; type locality: Gulf of Panama, Perlas Islands, Isla del Rey; holotype ♂, BM! — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 22, 42.

?*Dysdercus ruficeps* Var?; Walker, 1872, Catal. Heter. 5: 183.

A medium-sized (12-13 mm), brownish to blackish species without a white annulus at base of the antennal segment 4; relatively broad posterior margin of pronotum, costal margin, and apical border of membrane white. Pronotum shiny.

Head. — Colour red; antenna black except for red extreme base; rostrum red with segments 3 and 4 blackened; paraclypei extended, apices acuminate, especially in male specimens.

Thorax. — Collar, anterior part of lateral pronotal margin, posterior margin of disc (as broad as collar), posterior pleural margins, and epicoxal lobes white; anterior callar sulcus black; callus and posterior part of lateral margin red; disc brown to dark brown towards white posterior margin. Scutellum black, in some specimens with reddish markings at anterior and lateral margins. Corium yellowish brown to dark piceous, darker at clavus than between costal margin and claval suture, costal margin white. Membrane



Figs. 72-76. *Dysdercus mimuloides* Blöte. 72-74, male, holotype; 72-73, genital capsule in lateral and posterior view resp.; 74, right paramere in lateral view. 75, male from Ecuador, right paramere in posterior view. 76, female from Panama (allotype), genitalia in posterior view.

brownish black with a rather broad, distal, white margin. Sterna, pleura, coxae, trochanters, and bases of femora orange to brownish; remaining parts of legs darkened to blackish; ostiolar peritremes yellow.

Abdomen. — Sternites red, shiny; posterior margins of sternites II-VII yellowish white. — Male: sides of sternites VI, VII dull; white posterior margin of segment VI narrow; segments VIII, IX, wholly red, the latter densely covered with long pilosity; posterior margin of segment IX (figs. 72, 73) with a broad, rather deep, semicircular excavation antero-dorsally limited

by an almost straight-edged capsular lamella; on both sides of excavation a small, dark tubercle. Paramere (figs. 74, 75) with a very slender, apically tapering shaft; head conical, distally with one hooked spur which is obliquely cut off at apex. — Female (fig. 76): first gonocoxa hardly reduced, distal margin angularly produced. Second pair of gonocoxae forming one broad, sclerotized, flat plate, moderately convex at sides and slightly concave at distal margin.

Length: 12-13 mm.

Material (distribution: fig. 71).

Panama. — Isla del Rey, Perlas Is, Gulf of Panama, L. E. Cheesman, St. George Exped., B. M. 1925-573, holotype ♂ (figs. 72-75), allotype (fig. 76), 3 paratypes: 2 ♀, 1 ♂ (1 ♀ very pale-coloured), 1 nymph (BM), 1 ♂, 1 ♀ (ML).

Ecuador. — "In harbor, Puerta Boliver, at night on deck", 9.iv.1932, M. Kislink & C. E. Cooley, 1 ♂ (USNM). A very dark specimen, white parts very clear; head black except for median part of vertex, side of frons and medial part of underside red. Rostrum and lateral part of red callus blackened; disc, scutellum, wings, pleura, and legs blackish. Abdomen bright red, posterior margins of sternites white. "W coast of America", 1 ♂; "*D. mimus* Walker's Catal.", 339, 340", 2 ♂ (BM, 56-85).

The *Dysdercus flavolimbatus* group

Dysdercus ruficeps (Perty)

(figs. 77-82; pl. 7 fig. 1)

Lygaeus ruficeps Perty, 1833, in Spix & Martius, Delect. Anim. Artic.: 172, pl. 34 fig. 7; type locality: Equatorial Brazil; type lost?

Astemma ruficeps; Blanchard, 1840, Hist. Ins.: 129.

Dysdercus ruficeps; Herrich-Schäffer, 1850, Wanz. Ins. 9: 176. — Hussey, 1929, Gen. Catal. Hem. 3: 100, 110, 111. — Blöte, 1931, Zool. Meded. 14: 131, 133. — Schmidt, 1932, Wien. Ent. Ztg. 49: 271. — Hargreaves, 1948, List Cotton Insects: 30. — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 23, 46, pl. 4 fig. 5 (paramere).

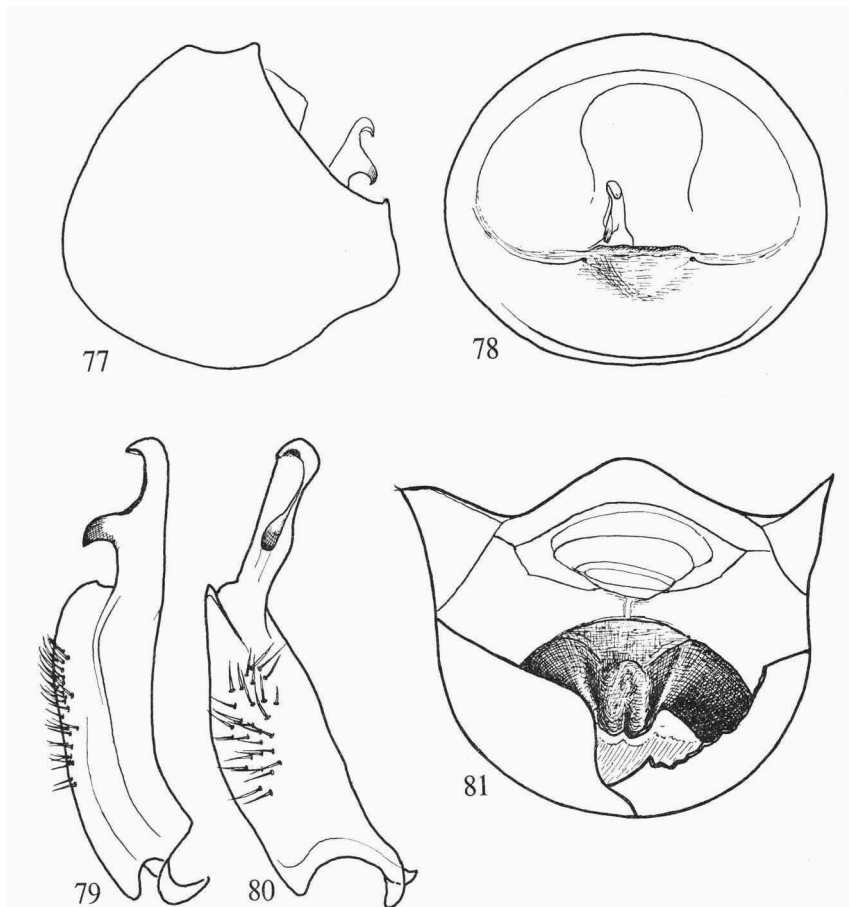
A medium-sized to large black species (12-17 mm) with a red head and yellow disc of pronotum.

Head. — Ground colour red, in some cases with two small, blackish dots against neck; tylus blackened apically; antenna dark brown to black with a reddish base; rostrum dark red to blackish, often extreme base and joint between segments 1 and 2 red.

Thorax. — Pronotal collar and disc pale yellow; lateral margin piceous to black; callus black, sometimes with reddish markings laterally and medially. Corium brownish to black: membrane black, distal border whitish. Ventral surface black; collar, posterior pleural margins and epicoxal lobes,

including ostiolar peritremes yellowish. Coxae and often also trochanters red; rest of legs piceous to black. In specimens from Panama the scutellum, humerus and apex of corium tend to be brownish instead of black.

Abdomen. — Dorsum red; underside black, anterior margin of sternite II and posterior margins of sternites VII, VIII yellow; spiracular peritremes and trichobothrial spots reddish. — Male: segment IX (figs. 77, 78) yellowish to brown, with a shallow, medial, triangular excavation posteriorly. The latter limited dorsally by a low, straight, capsular lamella and laterally by crested or almost toothed ends of lateral margin of genital cavity. Paramere (figs. 79, 80) large; shaft sparsely set with short pilosity,



Figs. 77-81. *Dysdercus ruficeps* (Perty). 77-80, male from Pará, Brazil; 77-78, genital capsule in lateral and posterior view resp.; 79-80, right paramere in lateral and posterior view resp. 81, female from Pará, Brazil, genitalia in posterior view.

crested against mesial shoulder; head with two spurs, set obliquely on shaft; proximal spur firm, recurved; distal spur short and strongly recurved. — Female (fig. 81): first gonocoxa moderately reduced, roundly produced at distal margin; sclerites of second gonocoxae conically curved with distal margins concave; medial part of gonocoxae less sclerotized and with an indistinct median carina; apical edge produced and thickened.

Length of male 12-15 mm; length of female 12.5-17 mm.

The type of *Dysdercus ruficeps* (Perty). — The type locality of *Dysdercus ruficeps* given by Perty is equatorial Brazil. Spix and Martius collected from 1817 to 1820 in two areas, viz. eastern Brazil and along the Amazon River. Because this species has never been reported from NE Brazil but is known from the Amazon region, it is virtually certain that Perty's specimens also originate from the latter region. Spix and Martius visited that area from August 1819 to June 1820 and collected from Belem westwards along the Rio Amazonas to Barra do Rio Negro, along the Rio Negro to Barcellos, along the Rio Solimões to Villa Ega and Tabatinga, and along the Yapurá to the Arara-Coara Falls (Spix & Martius, 1831; Levi, 1964).

The location of the type series is not known. It is not among the remnants of Perty's collection, now in the Naturhistorisches Museum, Bern (Dr. H. Volkart, in litt.), or in the collections of the Zoologische Staatssammlung, München (Dr. H. Freude, in litt.); thus, there remains little hope that the type is still extant. Since there is no doubt at all about the identity of this species, a neotype designation is not necessary.

Material (distribution: fig. 82).

Nicaragua. — Chontales, Janson, 1 ♀ (BM).

Costa Rica. — Talamanca, Bovallius, 5 ♂, 4 ♀ (NRS).

Panama. — C. Z., Ft. Clayton, 13.viii, F. N. Young, 3 ♂ (MCZ). — Matachin, O. Thieme, vi.1877, 1 ♂ (BM). Bocas del Toro, 14.i.1922, F. Cobb, 4 ♂, 1 ♀; United Fruit Co, Changuinola, 29.ix.1925, P. W. Walker, 2 ♂, 5 ♀ (MZM).

Colombia. — "Colombia", 1 ♂, 1 ♀ (NRS). "Colombia", Weston, 1 ♂; "Colombia", Walker's Catal., 1 ♀; Cali, 1 ♀ (BM). Purnio, O. Bürger, 2 ♂, 1 ♀ (HZM). Santander, 1944, N. C. Fasset, 2 ♂ (KU). Bogota, Lindig, 3 ♂, 3 ♀ (NRS). La Cirnitedze (?), (Coraze), 29.xi.1947, Richler, 1 ♂; Muzo, Boyaca, 1260 m, 3 and 8.ii.1957, Foerster, 6 ♂, 5 ♀, 1 nymph (MB). 5 mi W Villavicencio, Meta, 920 m, 11.iii.1935, E. J. Schlinger & E. S. Ross, 1 ♀ (CAS). Villavicencio, 12-21.vii.1938, F. W. Furry & H. Dybas, 3 ♂, 2 ♀; Pto Salgar, Cundinamarca, 31.vii.1938, C. H. Seevers, 2 ♀; Bogotá, viii.1915, W. S. Adkins, 1 ♂ (CNHM). Bolivar, Batotal, iv.1939, M. Athen-Dahl, 4 specimens (ZML).

Ecuador. — "Ecuador", 1 ♂ (MB). Balsapamba, R. Haensch, 1 ♂, 1 ♀ (HZM). Napo, 1 ♀, 1 cop. (ML). Santa Juéz, R. Haensch, 1 ♀ (Breddin Coll., DEI). Palmar, 31.iii.1941, 2 ♂, 3 ♀ (J. R. de la Torre-Bueno Coll., KU). Archidona, Napo-Paatsza, 650 m, iv.1935, 1 ♂, Heran, Batzu, Yacu, iii.1935, 1 ♂, Mrs. Y. Mexia; Pichilingue, Los Rios, 40 m, 2.ii.1955, E. I. Schlinger & E. S. Ross, 1 ♂, 1 ♀ (CAS).

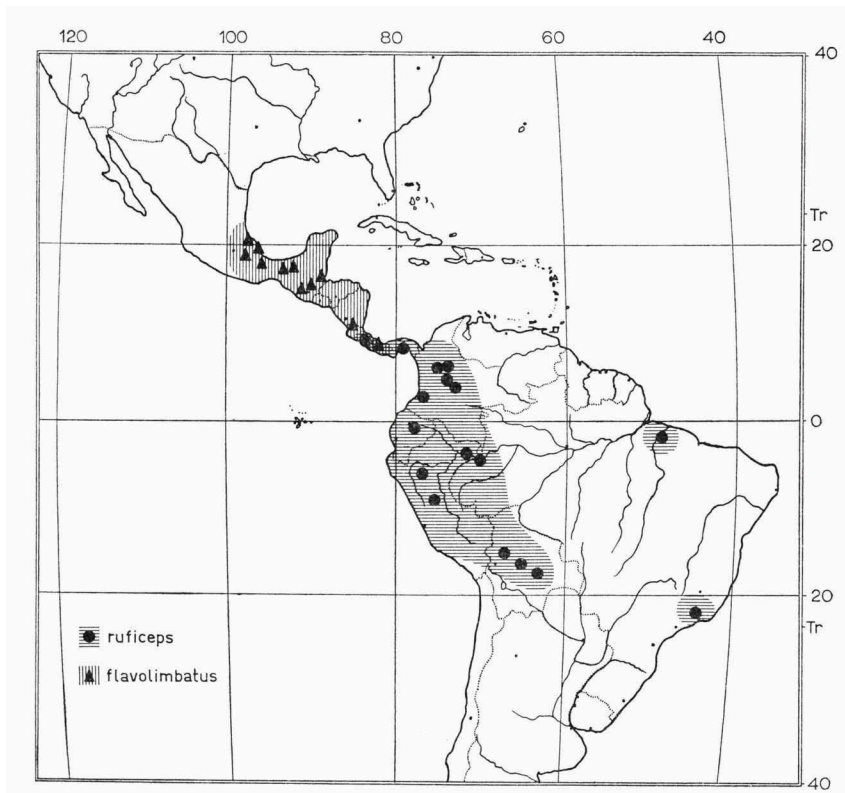


Fig. 82. Distribution of *Dysdercus ruficeps* (Perty) and *D. flavolimbatus* Stål.

Peru. — Marcapata, Jensen-Haarup, 1 ♀ (NRS), 1 ♀ (MC). Tarapoto, 1 ♂, 1 ♀; 10.i.1904, W. Schnuse, 1 ♂, 1 ♀; Marcapata, 3 ♂, 2 ♀ (MD). Oxapampa, 1 ♂ (ML). Amazon (Breddin Coll., DEI). Andes Mt, 1 ♀ (J. R. de la Torre-Bueno Coll., KU). Tarapoto, 2 ♂, 3 ♀ (NRS). Monson Valley, Tingo Maria, 23.ix.1954, 2 ♂, 1 ♀, 9.x.1954, 5 ♂, 6 ♀, E. J. Schlinger & E. S. Ross; Quillabamba, La Convención V. Vilcansta, 1000 m, v.1936, Mrs. Y. Mexia, 6 ♂, 2 ♀ (CAS). Marcapata, 1 ♀ (ZSM).

Bolivia. — "Bolivia", 1 ♀ (Breddin Coll., DEI). "Bolivia", J. Steinbach, 1904, 7 ♂, 7 ♀; "Bolivia", Walker's Catal., 1 ♀ (BM). Santa Cruz, Steinbach, 3 ♂, 3 ♀ (NMB). Yungas, 2 ♂, 2 ♀; Coroico, 2 ♂, 2 ♀ (MD). Chapare, Zischka, 1 ♂, 1 ♀ (ML). Mojos, N. Holmgren, 2 ♀ (NRS). Tumupasa, xi-xii.1921, Mulford Bio. Expl., W. M. Mann, 1 ♂, 2 ♀ (det. Stehlík); Rio Cristal Mayu, 50 mi NE Cochabamba, 17-31.xi.1949, L. Pena, 5 ♂, 5 ♀ (MB). Chapare, Rio Chipiriri, 400 m, 5.ii.1953, Forster, 1 ♂, 1 ♀ (ZSM).

Brazil. — Amazon, Stevenson, 1 ♀ (NRS). Amazon, 1 ♂ (BM). Amazon, 1 ♂, 1 ♀ (Breddin Coll., DEI). "Brasilia bor.", 2 ♂ (NRS). Benjamin Constant, 18-28.ix.1962, K. Lenko, 1 ♂, 3 ♀ (ZSP). — Pará, Benevides, 30.xii.1960, Bechyně, 1 ♂, 1 ♀; Belém, 20.v.1961, Ubiracy, 1 ♂ (MNR). Pará, Baker, 8 ♂, 8 ♀ (POM). — Rio de Janeiro, xii.1925, F. Porter, 1 ♂, 3 ♀ (CNHM).

Dysdercus flavolimbatus Stål

Fairly large (12-16 mm), lateral pronotal margin normal: sharp and reflexed; antennal segment 4, pronotal posterior margin and callus, scutellum, and at least a spot on corium, black; lateral margin of the latter yellow; abdominal sternites two-coloured.

Dysdercus f. flavolimbatus Stål

(figs. 82-87; pl. 5 fig. 1)

Dysdercus flavolimbatus Stål, 1861, Öfvers. Kongl. Sv. Vetén.-Akad. Förh. **18**: 198; type locality: Mexico; lectotype ♀, NRS! — Hussey, 1929, Gen. Catal. Hem. **3**: 91. — Blöte, 1931, Zool. Meded. **14**: 133. — Calderon, 1931, Insect Pest Surv. Bull. **11** (10): 686-688. — Schmidt, 1932, Wien. Ent. Ztg. **49**: 270. — Hargreaves, 1948, List Cotton Insects: 30. — Lima et al., 1962, Mem. Inst. Osw. Cruz **60**: 22, 37.

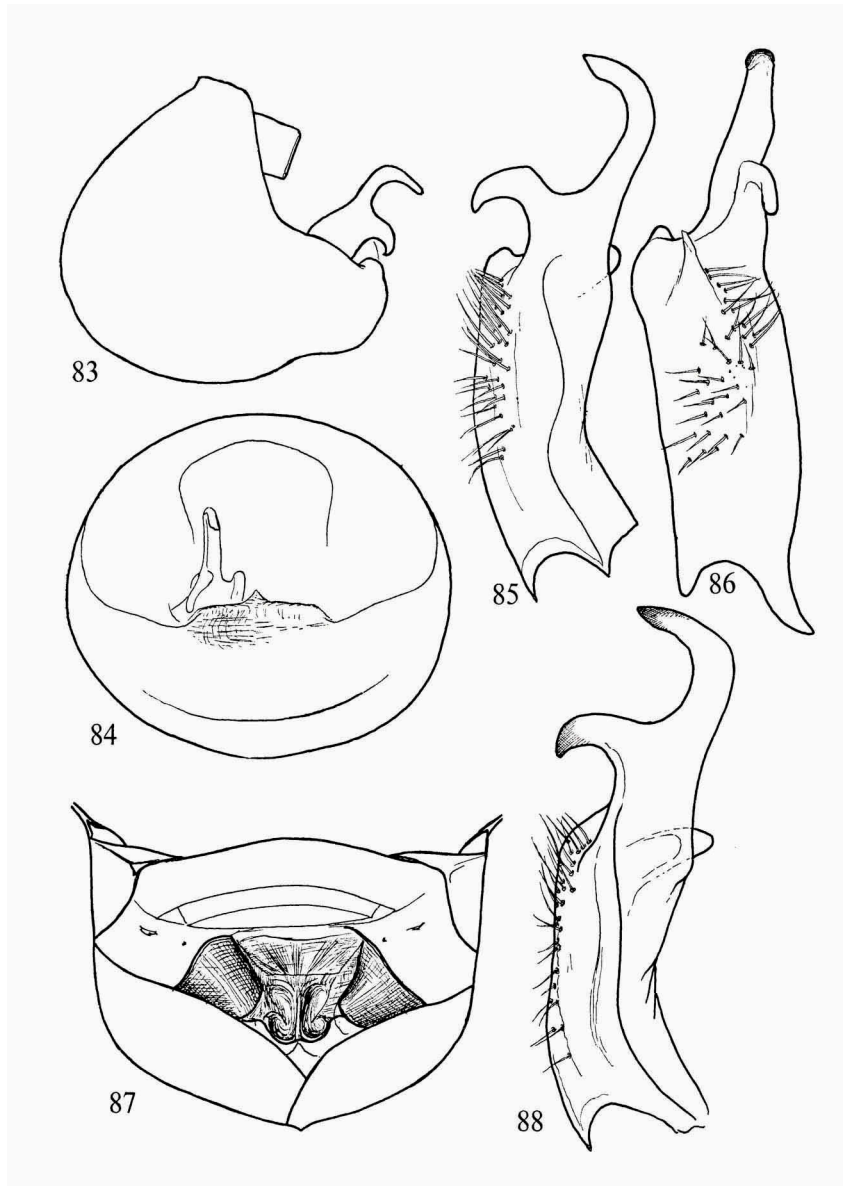
Dysdercus obscuratus; (nec Distant). — Blöte, 1931, Zool. Meded. **14**: 129. — Schmidt, 1932, Wien. Ent. Ztg. **49**: 270.

A dark subspecies with yellow lateral margins, strongly resembling *D. o. obscuratus* Distant.

Head. — General colour red; antenna dark brown to blackish with a red base; rostrum red, segment 3 brown, last segment blackish.

Thorax. — Pronotal collar and extreme posterior margin yellowish white; pre-callar sulcus black; callus red, central part blackened; disc yellow with a large, dark brown to blackish posterior fascia, sometimes covering disc almost entirely; lateral margin of disc orange-yellow. Scutellum brownish to black, apex yellow. Corium largely brownish black; humeral region, costal margin (name!), and distal angle of corium yellow; posterior part of corial dark area black. Membrane black with a slightly metallic blue lustre, distal margin whitish. Ventral surface: collar, posterior pleural margins, and epicoxal lobes yellowish white; sterna orange, pleura red; coxae and trochanters reddish to brown, other leg segments yellowish red to almost pure black. Ostiolar peritremes yellowish to brown.

Abdomen. — Sternites white with broad, red to black anterior fasciae which are enlarged medially and laterally; lateral margin of abdomen white. — Male: segments VIII, IX orange-brown; capsule (figs. 83, 84) rounded posteriorly, medially almost without an excavation but somewhat curved inwards, without a true capsular lamella. Paramere (figs. 85, 86) robust, with a firmly built shaft, crested distally and with an anteriorly curved, mesial shoulder; neck very short; head with two spurs; proximal spur large, hook-shaped, recurved; distal spur blunt, dorso-ventrally flattened, and directed posteriorly. — Female (fig. 87): distal margin of first



Figs. 83-88. *Dysdercus flavolimbatus* Stål. 83-86, male from Vera Cruz, Mexico; 83-84, genital capsule in lateral and posterior view resp.; 85-86, right paramere in lateral and posterior view resp. 87, female from Vera Cruz, Mexico, genitalia in posterior view. 88, *D. f. oncopeltus* Distant, male, lectotype, paramere in lateral view.

gonocoxa rounded; sclerites of second gonocoxae laterally situated, conically curved, distal margins deeply concave; 'cones' directed obliquely towards midline, united medially by a large, less sclerotized part of the segment. This part with a median, apically forked and recurved crest forming an anchor-shaped structure.

Length of male 12-14 mm; length of female 12.5-16 mm.

Specimens from Chiapas, Mexico and Guatemala to Panama are characterized by very dark, almost black antennae, legs, pleura, and basal fascia of abdominal segments. One specimen from Panama, collected and kindly presented to me by Dr. G. B. Fairchild, may represent an intermediate form between the nominate form and the subspecies *oncopeltus* (see below); in this male, the black spot on the wing, though smaller than in *oncopeltus*, is distinct and the area between this marking and the clavus only slightly blackened. Specimens in a series from Tela, Honduras vary widely but on the whole tend to lack any well defined dark markings and suffusions.

Lectotype designation of *Dysdercus flavolimbatus* Stål. — Stål's species is based on several specimens from "Mexico, Sallé". In the Stockholm Museum collection I found five syntypes, one of them indicated as "Type" and the other four as "paratype". The female specimen labelled "Type" bears Stål's identification label and is here designated as the lectotype of *Dysdercus flavolimbatus* Stål, 1861. Two of the syntypes, a male and a female, belong to *Dysdercus o. obscuratus* Distant and the two others, both females, to *D. mimulus* Hussey.

Material (distribution: fig. 82).

Mexico. — "Mexico", Sallé, "Typus", *D. flavolimbatus* Stål (lectotype, NRS). — Vera Cruz. Atoyac, Schumann, 1 ♂ (BM). San Rafael, vi.1896 and 6.iii.1896, 2 ♀ (ISU). 30 mi S Acayucan, 21.iv.1962, F. D. Parker & L. A. Stange, 3 ♂, 3 ♀ (Menke don.); San Andrés Tuxtla, 5 mi N, 28.xi.1955, 1 ♂, 1 ♀, Catemaco, 10 mi E, 4.xii.1955, 1 ♀, J. C. Schaffner (ML). Jalapa, 739, 1 ♂ (Jensen-Haarup Coll., MC). Jalapa, 3 ♀ (Muche-Radeberg Ank., MD). Jalapa, 1 ♀ (*D. flavolimbatus* Stål, det. Taeuber; *D. obscuratus* Dist., det. H. C. Blöte, Cat. No. 2) (ML). Tecolutla, 1 mi N, 12.vi.1961, Univ. Kans. Mex. Exped., 1 ♂ (KU). Córdoba, 17.vii.1936, C. H. Seevers, 2 ♂, 1 ♀; Córdoba, 30.vii.1936, E. C. Williams, 1 ♀ (CNHM). Córdoba, 12.vi, F. Knab, 1 ♂ (*D. obscuratus* Dist., det. J. L. Stehlik) (MB). — Tabasco. Teapa, iii. [1888], H. H. Smith, *D. obscuratus* Dist., 1 ♀ (Biol. Centr.-Am. Coll., AMNH), 6 ♂, 2 ♀ (BM), 1 ♀ (NRS). — Chiapas. Ruin at Palenque, 26-30.vi.1959, P. & C. Vaurie, 1 ♂ (AMNH). Chiapas, 15.xi.1907, L. Conradt, 1 ♀ (MW). — "Mexique, Chaptas Boutard, ex Coll. Kdo", 1 ♂ (*D. concinnus* Stål, det. Kirkaldy, *D. obscuratus* Dist., det. R. F. Hussey, 1931) (Usinger, KU).

Guatemala. — Moca, Such, 3000 ft, 18.vi.1947, C. & P. Vaurie, 2 pairs (AMNH). Olas de Moka, Solola, 7.ix.1908, 1 ♀ (*D. obscuratus* Dist., det. R. F. Hussey 1931, "Plesiotype ♀ specimen in synopsis, 1941") (G. P. Engelhardt Coll., Usinger, KU). Alta Vera Paz, cacao, 29.iii.1906, Barber & Schwartz, 1 ♀ (*D. obscuratus* Dist. det.

Stehlik) (MB). Finca el Zapote, Escuintla, vii.1948, R. D. Mitchell, 1 ♀ (CNHM).

British Honduras. — Punta Gorda, iii.1933, J. J. White, 1 ♂ (BM).

Honduras. — Tela, Guaimas, i.v.1923, T. H. Hubbell, 6 ♂, 13 ♀ (MZM).

Costa Rica. — Orosi, 2 ♂, 2 ♀ (W. H. Muche-Radeberg Ank., MD). Orosi, "58", 1 ♂ (*D. flavolimbatus* Stål, det. Taeuber, *D. obscuratus* Dist. det. H. C. Blöte, Cat. No. 1); Orosi, 1 ♂, 2 ♀ (ML). Cache, H. Rogers, 1 ♂; Cache, 1000 m, v.1905, 1 ♀, P. Biolley (BM).

Panama. — Rio Changena, Boca del Toro, 2400 ft, 17.ix.1961, G. B. Fairchild, 1 ♂ (ML).

Locality uncertain. — San Juan, Vera Paz, G. C. Champion, 1 ♂ (BM). El Fortin, 12.viii.1941, H. Dybas, 2 ♀ (CNHM).

Dysdercus flavolimbatus oncopeltus Distant

(figs. 82, 88; pl. 5 fig. 2)

Dysdercus oncopeltus Distant, 1883, Biol. Centr.-Amer. Het. **1**: 232, pl. 21 fig. 13; type locality: Panama, V. de Chiriqui, 4000-6000 ft; lectotype ♂, BM! — Hussey, 1929, Gen. Catal. Hem. **3**: 98. — Blöte, 1931, Zool. Meded. **14**: 133. — Lima et al., 1962, Mem. Inst. Osw. Cruz **60**: 23, 45.

Habitus and general coloration as in the nominate form, but the exocorium yellow with a black dot just behind the inner angle against posterior margin, not touching costal margin. Pleura, legs, and anterior bands of abdominal sternites blackish. Genitalia similar to those of the nominate subspecies (fig. 88).

Lectotype designation of *Dysdercus oncopeltus* Distant. — In 1883 Distant described *Dysdercus oncopeltus* having "... clavus black. Corium ochraceous, with a large transverse black macular fascia crossing at inner angle." ... "Hab. Panama, Volcan de Chiriqui, 4000-6000 feet (Champion)". The author had an opportunity to study the type series in the British Museum. In his opinion this form is only a subspecies of *D. flavolimbatus* Stål because the genital structures of both male and female are similar to those of Stål's species. A female specimen from "V. de Chiriqui, 25-4000 ft, Champion" has been labelled "Type". This appears to be incorrect because the type specimens came from 4000-6000 ft. Indeed, there were four such specimens in the same collection, viz. three males and one female. Of these specimens, all obviously belonging to the true type series, one of the male specimens is here designated as the lectotype of *Dysdercus oncopeltus* Distant, 1883. The genital capsule of this specimen has been dissected and placed under the specimen; the right paramere is shown in fig. 88.

Material (distribution: fig. 82).

Panama. Volcan de Chiriqui, 4000-6000 ft, G. C. Champion, 1 ♂ (lectotype, fig. 88), 2 ♂, 1 ♀ (type series of *D. oncopeltus* Distant, Distant Coll.); V. de Chiriqui, 25-4000 ft, G. C. Champion, 1 ♀, "Type" (BM). Lino, 1 ♀ (ML). Chiriqui, 1 ♂ (MC).

Dysdercus concinnus Stål

Medium-sized to large polytypic species (10-16 mm); corium yellowish, usually with a large black spot; sternites red, posterior margins white.

Dysdercus c. concinnus Stål

(figs. 89-93, 98; pl. 6 fig. 1)

Dysdercus concinnus Stål, 1861, Öfv. Kongl. Sv. Vet.-Akad. Förh. **18**: 198; type locality: Mexico; holotype ♂, NRS! — Hussey, 1927, Bull. Brooklyn Ent. Soc. **22**: 234, 235 fig. 2 (paramere). — Hussey, 1929, Gen. Catal. Hem. **3**: 88. — Blöte, 1931, Zool. Meded. **14**: 120, 133. — Schmidt, 1932, Wien. Ent. Ztg. **49**: 267. — Torre-Bueno, 1941, Ent. Amer. (n.s.) **21**: 118. — Hargreaves, 1948, List Cotton Insects: 30. — Lima, et al., 1962, Mem. Inst. Osw. Cruz **60**: 20, 34, fig. 1 (after Hussey).

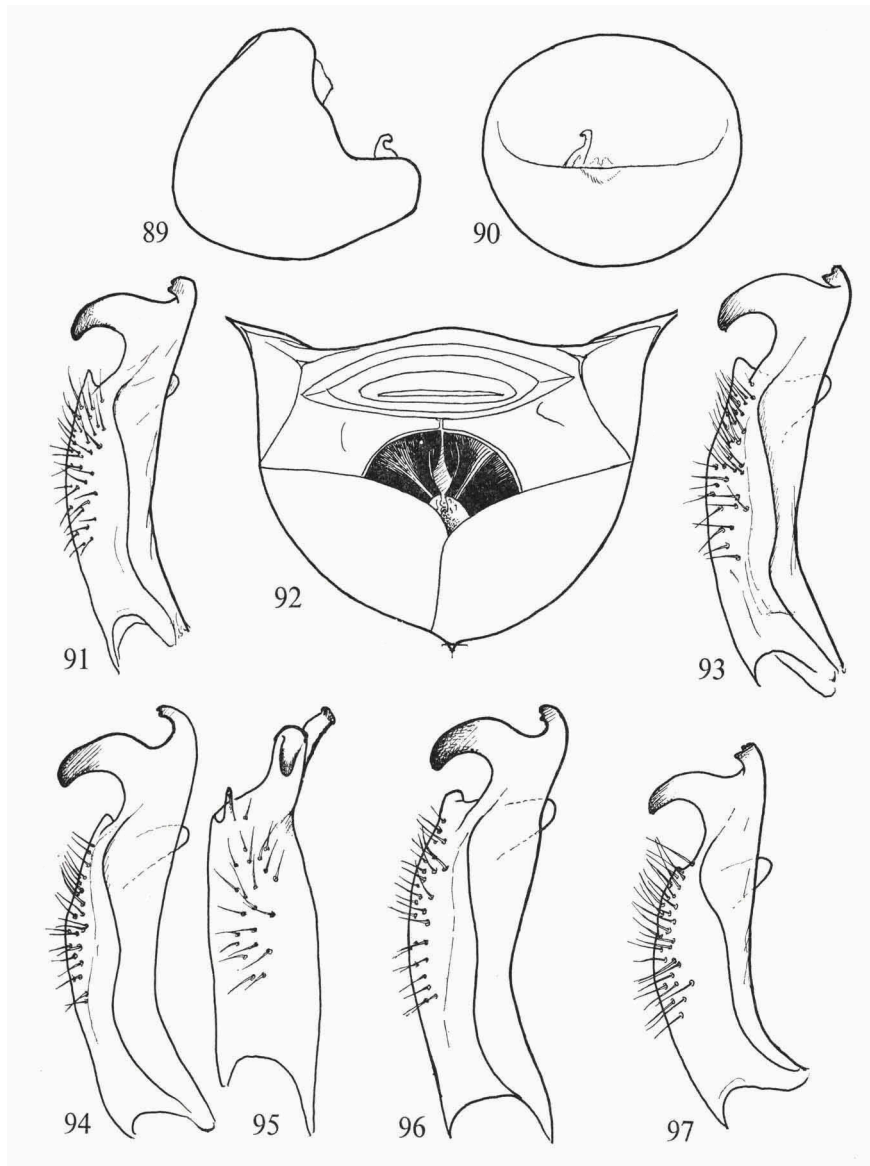
Dysdercus splendidus Distant, 1883, Biol. Centr.-Amer., Het. **1**: 231, pl. 21 fig. 4; type locality: Bugaba, Panama; holotype ♂, BM!

Dysdercus mimus var. *splendidus*; Hussey, 1929, Gen. Catal. Hem. **3**: 96. — Lima et al., 1962, Mem. Inst. Osw. Cruz **60**: 44.

Head. — Upper surface red with blackish suffusions on frons and vertex; often only median line and margin around eye remaining red; sometimes upper surface of head almost entirely black, sides and ventral surface red; antenna black except for reddish base; first segment of rostrum red, other segments blackish towards tip.

Thorax. — Collar white, or yellowish to yellowish red; pre-callar sulcus more or less blackish; callus and anterior margin of disc red; remainder of disc and lateral margin black; posterior margin with narrow yellowish border. Scutellum variable in colour but usually black. Corium white to yellowish white; clavus yellow; costal margin toward humerus as a rule turning to orange-yellow; corium with a large, semicircular, black spot on middle; this spot touches the costal margin, but does not reach the inner margin. Extreme apex of corium and membrane black, the latter with a very distinct whitish border. Ventral surface: pronotal epipleuron, propleura, and proximal part of posterior propleural border red; distal part of posterior propleural border and collar white, sometimes bordered with black towards red parts; meso- and metapleura including ostiolar peritremes yellow, former with brown to blackish border anteriorly; epicoxal lobes yellow with red at base. Coxae and trochanters yellow, femora red; remaining parts of legs blackish.

Abdomen. — Abdominal sternites white to pale yellow; anterior borders of sternites IV-VII broadly dark red; posterior borders of these red markings concave at sides, especially in segments IV, V; dorsal surface red with yellow posterior margins. — Male: posterior margin of sternite VI with narrow, and that of sternite VII with broad yellow to yellowish red



Figs. 89-97. *Dysdercus concinnus* Stål. 89-91, male, holotype; 89-90, genital capsule in lateral and posterior view resp.; 91, right paramere in lateral view. 92, female from Nicaragua, genitalia in posterior view. 93, *D. splendidus* Distant, male, holotype, right paramere in lateral view. 94-95, *D. c. pehlkei* Schmidt, male, lectotype, right paramere in lateral and posterior view resp. 96, *D. c. flavoscutellatus* Schmidt, male, lectotype, right paramere in lateral view. 97, *D. c. maritimus* n. subsp., male holotype, right paramere in lateral view.

border. Segments VIII, IX entirely yellow. Posterior margin of genital capsule (figs. 89, 90) slightly produced, evenly rounded, almost without a median excavation and without a capsular lamella; lateral margin deeply concave (fig. 89). Paramere (figs. 91, 93): shaft slender, acutely carinate medio-apically; mesial shoulder curved and produced anteriorly; neck short; head with two spurs; proximal spur very large, recurved; distal spur very small, somewhat laterally situated, and with an obtuse apex. — Female (fig. 92): first gonocoxa yellow, its distal margin prominently convex; sclerites of second gonocoxae broad, conically curved, close to each other but not fused.

Length of male 10-14 mm, length of female 13-16 mm.

Specimens from Panama have collar slightly blackened posteriorly, scutellum yellow, crescentic spot on the hemelytron sometimes a little narrowed

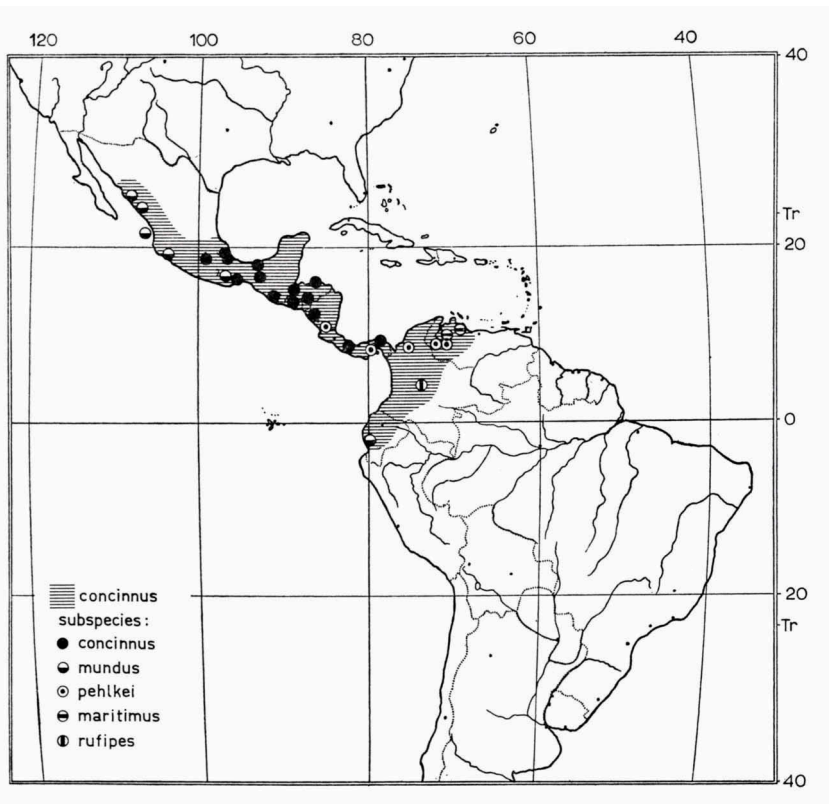


Fig. 98. Distribution of *Dysdercus concinnus* Stål.

mesially, and red colour of femora and venter deeper. Distant described such a specimen as *Dysdercus splendidus*, but the present author considers it to belong to the nominate subspecies, because the most remarkable characters of this form are the yellow clavus and anterior part of the costa, contrasting with the white remaining parts and the very broad white posterior margins of the sternites IV, V. These characters connect it with the specimens from Mexico and separate it sharply from the Colombian relatives. The writer studied the type of *D. splendidus* Distant (fig. 93) in the British Museum and found its genital characters almost identical to those of *D. concinnus* Stål (fig. 91).

Material (distribution: fig. 98).

United States of America. — Texas. Brownsville, in palm forest, 29.xii.1945, Beamer, 2 ♂, 3 ♀; Brownsville, 7.3.1938, Beamer, 1 cop.; Brownsville, vi., 1 ♂ (det. E. P. Van Duzee); Cameron Co [County], 8.3.1928, Beamer, 1 cop. (KU). Brownsville, 14.vii.1922, T. C. Barber, 1 ♂ (det. Sailer); Brownsville, 24.xii.1918, Piper plantation, E. L. Diven, 1 ♀ (det. Stehlik) (MB).

Mexico. — "Mexico", 1 ♀, *Dysdercus lunulatus* Uhl., det. Uhler (Uhler Coll., USNM). "Mexico", 1 ♀ (ML). "Mexico", Sallé, 1 ♂, holotype (NRS), 2 ♂ (BM). Metamoros, 1 ♂ (E. P. Van Duzee Coll., CAS). Presidio, Forrer, 1 ♀ (BM). — Morelos. Tepoztlan, 4.v.1945, N. J. H. Krans (USNM). — Vera Cruz. Jalapa, 1 ♂ (MC). Jalapa, 737, 1 ♂ (Jensen-Haarup Coll., MC). 30 mi S Acayucan, 21.iv.1962, F. D. Parker & L. A. Stange, 5 ♂, 6 ♀ (ML). Cotaxtla, Exp. Sta., 26.vi.1962, 15 watt black light trap, D. H. Janzen, 1 ♂, 1 ♀ (UCB). San Rafael, Ticaltepec, 20.iii.1896, 1 ♂; 2.vi.1896, 1 ♀ (ISU). — Oaxaca. Juchitán, 10 mi E, 15.iv.1953, R. C. Bechtel c.s., 1 ♀ (UCB). — Tabasco. Teapa, ii-iii.[1888], H. H. Smith, 3 ♂, 2 ♀ (BM). Frontera, vi.1897, 1 ♀ (ISU). — Chiapas. Ocosingo, 2 mi SE, 8.iii.1953, Smith, 1 ♂; Soyalo, 4 mi SE, 14.iii.1953, R. C. Bechtel c.s., 1 ♀ (UCB).

Guatemala. — Chejel, vi., Schaers & Barnes; Esquintla, 31.i.1905, Stella Deam (USNM). San José, 20.viii.1954, E. S. Ross, 1 ♂, 3 ♀ (CAS). Zapote, 1 ♂, 1 ♀, Capatillo, 1 ♂, G. C. Champion (BM). Alta Vera Paz, San Diego, 19.iv.1935, 1 ♀ (det. J. C. Lutz) (MZM).

British Honduras. — Columbia, xii.1932, J. J. White, 1 ♀ (BM).

Honduras. — La Ceiba, 1.x.1916, F. J. Dyar (USNM). Tegucigalpa, 24.vi.1947, C. W. Cook, 1 ♀ (CAS). Copan, 2.xii.1937, C. Roys, 1 ♀ (KU). "Honduras", 1 ♀ (BM). Tela, Guaimas, 1.v.1923, T. H. Hubbell, 429, 1 ♂, 2 ♀ (det. R. F. Hussey) (MZM).

El Salvador. — Univ. El Salv., San Salvador, 700 m, 15.xii.1964, M. E. Irwin, 2 ♂, 1 cop. (UCR).

Nicaragua. — La Calera, 4.iii.1956, 2 ♂, 1 ♀, 29.iii.1956, 2 ♂, 1 ♀, W. Pfeaffle (ISU).

Panama. — Barro Colorado I., 30.vii.1935, J. D. Hood; Cabima, 22.iii.1911, A. Buseck (USNM). Panama, 2 ♀ (NMB). "Porto Bello" [Portobelo?], 6 mi E, XX Plantation, 19.ii.1930, T. O. Zachokko, 1 ♀ (CAS). Lino, 1 ♀ (*D. concinnus* Stål v. *mundus* Walk., det. H. C. Blöte); Lino, 1 ♀ (*D. concinnus* Stål v. *splendidus* Dist., det. H. C. Blöte, ML). Chiriqui, 260, 1 ♀ (NRS). V. de Chiriqui, 800-1500 ft, G. C. Champion, 1 ♂; Bugaba, 800-1500 ft, G. C. Champion, 1 ♂ (holotype of *D. splendidus* Distant); Colon, Boucard, 1 ♂ (BM).

Locality unknown. — W 44, 1 ♀ (ZSM).

Dysdercus concinnus mundus Walker

(fig. 98)

Dysdercus mundus Walker, 1872, Catal. Heter. 5: 181; type locality: Mexico; holotype ♀, BM! — Hussey, 1929, Gen. Catal. Hem. 3: 88. — Blöte, 1931, Zool. Meded. 14: 120 (as a var. of *concinnus*). — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 34.

The colour of specimens from the Mexican States of Sinaloa, Oaxaca, Nayarit, and Colima, and from the Tres Marias Islands differs remarkably from that of the nominate form. In this subspecies the scutellum and entire corium are deep yellow and the pale margins of the sternites more yellow than white. The author studied Walker's type in the British Museum, which is labelled only "Mexico". This specimen agrees perfectly with those the author studied from the above-mentioned regions.

Material (distribution: fig. 98).

Mexico. — Sinaloa. Mazatlán, 1.1917, 1 ♂, 5.iii.1918, 1 ♂, 6 ♀, J. A. Kusche; Mazatlán, 15-23.vi.1918, Venedio, 2 ♂, 1 ♀ (CAS). Mazatlán, 40 mi N, 27.vii.1952, at light, J. D. Lattin, 1 ♂ (UCB). 16 mi SE Guamuchil, 16.vi.1961, A. S. Menke, 3 ♂, 3 ♀ (ML). Eldorado, 14.iv.1929, S. E. Flanders, 1 ♀ (det. Van Duzee) (UCR). — Tres Marias Is., Maria Madre, Id. village, 16-21.v.1925, H. H. Keifer, 6 ♂, 7 ♀ (CAS). — Colima. Vulkan Colima 3.x.1918, Joh. Laue, 2 ♀ (ZSM). — Oaxaca. Oaxaca, 23.xii.1951, on *Malva* etc., I. J. Andit, 6 ♂, 6 ♀ (UCR). La Ventosa, 20 mi SE, 2.i.1956, J. C. Schaffner (ML).

Ecuador. — Guayaquil, 1.ii.1946, F. Mus. Exped., C. C. Sanborn, 1 ♀ (CNHM).

Dysdercus concinnus pehlkei Schmidt

(figs. 94, 95, 98; pl. 6 fig. 2)

Dysdercus pehlkei Schmidt, 1932, Wien. Ent. Ztg. 49: 267; type locality: Colombia, Rio Magdalena; lectotype ♂, MW! — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 46.

Head often with a more or less bilobate dark area on upper side; collar blackish, anterior margin yellow; scutellum usually black; corium yellowish white, without more deeply-coloured area basally and with a large round, black spot near the middle; femora red; abdominal sternites orange, narrowly bordered posteriorly with white.

Lectotype designation of *Dysdercus pehlkei* Schmidt. — Schmidt's type series in the Warsaw Museum consists of twenty-two specimens, labelled "Rio Magdalena 1914 Pehlke S.", a male of which is here designated as the lectotype of *Dysdercus pehlkei* Schmidt, 1932; its right paramere is shown in figs. 94, 95.

Material (distribution: fig. 98).

Costa Rica. — Orosi, 1 ♀ (ML).

Panama. — La Chorrera, 23.v.1944, K. E. Frick (CAS). Lino, 2 ♀ (ML).

Venezuela. — Rio Escalante, a 30 km Sta. Cruz, Zulia, 26.ix.1951, L. A. Salas, 1 ♂ (IZM). Merida, 1 ♀ (NRS).

Colombia. — Amaya Cispata Bay, B. Martin, 2.vi.1916, 2 ♂, 2 ♀; Monteria, B. Martin, under bark, 1 ♂, 1 ♀ (CAS). Rio Magdalena, 1914, E. Pehlke, 9 ♂, 13 ♀ (type series) (MW). Aracataca, Magdalena, 30.xii.1925, F. W. Walker, 1 ♂, 2 ♀; Rio Frio, at light, 15.v.1925, F. W. Walker, 1 ♀ (MZM).

Dysdercus concinnus flavoscutellatus Schmidt

(fig. 96)

Dysdercus flavoscutellatus Schmidt, 1932, Wien. Ent. Ztg. 49: 267; type locality: Colombia, Rio Magdalena, Hac. Pehlke; lectotype ♂, MW! — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 22, 37.

Closely resembling *D. c. pehlkei*, but scutellum often yellow; corium deep yellow (resembling that of *D. c. mundus*); abdominal sternites brownish red or darkened, without lighter posterior borders; femora blackish.

Lectotype designation of *Dysdercus flavoscutellatus* Schmidt. — This subspecies has been described from a male and a female specimen now in the Warsaw Museum collection. The male labelled "Columbien (Hac. Pehlke) E. Pehlke S.", is here designated as the lectotype of *Dysdercus flavoscutellatus* Schmidt, 1932.

Material.

Colombia. — Hac. Pehlke, E. Pehlke, 1 ♂, 1 ♀ (syntypes) (MW). Bogotá, Lindig, 1 ♂, 2 ♀ (NRS). "Trinidad, Port of Spain", 1 ♂, 1 ♀ (MH) (locality apparently incorrect); Bogotá, 4 specimens (erroneously included among the "paratypes" of *D. rufipes* Stål) (NRS).

The following specimens are somewhat different:

Venezuela. — La Meza, Trujillo, 2000 m, 30.x.1955, F. Kern, 1 ♂, 1 ♀; La Meza, 1800 m, 29.iii.1947, H. E. Box, 1 ♀ (IZM). Very darkly pigmented specimens with narrow white posterior margins of sternites; head, pronotum (except for the callus in two specimens), scutellum, and legs black.

Dysdercus concinnus rufipes Stål

(fig. 98; pl. 6 fig. 3)

Dysdercus rufipes Stål, 1870, Enum. Hem. 1: 121, Vars. a, b, c; type locality: Colombia, Bogotá; lectotype Var. a, ♂, NRS! — Hussey, 1929, Gen. Catal. Hem. 3: 102. — Blöte, 1931, Zool. Meded. 14: 133. — Schmidt, 1932, Wien. Ent. Ztg. 49: 266. — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 23, 51.

Body red; antenna except base, apex of rostrum, membrane, and distal parts of legs blackish; posterior part of pronotum and spot on corium often also blackish.

Lectotype designation of *Dysdercus rufipes* Stål. — Stål (1870) divided his *D. rufipes* into three varieties according to the colour pattern of the corium. In the Naturhistoriska Riksmuseet (Stockholm) the writer found under this name a "type" series of eight specimens, all labelled Bogotá, among which certain specimens have been indicated as holotype, allotype, and paratypes. From this series only the first three specimens belong to the true type series (ground colour and legs red), while in the other specimens the ground colour is not red and the legs are blackish. Of the true types (syntypes) a male (labelled allotype), agrees with var. *a* and is here designated as the lectotype of *Dysdercus rufipes* Stål; another specimen ("paratype") represents var. *b*, and one ("holotype") var. *c*, as the original descriptions clearly indicate. "Paratypes" 2-5 belong to *D. concinnus flavo-scutellatus* Schmidt, and the last one is a specimen of *D. bidentatus* Hussey.

Material (distribution: only known from the type locality: Bogotá, fig. 98). Colombia. — Bogotá, Lindig, 1 ♂ (lectotype), 1 ♂, 1 ♀ (NRS).

***Dysdercus concinnus maritimus* nov. subsp.**

(Figs. 97, 98; pl. 6 fig. 4)

Head. — Dorsal parts and sides blackened; underside orange-red; antenna dark brown; rostrum red with apex blackened.

Thorax. — Collar, callus, and lateral margin of pronotum red; disc brownish yellow; transverse line on collar, edge of lateral margin, and a fascia near posterior border blackened. Scutellum black. Corium brownish yellow; lateral edge, a round spot against this edge near the middle, and extreme posterior corner black; membrane blackish brown with a slightly bluish lustre, distal margin greyish white. Underside: collar, pronotal epipleuron, posterior pro- and mesopleural margins, epicoxal lobes, coxae, trochanters, and femora red; other parts of thorax orange; tibiae and tarsi dark reddish brown.

Abdomen. — Sternites orange-red, medial parts of sternites III, IV yellowish; last sternites darker red. Genitalia as in the nominate form; the right paramere of the holotype is shown in fig. 97.

Material (distribution: fig. 98).

Holotype (male), Venezuela, Carabobo, Porto Cabello, 290; allotype from same locality (NRS). Paratypes: Venezuela, Carabobo, Borburata, 300 m, 8.v.1964, F. Fernández Y. & C. J. Rosales, 1 ♂; Yaritagua, 4.x.1952, F. Fernández Y., 2 ♂, 1 ♀ (head red) (IZM).

Dysdercus bimaculatus (Stål)

(figs. 99-104; pl. 5 figs. 3, 4)

Dysdercus bimaculatus Stål, 1854, Öfv. Kongl. Sv. Vet.-Akad. Förh. **11**: 236; type locality: Isla San José, Panama; lectotype ♂, NRS!

Dysdercus bimaculatus; Stål, 1859, Kongl. Sv. Freg. Eugénies Resa omkr. jord. **3**, Ins.: 253. — Sailer, 1947, Proc. Ent. Soc. Washington **49**: 15-19, figs. (paramere, ♀ pronotum) (restoration). — Lima et al., 1962, Mem. Inst. Osw. Cruz **60**: 22, 31, pl. 3 fig. 3, pl. 4 fig. 12 (paramere).

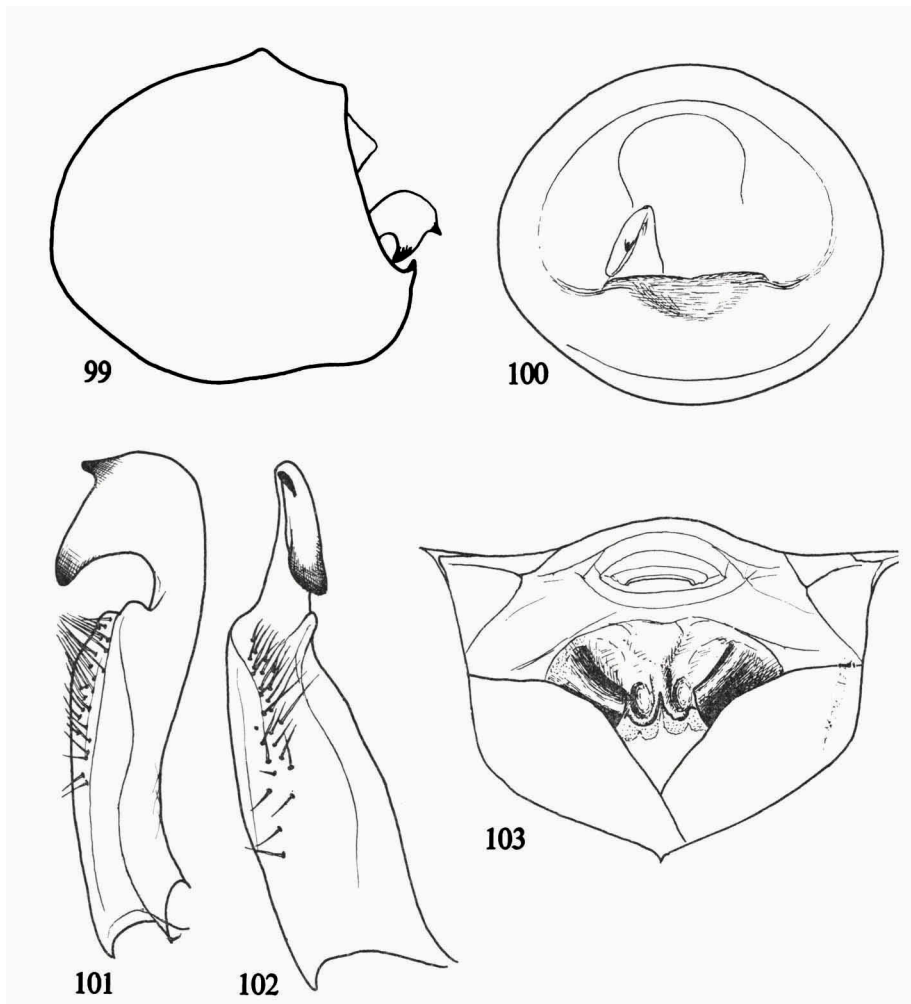
Dysdercus obliquus; Stål, 1870, Enum. Hem.: 121. — Hussey, 1929, Gen. Catal. Hem. **3**: 97. — Blöte, 1931, Zool. Meded. **14**: 129 (pro parte: Cat. No 1-3). — Torre-Bueno, 1941, Ent. Amer. (n.s.) **21**: 117 (pro parte). — Vivas-Berthier, 1941, Bol. Soc. Venezol. Cienc. Nat. **7**: 117. — Szumkowski & Fernández Yépez, 1963, Agron. Trop., Maracay **13**: 85.

Medium-sized to large (12.2-18 mm); pale brownish grey; corium with a narrow, transverse, black spot; very similar to *Dysdercus obliquus* (Herrich-Schäffer) in appearance but distinguishable by genital characters.

Head. — Head, base of antenna, and first three rostral segments orange-red; antenna and last rostral segment black.

Thorax. — Pronotal collar white, pre-callar groove black; callus orange-red; lateral margin and disc dirty yellow. Scutellum usually orange-red with black anteriorly but often darkened or entirely black. Corium pale brownish grey with a transverse, black mark behind middle, varying from a small round spot near inner margin to a fascia approaching costal margin. Membrane light to dark grey, narrowly bordered with white distally, sometimes totally lacking black pigment, subhyaline, and then of same colour as corium. Ventral surface: collar, posterior pleural margins, and epicoxal lobes white; sulcus posterior to collar black laterally; epipleuron of pronotum, a moderately broad lateral margin of posterior propleural border, sterna, pleura, coxae, trochanters, and basal parts of femora orange-red; anterior margins of pleura, distal parts of femora, tibiae, and tarsi darkened to blackish. Ostiolar peritremes usually yellowish.

Abdomen. — Sternites dirty white to light yellowish; anterior margin black laterally, especially at segments III-VI; anterior margins of mid-ventral parts, sometimes posteriorly along the black anterior margins, and the lateral margins of these segments red; segment VII red except for white posterior margin. — Male: segment VI red, anterior margin blackish; segment VIII suffused with red laterally; genital capsule (figs. 99, 100) broadly and evenly rounded posteriorly; posterior margin slightly or not at all excavated medially, with a narrow, transverse capsular lamella dorsally of excavation. Shaft of paramere (figs. 101, 102) moderately slender, somewhat tapering distally, with a slightly prominent mesial shoulder,



Figs. 99-103. *Dysdercus bimaculatus* (Stål). 99-102, male, lectotype; 99-100, genital capsule in lateral and posterior view resp.; 101-102, right paramere in lateral and posterior view resp.; 103, female from Panama, genitalia in posterior view.

distal half moderately pilose; head subpedunculate, flat, with one chisel-shaped, recurved spur and a sub-apical, secondary, small tooth. In resting position the spur of the paramere is directed postero-laterally. — Female (fig. 103): sternite VII narrowed pre-apically as seen in profile. First gonocoxa red, distal margin whitish, rounded, and moderately produced. Sclerites of second gonocoxae shiny black, almost cylindrically curved, very laterally situated and widely separated by a large, membranous area.

Length of male 12.2-15 mm; length of female 15-18 mm.

Lectotype designation of *Dysdercus bimaculatus* Stål. — Stål based his species on several specimens, to be regarded as syntypes. The ♂ specimen in the Naturhistoriska Riksmuseet, Stockholm, provided with Stål's identification label and apparently later marked "typus", is here designated as the lectotype of *Dysdercus bimaculatus* Stål, 1854. The specimen is 15 mm long and quite undamaged.

Material (distribution: fig. 104).

United States of America. — Arizona. Quijota, Pima County, 7.x.1958, T. R. Haig, 1 ♀ (ML). Miami, 27.ix.1937, R. E. Allan, 1 ♂; Ramsey Canon, Huachuca Mts., W. H. Mann (*D. obliquus* H.-S., det. Barber, Parshley Coll.), 1 ♀ (CAS). Tucson, xi.1931, Irvin, 1 ♂ (*Dysdercus obliquus* H.-S., det. J. R. de la Torre-Bueno, 1941, parapselotype in synopsis); Tucson, ix.1931, C. E. Teeter, 1 ♀ (*Dysdercus obliquus* H.-S., det. J. R. de la Torre-Bueno, 1941); Douglas, San Bernardino Ranch, 3750 ft, viii, F. H. Snow, 1 ♀ (E. P. Van Duzee Coll.); Baboquivaria Mts, F. H.

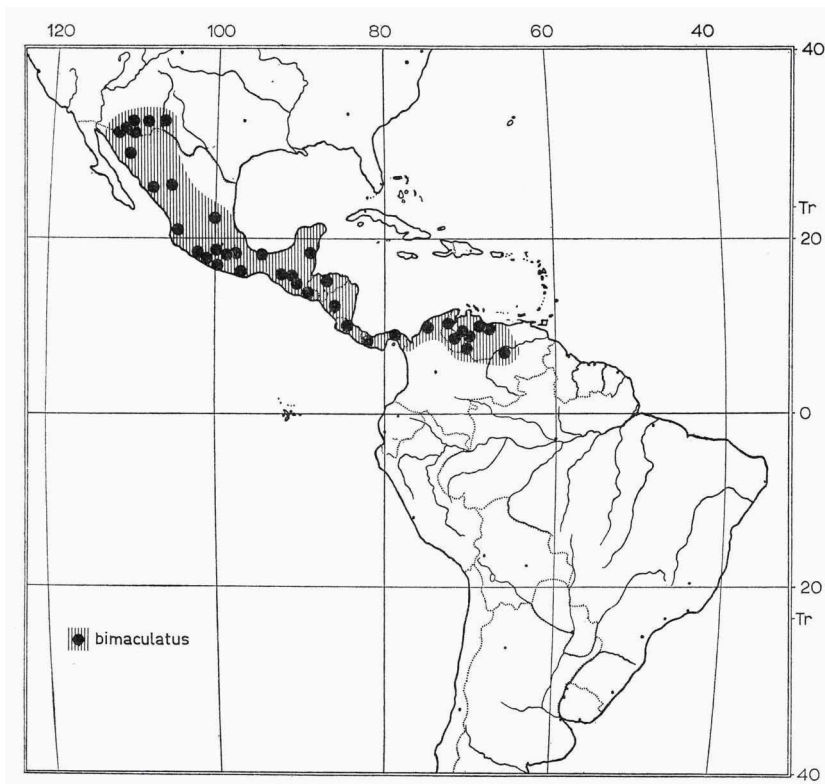


Fig. 104. Distribution of *Dysdercus bimaculatus* (Stål).

Snow, 1 ♀; Santa Rita Mts, 12.vi.1933, Beamer, 1 ♀ (KU). — New Mexico. White Sands, 27.vi.1940, L. C. Kuitert, 1 ♂ (KU).

Mexico. — "Mex.", 1 ♂ (KU). "Mexico", 1 ♂; "Mexico", Sallé, 1 ♂, 2 ♀; "Mexico", Boucard, 2 ♂, 1 ♀ (NRS). "Mex.", 1 ♂, 2 ♀ (E. P. Van Duzee Coll., CAS). — Sonora. Alamos, Quirocaba, 15.xi.1933, H. S. Goutry, 1 ♀; Tepara, Rio Mayo, 1.xii.1934, H. S. Goutry, 1 ♂, 1 ♀ (CAS). Esperanza, 7.v.1935, R. C. Bechtel c.s., 1 ♀ (UCB). Valle del Jaqui, 22.iv.1950, "en algodón", F. Pacreco, 1 ♂ (INAM). — Sinaloa, Guamuchil, 16 mi SE, 16.vi.1961, A. S. Menke, L. A. Stange, 1 ♂, 4 ♀; Elota, 8 mi SE, 18.v.1962, F. D. Parker & L. A. Stange, 1 ♂; Concordia, 20 mi NE, 2.ix.1957, J. C. Schaffner, 1 ♀ (ML). Mazatlán, 5.iii.1928, 2 ♂, 4 ♀; i.1917, 1 ♀, J. A. Kusche (CAS). — Durango. El Salto, 48 mi W, 8000 ft, 19.vii.1952, J. D. Lattin, 2 ♂, 1 ♀; Las Adjunctor, 85 mi E Mazatlán, 29.vii.1952, J. D. Lattin, 1 ♀ (UCB). — San Luis Potosi. Tamanzunchale, 11.xi.1946, 1 ♂ (CAS). Valles, 5 mi S, 13.vi.1952, Hobart, 3 ♂, 2 ♀ (KU). — Jalisco. Guadalajara, McConnel, 2 ♂, 6 ♀, Crawford, 1 ♀ (POM). — Colima. Colima, 2 ♂, 1 ♀ (W. H. Muche-Radeberg Ank., MD). Vulkan Colima, Joh. Laue, 1 ♂, 2 ♀ (ZSM). — Michoacan. Apatzingan, 12 mi E, 20.vii.1954, E. G. Linsey c.s., 1 ♂; Tuxpan, 11.vii.1951, P. D. Hurd, 1 ♀ (UCR). — Mexico. Rio Frio, 2 mi E, 27.vi.1957, on *Asclepias*, J. A. Chendak c.s., 1 ♀ (UCB). Bejucos, 2.vii.1933, 1 ♂, 2 ♀, Tejupilco, vii.1932, 1 ♂, H. E. Hinton (UCB). — Vera Cruz. Tinajas, 28.iv.1962, F. D. Parker & L. A. Stange, 1 ♂ (ML). Jalapa, 1 ♂ 1 ♀ (W. H. Muche-Radeberg Ank., MD). Atoyac, v-vi.1906, L. C. Reynolds, 1 ♀ (CAS). Puerto Mexico, 4 mi W, 18.iv.1953, R. C. Bechtel c.s., 1 ♂ (UCB). Orizaba, 4000 ft, 7.vii.1941, H. S. Dybas, 1 ♂ (CNHM). — Puebla. Tehuacan, 2 ♀ (W. H. Muche-Radeberg Ank., MD). Tehuacan, 3 ♀ (*D. obliquus* H.-S., det. H. C. Blöte, Cat. Nos 1-3) (ML). Atlixco, 34 mi S, 27.vi.1957, J. A. Chemsak c.s., 2 ♂; Puebla, 3.vii.1952, E. C. Gilbert c.s., 1 ♀ (UCB). Tehuiztingo, 17 mi N, 14.vii.1955, Univ. Kans. Mex. Exped., 1 ♀ (KU). — Morelos. Cuernavaca, 2 ♀; Cuernavaca, 12.v.1898, E. O. Ball, 1 cop. (ML). Cuernavaca, 13.v.1898, 2 ♂, 1 ♀ (E. P. Van Duzee Coll., CAS). Cuernavaca, 1.viii.1938, Lipovsky, 1 ♂ (KU). Cuernavaca, Crawford, 2 ♂, 1 ♀ (POM). — Guerrero. Balzas, 1 ♂, 1 ♀ (W. H. Muche-Radeberg Ank., MD). Iguala, 5 mi S, 15.vi.1946, E. C. Van Dyke, 1 ♀ (CAS). Chilpancingo, 4600 ft, G. C. Champion, 1 ♀ (BM). — Oaxaca. Matias Romero, 29 mi N, 19.vi.1958, J. C. Schaffner, 1 ♀; Matias Romero, 23 mi S, 5.vi.1962, F. D. Parker c.s., 4 ♂, 5 ♀ (ML). San Juanico, 24.iv.1953, R. C. Bechtel c.s., 2 ♀; Oaxaca, 43 mi SE, 13.vii.1952, E. E. Gilbert c.s., 2 ♀ (UCB). Monte Alban, 6000 ft, 27.vi.1961, Univ. Kans. Mex. Exped., 1 ♀ (KU). — Nayarit. Ahuacatlán, 8 mi N, 20.xi.1955, J. C. Schaffner, 1 ♂ (ML). Tepic, 24.vi.1940, L. W. Saylor, 1 ♂; Rio Santiago Ferry, 5 mi S, 27.xi.1948, H. B. Leech, 1 ♀ (CAS). Jesús Maria, 27.vii.1955, B. Malkin, 1 ♂; Arrojo Santiago, near Jesús Maria, 5.vii.1955, B. Malkin, 1 ♀ (UCB). Tepic, vii, Schumann, 1 ♂ (BM). — Chiapas. Tuxtla Gutiérrez, 4 mi E, 13.iii.1953, R. C. Bechtel c.s., 1 ♀ (UCB). — Milpas, 5900 ft, Forrer, 2 ♂ (BM).

British Honduras. — Br. Honduras, 1 ♀ (Breddin Coll., DEI).

Guatemala. — El Naranjo, Coloniba (Quesaltenango) 850 m, vii.1925, E. le Mout, 1 ♂, 2 ♀ (ML). Capetillo, G. C. Champion, 2 ♂, 3 ♀; Guatemala City, G. C. Champion, 1 ♀ (BM). Lake Atitlán, 23.ii.1939, Mrs. G. L. Artamonoff, 1 ♀ (CNHM). Capetillo, G. C. Champion, 1 ♂ (NRS).

El Salvador. — Yzalco, 1.xi.1929, K. A. Salman, on cotton, 1 cop. (CAS).

Honduras. — "Honduras", 1 ♂, 1 ♀ (*D. obliquus* H.-S., Taueber det.) (DEI).

Nicaragua. — La Calera, 31.iii.1956, W. Pfeaffle, 1 ♀ (ISU). Tipitapa, 9.xi.1951, on cotton, Swain 25, 1 ♂, 1 ♀ (det. R. I. Sailer and J. L. Stehlik) (MB).

Costa Rica. — "Costa Rica", van Patten, 1 ♀; Irazú, 6-7000 ft, H. Rogers, 1 ♀ (BM). San José, 28.iii.1903, Barber, 1 ♂ (Parshley Coll.); San José, vi.1904, P. Biolley, 1 ♂ (CAS). Finca, S. Miquel, Est. Barranca, "Her R. Highness Pr. Sigismund of Prussia", 3 ♀ (CNHM).

Panama. — El Sermeno, vi.1939, fruit fly trap, Jas Zetek, 1 ♀ (det. R. I. Sailer) (USNM), "Panama" 1 ♂, 1 ♀; La Chorrera, 1 ♂ (BM). Chiriquí, 1 ♀ (MD). La Chorrera, 98-146, 1 ♀ (BM). La Chorrera, 23.v.1944 and iv.1944, 2 ♀, Ft. Clayton, Canal Zone, iv.1944, 1 ♂, K. E. Frick (CAS). I. St. Joseph [Isla San José], Kinb. 398/66, "typus", 1 ♂ (lectotype) (NRS). I. St. Joseph, MZH. 7402 (MZH). Barro Colorado I., Canal Zone, 11.ii.1956, at light, Rettenmeyer c.s., 1 ♀ (KU). Barro Colorado I., 1941, K. W. Cooper, 6 ♂ (CNHM). Old Panama, 15.i.1934, R. Bliss (MB).

Colombia. — Amaya, Ciapata Bay, 27.v.1916, B. Martin, 1 ♀ (CAS). Quebrada Rodrigues, Rio Frio, 8.iii.1925, from dead leaves, F. W. Walker, 1 ♀ (*Dysdercus obliquus* H.-S., det. F. H. [Hussey] 1931) (*D. obliquus* H.-S., det. J. R. de la Torre-Bueno, 1941, Plesiotype specimen in Synopsis) (KU). Rio Frio, Mgd., iv, Darlington, 1 ♀ (MCZ). Bogotá, Lindig, 1 ♂, 1 ♀ (NRS).

Venezuela. — "Kasu Tu.", 22.ix.1961, F. Fernández Y. & C. J. Rosales (IZM). Agua Caliente, 20.vii.1930, H. J. Mac Gillavry, 1 ♂, 1 ♀ (MA). "Venezuela S. A.", vii.1927, Krueger, 1 ♂, 1 ♀ (KU). — Zulia. Kasmera Perija, 12.iv.1963, P. J. Salinas & M. Gelbéz, 2 ♂ (IZM). — Trujillo. El Cenizo, 14.ii.1949, B. Pulido R., 1 ♀ (IZM). — Mérida. Mérida, "en la luz", 23.v.1965, N. Angeles, 1 ♀ (IZM), 1 ♀ (NRS). — Apure. Cabuyare, 16.iv.1953, "en fruto de Camoruco" (*Sterculia apetala* (Jacq.) Karst.), 1 ♂, 4 ♀, 2 cop. (MAC). — Portuguesa. Mesa de Cavaca, 7.ii.1962, D. Villasmil & A. Dascoli, 1 ♂, 7 ♀; Camburito Acarigua, 18-19.ii.1949, "en *Sterculia apetala*", F. Fernández Y., 1 ♂, 3 ♀ (IZM). — Carabobo. Valle de Rio Borburato, 300 m, 9.v.1954, F. Fernández Y. & C. J. Rosales, 1 ♀; Barbula, 21.xi.1945, F. Diaz R. & R. Labrador, 1 ♀ (IZM). — Aragua. El Potrero, 5.ix.1945, F. Diaz R. c.s., 3 ♀ (ML). Cr. Cagua, 8.iv.1954, J. A. González, "en semillas de *Sterculia carthagenensis*", 4 ♂, 2 ♀ (det. R. I. Sailer); Cagua, 450 m, 9-26.xi.1957, E. Doreste, 7 ♂, 4 ♀; Maracay, 450 m, 2.iv.1963, "en luz", 1 ♂, 24.iii.1963, 1 ♂, E. Osuna; Maracay, 450 m, 4.v.1950, 1 ♂, 2 ♀; 18.xii.1950, 4 ♂, 2 ♀, J. J. R. Reguena; El Castaño cr., Maracay, 500 m, 20.vi.1957, F. Fernández Y., 1 ♂, 1 ♀; Gonzalito cr., Maracay, 2.ii.1950, "en camoruco", F. Fernández Y., 4 ♂, 5 ♀, 4 cop.; Piñonal, Maracay, 450 m, 13.vi.1945, "en *Sterculia apetala*", F. Fernández Y. & R. Labrador, 2 ♂, 3 ♀, 1 cop.; El Limón, 450 m, 27.xi.1950, M. Fernández M., 1 ♂; El Limón, 450 m, 10.vi.1961, F. Fernández Y., 1 ♀; Rancho Grande, 1100 m, 22.v.1964, E. Osuna, 1 ♂; Rancho Grande, 1100 m, 22.v.1958, F. Fernández Y., 2 ♀, Rancho Grande, 1100 m, 26.v.1964, A. Fernández Y., 1 ♀; Rancho Grande, 1100 m, 16.vi.1949, "a la luz", F. Fernández Y. & P. Fenjives, 1 ♀ (IZM). Tropical Research Sta., New York Zool. Soc. No 46131, 1 ♀ (AMNH). — Bolívar. Road El Dorado-Santa Elena, km 107, 460 m, 13.viii.1957, F. Fernández Y. & C. J. Rosales, 1 ♀ (IZM).

Ecuador. — Puna, Kinb., 1 ♀ (NRS). Guayaquil, 2 ♂ (MU). These three specimens probably also belong to Stål's type series (Stål, 1859: 253).

Locality unknown. — W. 206, (*obliquus* H.-S.), 1 ♂ (ZSM). Manaure (?), F. Simons, 2 ♀ (BM).

Dysdercus chiriquinus Distant

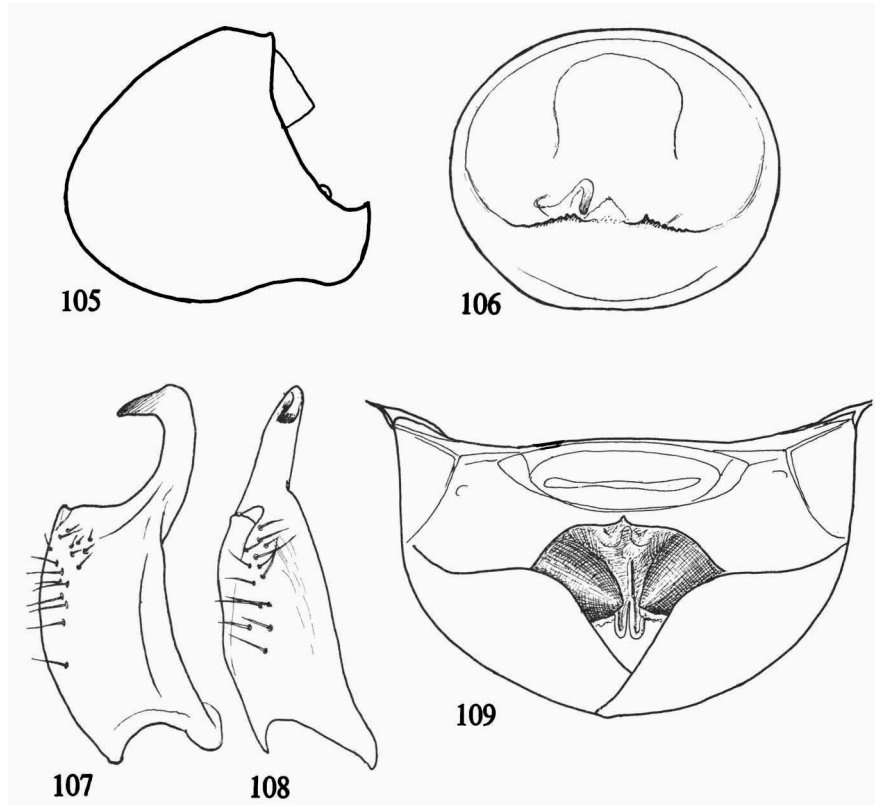
(figs. 105-110; pl. 7 fig. 2)

Dysdercus chiriquinus Distant, 1883, Biol. Centr.-Amer., Het. 1: 232, pl. 21 fig. 22; type locality: Volcano de Chiriquí, Panama; lectotype ♂, BM! — Hussey, 1929, Gen. Catal. Hem. 3: 87. — Blöte, 1931, Zool. Meded. 14: 136. — Schmidt, 1932, Wien. Ent. Ztg. 49: 272. — Vivas-Berthier, 1941, Bol. Soc. Venezol. Cienc. Nat. 7: 117 (*chiquirinus*). — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 32, pl. 3 fig. 4 (paramere). — Szumkowski & Fernández Yépez, 1963, Agron. Tropic., Maracay 13: 85.

A large, yellowish species (13.9-19.0 mm), with very long rostrum and a black dot on each hemelytron.

Head. — Upper surface orange-red, usually with a dark shade, underside pale orange; apex of anteclypeus and labrum blackened; gena-gula sulcus and maxillary plate red. Eye surrounded by red. Antenna dark brown to black with a reddish base. Rostrum yellowish brown, turning to blackish towards apex; the latter reaching base of sixth abdominal segment in the male and end of abdomen in the female.

Thorax. — Collar white; pronotal callus orange, pre- and post-callar sulcus blackish; disc and lateral margin pale greyish yellow, slightly darkened along lighter posterior margin. Scutellum brown to black, sometimes anterior margin and apex yellowish. Corium with same colour as disc; behind middle



Figs. 105-109. *Dysdercus chiriquinus* Distant. 105-107, male, lectotype; 105-106, genital capsule in lateral and posterior view resp.; 107, right paramere in lateral view. 108, male from Honduras, paramere in posterior view. 109, female from Brazil, genitalia in posterior view.

with a roundish, black spot (in Venezuelan specimens this spot tending to be smaller). Membrane dark grey to blackish, border whitish. Ventral surface: sterna and pleura orange-red, often with borders blackish; posterior pleural flanges and epicoxal lobes white; ostiolar peritremes yellowish. Legs light brown, gradually darkening to blackish towards apex.

Abdomen. — Sternites yellowish brown, turning to reddish brown towards apex of abdomen; posterior margins of sternites bordered with white, anterior margins and along the white borders with some black; lateral margins yellowish, suffused with dark streaks. — Male: white border of sternite VI narrow; sternite VIII with dark base and whitish posterior margin. Genital capsule (figs. 105, 106) reddish brown, with a somewhat produced, evenly rounded, posterior margin; lateral margin dorsally sharply edged and posteriorly ending on both sides of median in a blackish small tooth. Area between teeth slightly excavated, anteriorly continuing into the genital cavity. Paramere (figs. 107, 108) with a short, wide shaft; very sparsely pilose and provided with an excentric, recurved, posteriorly directed, sharp spur. — Female (fig. 109): first gonocoxa yellowish brown with a slightly produced distal margin; sclerites of second gonocoxae brownish, laterally inserted, conically curved, and separated by a less sclerotized, central area.

Upper surface of head, anterior pronotal corner, sterna, abdominal side, and mid-ventral area minutely pilose.

Length of male 13.3-16.2 mm; length of female 17.5-19.0 mm.

Lectotype designation of *Dysdercus chiriquinus* Distant. — The British Museum collection contains four syntypes. The male specimen labelled "Type" is here designated lectotype of *Dysdercus chiriquinus* Distant, 1883.

Material (distribution: fig. 110).

Mexico. — Vera Cruz. Córdoba, 1.iii.1907, 27.i.1908, 10.ii.1908, 5.vi.1908, F. Knab, 4 specimens (USNM). Córdoba, 10.ii.1908, 1 ♀, 17.ii.1908, 1 ♂, F. Knab (MB). — Chiapas, L. Hotzan, 1 specimen (USNM). Teapa, Tabasco, iii.1888, H. H. Smith, 1 ♂, 1 ♀ (BM).

Guatemala. — Cayanga, iv.1915, W. Schaus; Morales, vii.1928, J. J. White; Livingstone, ii.5, Barber & Schwarz (USNM). Petén, Tikal, iii.v.1956 (some at light), T. H. Hubbell & I. J. Cantrall, 12 ♂, 4 ♀ (MZM). Puerto Barrios, at light, 1-10.i.1966, J. Geijskes, 1 ♂, 1 ♀ (ML).

British Honduras. — San Antonio, v.1931, J. J. White, 10 specimens (USNM). Rio Grande, iv and viii.1935, 2 ♂ "Purchsd of Parish" (KU). Punta Gordá, vii.1931, 1 ♀, Columbia, iv-xii.1932, 2 ♂, 3 ♀, J. J. White (BM).

Honduras. — Progreso, 25.iii.1923, 1 ♀, Tela, 6.iv.1923, 1 ♀ (det. R. F. Hussey), T. H. Hubbell (MZM).



Fig. 110. Distribution of *Dysdercus chiriquinus* Distant.

Costa Rica. — Pozo Azul, 5.v.1902, M. A. Carriker; La Uruca, 1100 m, P. Biolley (USNM). Golfito, 30.x.1950, E. S. Ross & A. E. Michelbacher, 1 ♀ (CAS).

Panama. — V. de Chiriqui, 25-4000 ft, G. C. Champion, 2 ♂; id. 2-3000 ft, 2 ♀ (type series, BM). Mérida, 1 ♀ (Breddin Coll., DEI). Lino, 1 ♂, 1 ♀ (det. H. C. Blöte); Chiriqui, 262, 1 ♀ (ML). Rovira, Chiriqui, 1900 ft, 26.ii.1960, K. W. Brown, 4 ♂, 3 ♀ (TAMU).

Venezuela. — Zulia. Kasmera, Perija, 11-12.iv.1962, P. J. Salinas & M. Gelbéz, 4 ♂, 9 ♀ (IZM). — Tachira. La Fria, 16.iv.1920, J. & E. B. Williamson, 1 ♂ (det. R. F. Hussey) (MZM). — Trujillo. Carvajal, 15.vi.1957, C. J. Rozales, 1 ♂ (IZM). — Mérida. Mérida, 23.v.1965, "en la luz", N. Angeles, 11 ♂, 13 ♀; Mérida, 1620, 9.iv.1949, at light, H. E. Box, 5 ♂, 2 ♀ (IZM). Mérida, 1 ♀ (NRS). — Lara. Sanare, ii-iii.1954, R. Prieto, 1 ♂, 1 ♀ (IZM). — Cojedes. Tinaguillo, iii.1946, G. B. Leech, 1 ♂ (CAS). — Aragua. Rancho Grande, 1100 m, 16.vi.1949, F. Fernández Y., 1 ♀ (IZM).

Colombia. — Santa Martha Mts, Mt San Lorenzo, 4500 ft, 8.vi.1920, F. M. Gaige, 2 ♂, 1 ♀ (det. R. F. Hussey) (MZM). 7 mi W Alban, Cundinamarca, 1610 m, 14.iii.1955, 1 ♂, 18 mi W Honda, Tolima, 830 m, 16.iii.1955, 1 ♂, E. I. Schlinger & E. S. Ross (CAS).

Dysdercus obliquus (Herrich-Schäffer)

(figs. III-III6; pl. 7 fig. 3)

Pyrrhocoris obliquus Herrich-Schäffer, 1843, Wanz. Ins. 7: 19, pl. 223 fig. 701; type locality: Mexico; lectotype ♀, ZSM!

Dysdercus obliquus; Herrich-Schäffer, 1850, Wanz. Ins. 9: 176. — Morrill, 1927, Calif. Dept. Agric. Spec. Publ. 73: 80. — Hussey, 1929, Gen. Catal. Hem. 3: 97 (pro parte). — Blöte, 1931, Zool. Meded. 14: 129 (pro parte: Cat. Nos. 4-6; Nos. 1-3 = *D. bimaculatus* Stål), 134. — Calderon, 1931, Ins. Pest Surv. Bull. 11 (10): 686-688. — Schmidt, 1932, Wien. Ent. Ztg. 49: 271. — Torre-Bueno, 1941, Ent. Amer. (n.s.) 21: 117 (pro parte). — Sailer, 1947, Proc. Ent. Soc. Washington 49: 15-17, 2 figs. — Hargreaves, 1948, List Cotton Insects: 30 (pro parte). — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 23, 44, pl. 4 figs. 3, 13 (paramere).

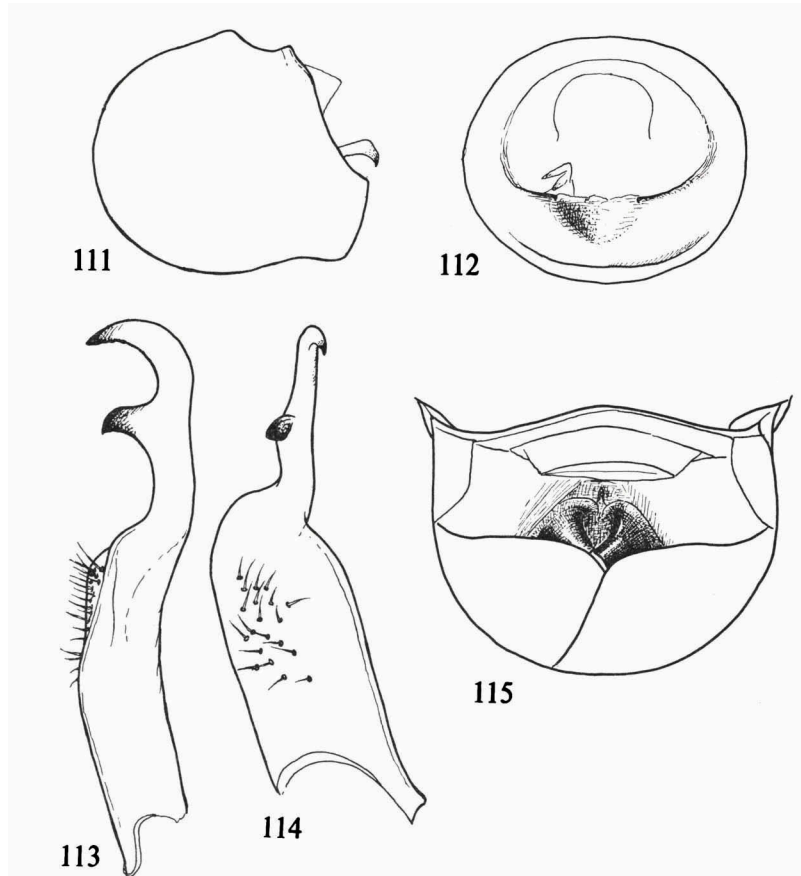
A medium-sized, pale greyish brown species (10.3-16.8 mm) with a black fascia on corium and a pale membrane; very similar in appearance to *D. bimaculatus*.

Head. — General colour orange-red; antenna brownish to black, with a reddish base; rostrum orange with last two segments blackened.

Thorax. — Collar white; anterior callar sulcus black; pronotal callus orange-red; lateral margin and disc yellow to dirty yellow; posterior margin lighter. Scutellum orange-red, sometimes with a blackish anterior part. Corium of same colour as disc, behind middle with a transverse black spot close to membranal border, not reaching costal margin. Membrane pale to dark grey, sometimes hardly pigmented; distal border narrowly white. Ventral surface: posterior pleural margins and epicoxal lobes white; sterna and pleura orange-yellow, anterior margins usually blackened. Coxae, trochanters, and femora orange-red, the latter sometimes more blackish or legs almost entirely yellowish (specimens from Panama). Ostiolar peritremes of metasternal scent gland as a rule blackened.

Abdomen. — Sternites yellowish white, lateral margins yellow, anterior margins brown to black, bordered with some red. — Male: basal black borders of sternites VI, VII heavier, segments tinged with yellow. Genital capsule (figs. III, III2) yellowish, posterior margin evenly rounded with a distinct excavation medially, on either side of this impression a minute tooth, without a lamella or crest. Paramere (figs. III3, III4) with sparsely pilose shaft, without a shoulder; head rounded with two, slightly recurved spurs, proximal spur chisel-shaped, distal spur sharply pointed, both postero-laterally directed. — Female (fig. III5): first gonocoxa yellow, evenly rounded distally; sclerites of second gonocoxae large, blackish, dorso-laterally situated, proximally nearly touching each other.

Length of male 10.3-13.4 mm; length of female 10.9-16.8 mm.



Figs. 111-115. *Dysdercus obliquus* (Herrich-Schäffer). 111-114, male from Chiapas, Mexico; 111-112, genital capsule in lateral and posterior view resp.; 113-114, right paramere in lateral and posterior view resp. 115, female, lectotype, genitalia in posterior view.

Lectotype designation of *Pyrrhocoris obliquus* Herrich-Schäffer. — Herrich-Schäffer's description of *Pyrrhocoris obliquus* is followed by the statement: "Von Herrn Sturm, aus Mexico".

A female specimen found in the Sturm collection in the Zoologische Staatssammlung in München, labelled "Mexico-B, Sammlung Jakob Sturm", and thought to be the type specimen, was kindly sent to me for examination by Dr. H. Freude. The specimen is well preserved, only the greater part of the scutellum, the right middle and both the hind legs are missing. It has obviously been repinned and is fastened to the new pin with a black glue. The genitalia are shown in fig. 115.

This specimen agrees very well with Herrich-Schäffer's description and illustration and unmistakably has type status. But because it cannot be proven to be the holotype, this specimen is here designated as the lectotype of *Pyrrhocoris obliquus* Herrich-Schäffer, 1843.

Material (distribution: fig. 116).

Mexico. "Mexico-B, Sammlung Jakob Sturm", 1 ♀ (lectotype) (ZSM). "Mexico", Sallé, 1 ♀ (BM). — Sinaloa. Guamuchil, 16 mi SE, 16.vi.1961, A. S. Menke, 1 ♀ (ML). Culiacan, 100 mi S, 24.xii.1960, D. G. Denning, 1 ♂ (UCB). — Jalisco. Guadalajara, viii, 1 ♀ (Breddin Coll., DEL). — Colima. Colima, 2 ♀ (W. H. Mucbe-Radeberg Ank., MD). — Michoacan. Michoacan, 20.viii.1954, 1 ♂, Apatzingan, 12 mi E, 20.vii.1954, 1 ♂, Linsley c.s. (UCB). Pátzcuaro, 2050 m, 27.vii.1947, T. H. Hubbell, 2 ♂ (MZM). — Nueva Leon. Monterrey, 11.iv.1910, 1 ♀, "*D. obliquus* H.S., JRTB. 1941 Paraplesio-type in synopsis" (KU). — Tamaulipas. Guemes, 15 mi N, Ciudad Victoria, 6.vi.1961, Univ. Kans. Mex. Exped., 4 ♂, 8 ♀ (KU). Hidalgo, 130 mi S Monterrey, 5.ii.1939, G. L. Artamonoff, 1 ♂ (CNHM). — San Luis Potosi. Ciudad del Maíz, 5 mi E, 4700 ft, 22-23.viii.1954, 1 ♂, 1 ♀, El Salto, 1800 ft, 8.vi.1961, 1 ♀, Univ. Kans. Mex. Exped.; Valles, 25.iii.1951, A. Chapman, 1 ♂ (det. R. I. Sailer), 1 ♂ (det. J. L. Stehlík)

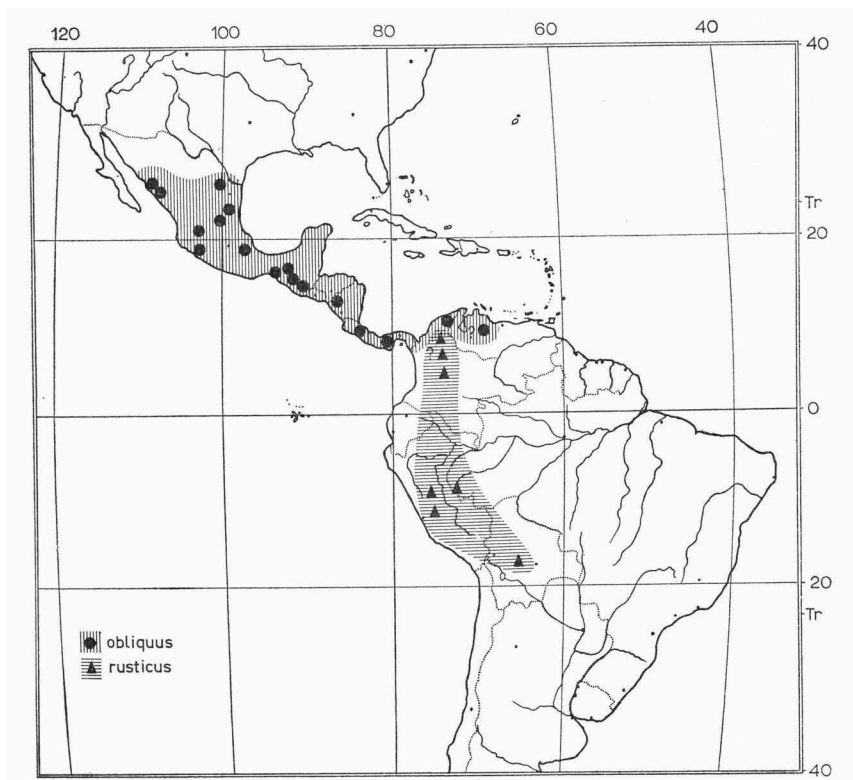


Fig. 116. Distribution of *Dysdercus obliquus* (Herrich-Schäffer) and *D. rusticus* Stål.

- (MB). Valles, 16-17.v.1949, G. M. Sutton, 2 ♂, 5 ♀; Valles, 5.ix.1951, J. E. Mosimann, 2 ♀ (MZM). — Hidalgo. Ixmiquilpan, 19-22.viii.1947, H. O. Wagner, 1 ♂, 2 ♀ (MZM). — Vera Cruz. Puerte Nacional, 5 mi W, 11.i.1951, R. F. Smith, 1 ♀; Jalapa, vi-vii.1948, Wegener, 1 ♀ (AMNH). San Rafael, Ticaltepec, 18-21.iii.1896, 3 ♂, 1 ♀ (ISU). Jalapa, Jensen-Haarup, 1 ♀ (CNHM). Jalapa, Hoege, 1 ♂, 1 ♀; Orizaba, xii.1887, H. H. Smith & F. D. Godman, 1 ♀ (BM). Jalapa, 2 ♂, 4 ♀ (W. H. Mueche-Radeberg Ank.); Jalapa, F. D. Godman, 1 ♀ (9.-Gesch. 1908) (MD). El Palmar, 6.vi.1948, A. C. Smith, 1 ♂; Córdoba, 21.iv.1908, Friedk-Knab, 1 ♀ (MB). Jalapa, 1 ♀ (MC). Jalapa, Joh. Laue, 1 ♂, 1 ♀ (ZSM). — Puebla. Tehuacan, 23.vi.1951, 1 ♂, 3 ♀ (UCB). Villa Juarez, 3900 ft, 20.vi.1955, A. & K. Hooper, 1 ♂, 1 ♀ (MZM). — Guerrero. Xucumantlan, 7000 ft, vi, H. H. Smith, 1 ♂ (BM). Iguala, 27-29.x.1947, H. O. Wagner, 1 ♀ (MZM). — Oaxaca. Tapanutepec, 3 mi N, 21-22.xii.1955, 3 ♂, 9 ♀, La Ventosa, 50 mi N, 14.xii.1955, 1 ♀, J. C. Schaffner (ML). Oaxaca, 18.iv.1953, Bechtel c.s., 1 ♀ (UCB). Tehuantepec, 65 m, 8.xi.1948, H. O. Wagner, 2 ♀ (MZM). — Chiapas. Comitán, 14 mi SSE, 23.vii.1963, J. Doyen, 1 ♂, 2 ♀; Soyalo, 4 mi SE, 15.iii.1953, Bechtel c.s., 1 ♀ (UCB). — Not located. Tamos, 7.xii.1909, F. C. Bishopp, "♀ drawn", 1 ♀ (MB). Presidio, Forrer, 1 ♀ (BM).
- Guatemala. — "Guatemala", 1 ♂ (Breddin Coll., DEI). Duenas, G. C. Champion, 2 ♂ (BM). Cerro Zunil, 4000-5000 ft, Champion, 1 ♀ (BM), 1 ♀ (Edm. Schmidt det., 1931) (DEI).
- Nicaragua. — Jinotega, Dept. Jinotega, 1050-1200 m, vii.1947, C.N.H.M. Bot. Exped. Centr. Am. 1946/47, P. C. Standley, 1 ♀ (CNHM).
- Costa Rica. — Irazú, 6000-7000 ft, H. Rogers, 2 ♀ (BM), 1 ♂ (MD). Finex S. Miguel, Barranca, "Her R. Highness Pr. Sigismund of Prussia", 1 ♀ (MD).
- Panama. — Lino, 4 ♂, 4 ♀ (MD), 3 ♂, 1 ♀ (ML). Cerro Campana, vi.1958, J. Lane, 1 ♀ (ZSP). V. de Chiriquí, 2000-3000 ft, G. C. Champion, 2 ♂ (BM). Boquete, Chiriquí Prov., 7.iii.1923, F. M. Gaige, 1 ♂, 2 ♀ (MZM).
- Colombia. — Papayal, 7000-7800 ft, 14.xi.1934, H. F. Schwarz, 1 ♀ (AMNH).
- Venezuela. — Santa Lucia, v.1922, L. R. Reynolds, 1 ♂, 1 ♀ (CNHM).
- Not located. — Coll. Camilie Van Volxem, M. R. Belg., 179, MZH 7411, 1 ♀ (MZH). MB [Museum Berlin?] 1837-1, 2 ♂, 1 ♀ (ML).

Dysdercus rusticus Stål

(figs. 116-121; pl. 7 fig. 4)

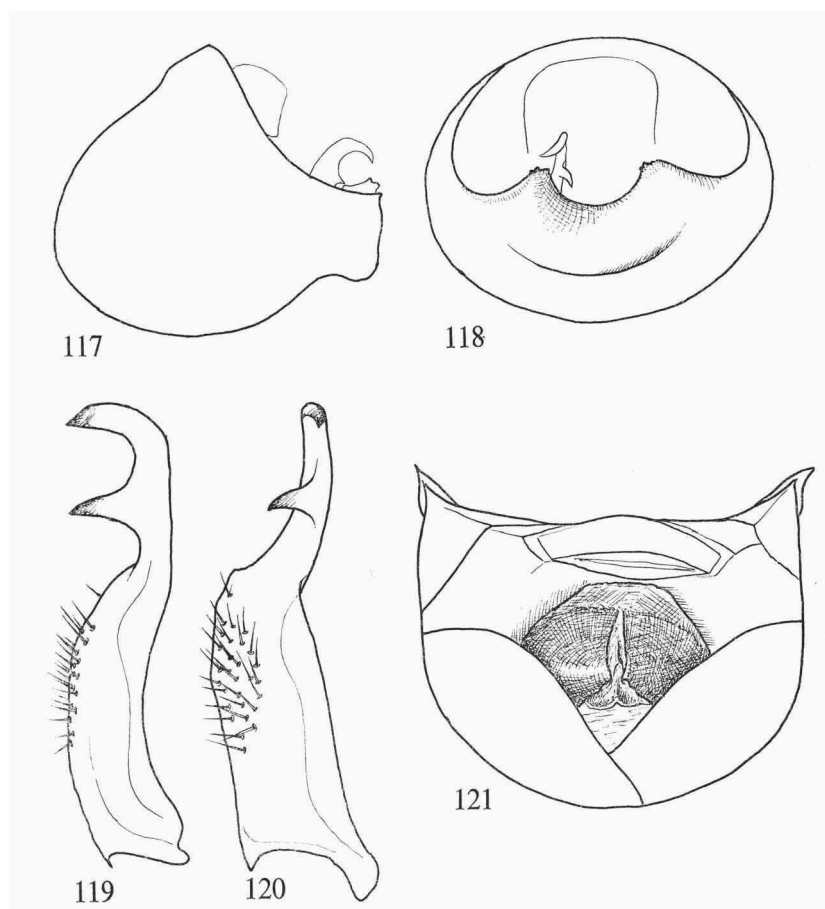
Dysdercus rusticus Stål, 1870, Enum. Hem. 1: 123; type locality: Colombia, Bogotá; lectotype ♀, NRS! — Hussey, 1929, Gen. Catal. Hem. 3: 102. — Blöte, 1931, Zool. Meded. 14: 133. — Schmidt, 1932, Wien. Ent. Ztg. 49: 272. — Hargreaves, 1948, List Cotton Insects: 30. — Wille, 1951, Ent. Agric. Peru: 16, 31. — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 23, 51.

Large species (12-18 mm) with a long rostrum, without a white annulus at base of fourth antennal segment and without black marking on hemelytra.

Head. — Colour orange-red, often blackened towards apices of tylus and antenniferous tubercle and slightly suffused with black on upper surface; antenna reddish brown, last segment blackish; rostrum same colour as antenna but apex of last segment blackened; rostrum long, in the male reaching abdominal segment V, in the female to VI.

Thorax. — Pronotal collar dirty white; callus orange-red, surrounding

sulcus black; lateral margins and disc dirty yellow; the latter with a transverse, blackish fascia near posterior margin. Scutellum brownish orange with blackish borders laterally and posteriorly, seldom almost entirely blackish. Corium same colour as disc; proximal part reddish, median plate often blackened. Membrane dark grey to blackish with light grey border. Ventral surface: sterna and pleura orange-red, often suffused with brown and surrounded by a blackish border; posterior border of pleura and epicoxal lobes more or less dirty white. Ostiolar peritremes yellowish; coxae orange-red, remaining parts of legs reddish brown to brown, somewhat blackened towards apices.



Figs. 117-121. *Dysdercus rusticus* Stål. 117-120, male from Bolivia; 117-118, genital capsule in lateral and posterior view resp.; 119-120, right paramere in lateral and posterior view resp. 121, female from Peru, genitalia in posterior view.

Abdomen. — Sternites centrally yellowish white, anterior margins red becoming black laterally, lateral margins with red to blackish triangular markings; anterior half of sternites VI, VII largely red, especially in the male; other sternites slightly suffused with red. — Male: segments VIII, IX orange-red; IX (figs. 117, 118) with posterior margin gradually rounded and medially with a deep, dorsal excavation, limited laterally by an anteriorly crested elevation; lamella not visible. Paramere (figs. 119, 120) with a slender shaft, shoulders scarcely visible and the head with two spurs; proximal spur straight, dorso-ventrally flattened, and bluntly pointed as seen from above; distal spur gradually curved, pointing laterally, apex sharp. — Female (fig. 121): first gonocoxa red and gradually rounded distally; sclerites of second gonocoxae dorso-laterally inserted, sharp-conically curved, mesial margins close to median.

Length of male 12-15 mm; length of female 13-18 mm.

Lectotype designation of *Dysdercus rusticus* Stål. — Stål's *D. rusticus* is based on two female specimens from Bogotá, Colombia, in the collection of the Stockholm Museum. The specimen bearing a label "Typus" and Stål's identification label is here designated as the lectotype of *Dysdercus rusticus* Stål, 1870.

Material (distribution: fig. 116).

Colombia. — "Colombia", F. M. Anderson, 2 ♀ (CAS). Puerto Wilches, 1.12.1931, C. H. Ballou, 1 ♂, 1 ♀ (MB). Peñas Blancas, Rio Magdalena, 18.iv-9.v.1926, Woronov, 4 ♂, 4 ♀ (ZIL). Bogotá, 2 ♀ (lectotype and syntype) (NRS).

Peru. — Monson Valley, Tingo Maria, x-xi.1954, E. J. Schlinger & E. S. Ross, 6 ♂, 16 ♀ (CAS). Dept. Junin, Prov. Tarma, 1400 m, A. S. I., 20.vii.1940, F. Waytkowski, 1 ♀ (KU).

Brazil. — Territorium do Acre, Cruzeiro do Zul, i.1954, 2 ♀ (MNR).

Bolivia. — Chapare, Cochabamba, Cristal Mayu, 800 m, 1960, F. Steinbach, 1 ♂, 2 ♀ (ML).

**Dysdercus lunulatus* Uhler

(figs. 122-127; pl. 8 fig. 1)

Dysdercus lunulatus Uhler, 1861, Proc. Ent. Soc. Philadelphia 1: 24; type locality: Mexico?; holotype in the collection of the Entomological Society of Philadelphia is lost; neotype ♀, type locality: Mexico, Jalapa, ML! — Hussey, 1929, Gen. Catal. Hem. 3: 93, 95 (synonymized with *D. mimus* (Say)). — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 43 (*lunatus*).

Dysdercus bidentatus Hussey, 1927, Bull. Brooklyn Ent. Soc. 23: 233, 235, fig. 2 (male genitalia); type locality: Volcan de Chiriqui, Panama; holotype ♂, MCZ (new synonym). — Hussey, 1929, Gen. Catal. Hem. 3: 86. — Blöte, 1931, Zool. Meded. 14: 117, 133. — Schmidt, 1932, Wien. Ent. Ztg. 49: 266. — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 22, 31.

Medium-sized to large (10.5-17.0 mm); antennal segment 4 wholly blackish; a bilobate to trapezoidal spot on head and a crescentic spot near middle of corium, black; pronotum: disc black, lateral margin yellowish to red; abdominal sternites red without white margins.

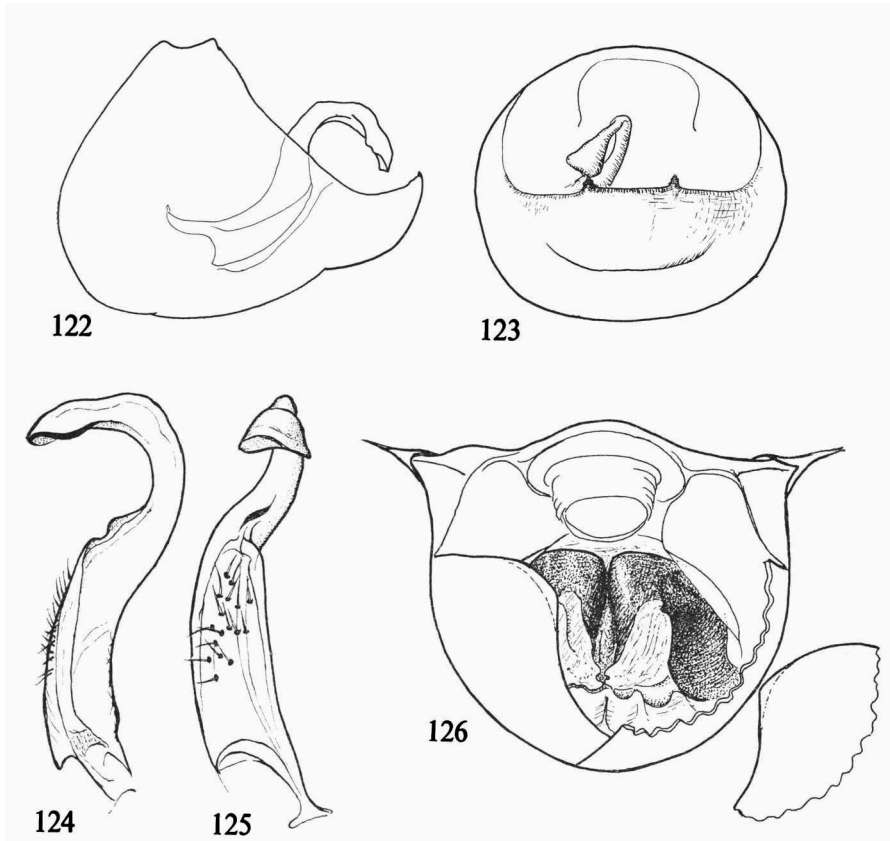
Head. — Colour orange to red with a bilobate to trapezoidal black spot above; clypeal apex blackish; antenna dark brown to blackish including entire segment 4; rostrum usually of same colour as antenna but base and first joint reddish. Antennal segment 4 considerably longer than 1.

Thorax. — Side of pronotum concave, lateral margin strongly reflected. Pronotal collar yellowish white with medial part of posterior margin black or often almost entirely black; callus of same colour as head; disc black, extreme posterior margin usually pale; lateral margin of pronotum yellow to red, often edged with black. Scutellum, a large corial spot, distal corial angle, and membrane black; ground colour of corium pale yellowish white; corial spot irregularly crescentic with flat side approaching costal margin but often leaving edge itself yellowish; anterior margin of spot more or less straight and usually with an indentation at crossing with corial cleft. Membrane distally with a whitish border. Ventral surface: collar and posterior pleural borders yellowish white, the latter often suffused with red; sterna and pleura yellowish to orange-red; anterior prosternal sulcus and borders of meso- and metapleura blackish; epicoxal lobes orange to red; ostiolar peritremes yellow. Coxae orange, remaining parts of legs brown to dark brown with tibiae usually blackish, femora proximally and ventrally often reddish.

Abdomen. — Sternites yellow, laterally and posteriorly suffused with red; anterior margins of sternites III-VII black laterally; often a triangular area laterally and a bilobate area at anterior mid-ventral part of sternites IV-VI suffused with brown to black. — Male: sternites VIII, IX red; posterior margin of genital capsule (figs. 122, 123) rounded and with two dorsally directed teeth on each side of the median, anterior to which the genital cavity is limited by a triangular capsular lamella. Paramere (figs. 124, 125) with a slightly curved, slender shaft, sparsely covered with setae and ending in a single, large, strongly recurved spur, the apex of which is flat and somewhat truncate. — Female (fig. 126): first gonocoxa yellowish to orange-red, slightly reduced, distal margin nearly angular. Sclerites of second gonocoxae large, contiguous in midline, deeply concave distally.

Length of male 10.5-12.0 mm; length of female 11.5-17.0 mm.

Neotype designation of *Dysdercus lunulatus* Uhler. — Hussey (1929: 95) synonymizes Uhler's *Dysdercus lunulatus* with *D. mimus* (Say), but Uhler mentions in his description some characters that do not agree with *D. mimus*,



Figs. 122-126. *Dysdercus lunulatus* Uhler. 122-125, male from Panama; 122-123, genital capsule in lateral and posterior view resp.; 124-125, right paramere in lateral and posterior view resp. 126, female from Barro Colorado Island, Panama, genitalia in posterior view.

viz.: "Head . . . with a bilobed dusky spot upon the middle"; "Thorax . . . a little dusky against the anterior margin"; and "the remaining inferior surface, excepting the three last segments, which are bright red, yellowish-red".

The only species that does fit the description of *D. lunulatus* is the one described by Hussey in 1927 as *D. bidentatus*. Only one character of *lunulatus* seems not to fit this species: Uhler described the half-moon shaped blackish spot on the hemelytron as not "running upon the exterior elevated edge". At first sight this seems not to be the case in *D. bidentatus*, but examination of many specimens from the side shows that this edge is usually indeed yellow. Furthermore, the length of "6 lines" [= 12.7 mm] he gives for *lunulatus* fits *D. bidentatus* much better than *D. mimus*, which

is a smaller species. It is therefore quite certain that Uhler and Hussey had the same species before them and consequently that *D. bidentatus* must sink into synonymy.

According to Uhler (1861), "the specimen described is in the collection of the Society", obviously meaning the collection of the Entomological Society of Philadelphia. The late Dr. H. J. Grant, Chairman of the Department of Insects of the Academy of Natural Sciences of Philadelphia where what remains of the Society's collection is kept, informed the author that the type specimen of *Dysdercus lunulatus* Uhler, 1861 is not in the collection. He presumed that it had been destroyed by a dermestid infestation in the early days when there was no Conservator of the collections.

During the search for the type, a specimen from Uhler's collection, named by Uhler himself as: "*Dysdercus lunulatus* Uhler, Mex." and therefore supposed to have type status, was kindly sent to the author for inspection by Dr. R. C. Froeschner (USNM). This specimen cannot be the type, however, because it lacks the dusky spot on the head, the anterior margin of the thorax is not dusky, the abdominal segments are banded red and white, and the length is 16 mm. In fact, it is a female of *Dysdercus concinnus* Stål.

In order to stabilize the identity of *Dysdercus lunulatus* Uhler, 1861, and its supposed synonymy with *D. bidentatus* Hussey, a neotype is here designated. This neotype is a female labelled "Jalapa Mexico" fitting reasonably Uhler's description; the length is 13.8 mm. It bears also a label "56" and an identification label "Museum Leiden *Dysdercus bidentatus* Hussey Det.: Blöte, Cat. No. 1". This neotype is in the Leiden Museum.

Material (distribution: fig. 127).

Mexico. — Córdoba, Vera Cruz, 24.ii.1908, F. Knab; Chiapas, 1910, C. Hotzen (USNM). Chiapas, 20.ix.1907, L. Conradt, 1 ♂ (MW). Jalapa, 56, 1 ♀, *D. bidentatus* Hussey, det. Blöte, Cat. No. 1 (neotype of *D. lunulatus* Uhler) (ML). Teapa, Tabasco, ii[.1888], H. H. Smith, BCA-Hem I, *D. concinnus*, 1 ♀ (BM).

Centr. America. — S. Francisco, 4500 ft, H. Rogers, 1 ♀ (Distant Coll., BM).

British Honduras. — R. Sarstoon, Blancaneau, 1 ♀ (BM).

Guatemala. — Cerro Zunil, 4-5000 ft, G. C. Champion, 1 ♀ (BM).

Honduras. — Progreso, 19.iii.1923, 1 ♂, Tela, 17.iii.1923, 1 ♀, T. H. Hubbell, paratypes of *D. bidentatus* Hussey (MZM).

Costa Rica. — San Pedro de Montes de Oca, 6.iii.1934, C. H. Ballou; Carthago, 26.ii.1926, P. C. Standley (USNM). Orosi, 1 ♀ (Muche, MD). Guanacaste near Turin (10° 20' N, 84° 50' W), 15.ii.1960, at light, Palmer, 3 ♂, 2 ♀ (KU). Orosi, 1 ♀ (ML). Pacayas, C. Werckele, 1 ♂, paratype of *D. bidentatus* Hussey (MZM).

Panama. — Volc. Chiriqui, 2-3000 ft, Champion, Biol. Centr.-Amer., 1 sp.; El Carmeno, 1.iv.1941, Fruit fly trap, J. Zetek, 4775, Lot No. 41-7233, 1 sp. (USNM). Rio Changena, Boca del Toro, 2400 ft, 23.ix.1961, G. B. Fairchild, 1 ♂ (ML). Chiriqui, 1 ♀ (Muche, MD). Chiriqui, 1 ♂; Lino, 1 ♀ (ML). Porto Bello [Portobelo?], 16.iii.1911, 1 ♂ (*D. bidentatus* Hussey, det. R. I. Sailer), Trinidad Rio, 19.iii.1912, 1 ♀

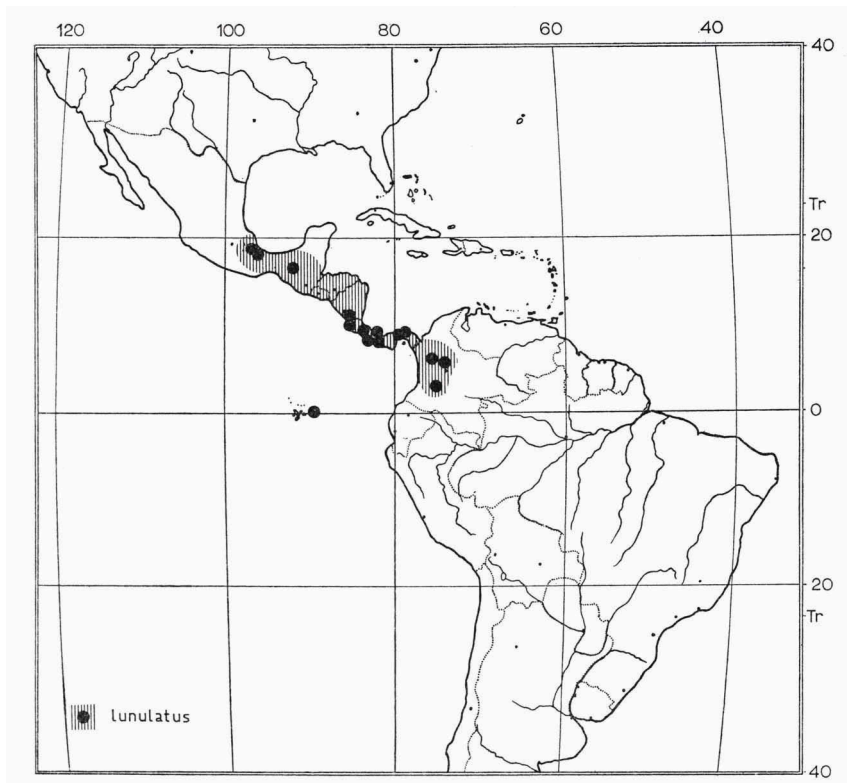


Fig. 127. Distribution of *Dysdercus lunulatus* Uhler.

(det. J. L. Stehlík), A. Busck (MB). Volcan de Chiriqui, 2000-3000 ft, 2 ♂, 4000-6000 ft, 1 ♂, G. C. Champion; 200 mi from Panama, 18.ii.1925, H. F. Slatery, 1 ♂; Gatan, 1-3.ii.1925, Bateson, 1 ♀ (BM). David, Chiriqui, 31.i.1960, 1 ♂, 15 mi NNE Rovira, Chiriqui, 5500 ft, 6.iii.1960, 2 ♂, 1 ♀, 3000-4000 ft, 17.iii.1960, 2 ♀, K. W. Brown (TAMU). Canal Zóne. Barro Colorado I., vii-viii.1942, J. Zetek, No 4985, 1 ♂; Ancon, 4.vi.1911, A. H. Jennings, 1 specimen; Barro Colorado I., iv.1940, J. Zetek, No 4647, Lab. No 40-8104, 1 specimen (USNM). Ft. Clayton, vii.1944, 1 ♀, Gemboa, vi. 1944, 1 ♀, Barro Colorado I., 12.xi.1944, 1 ♀, K. E. Frick (CAS). Barro Colorado I., 19.iv.1926, C. T. Greene, 1 ♀ (MB). "Panama", Galathea Exped., 15.v.1952, 1 ♂, 1 ♀ (MC). Barro Colorado I., iii.1926, F. M. Gaige, 1 ♀; Barro Colorado I., 9-10.xi.1923, F. 4855, paratype of *D. bidentatus* Hussey, 1 ♀ (MZM).

Colombia. — Medellin, viii.1866, in sago palms, F. L. Gallego M. (USNM). Muzo, Hno Apolinar M., 1 ♀; Medellin, 5000 ft, Mrs. C. S. Capp (CAS). S. Antonio, 2000 m, 1 ♀ (*D. bidentatus* Hussey, det. Tauber) (Bredin Coll., DEI). Antiochia, 1 ♂, syntype of *D. concinnus* Stål; Bogotá, Lindig, 1 ♂, syntype of *D. rufipes* Stål (NRS). Rio Magdalena, 12 ♂, 5 ♀, Hazienda Pehlke, iv-vi.1908, 1 ♂, E. Pehlke (MW). San Bartolo y Volcan, 20.vi.1936, 1 ♂, M. Athen Coll. (ZML).

Galapagos Is. — Chatham I., 13.ii.1925, G. Bateson, 1 ♀ (BM).

The *Dysdercus maurus* group***Dysdercus suturellus*** (Herrich-Schäffer)

A medium-sized species (10-15 mm); antennal segment 4 entirely black; posterior part of pronotum and corium pale brown to brown without a black spot, margins white.

Dysdercus s. suturellus (Herrich-Schäffer)

(figs. 128-132, 135; pl. 8 fig. 2)

Pyrrhocoris suturellus Herrich-Schäffer, 1842, Wanz. Ins. **6**: 76, pl. 206 fig. 645; type locality: N. America?; holotype lost (ZSM).

Dysdercus suturellus; Herrich-Schäffer, 1850, Wanz. Ins. **9**: 176. — Howard, 1889, Insect Life **1**: 242. — Uhler, 1894, Proc. Zool. Soc. London **1894**: 190. — Hunter, 1912, USDA Circ. **149**: 1-5. — Quaintance, 1913, Proc. Ent. Soc. Washington **15**: 59. — Hussey, 1929, Gen. Catal. Hem. **3**: 105. — Blöte, 1931, Zool. Meded. **14**: 133. — Anon., 1931, J. Econ. Ent. **24**: 1278, 1299. — Creighton, 1936a, J. Econ. Ent. **29**: 94. — Creighton, 1936b, J. Econ. Ent. **29**: 282. — Creighton, 1938, J. Econ. Ent. **31**: 735-739. — Barber, 1939, Sc. Surv. Porto Rico Virgin Is. **14**: 366. — Wolcott, 1941, J. Agric. Univ. Puerto Rico **25**: 71 (based on Ballou's 1906 record). — Torre-Bueno, 1941, Ent. Amer. **21** (n.s.): 118. — Smith, 1942, Bull. California Agric. Sta. **660**: 47. — Callan, 1943, Trop. Agric. **20**: 113, 115. — Hargreaves, 1948, List Cotton Insects: 31. — Gaines, 1957, Ann. Rev. Ent. **2**: 333. — Lima et al., 1962, Mem. Inst. Osw. Cruz **60**: 23, 27, 52, pl. 4 fig. 11. — Not seen: Glover, 1858, Ann. Rept. USDA **1857**: 271. — Schwarz, 1879, Rept. USDA: 348. — Comstock, about 1880. — Saunders, 1883, Insects injuring fruits: 387. — Hubbard, 1885, ??: 186-188. — Quaintance, 1896, Bull. Florida Agric. Exper. Sta. **34**: 302.

Head. — Colour red, rarely with a dark suffusion dorsally; antenna black with a red base; rostrum red, last segment blackish.

Thorax. — Pronotal collar white, posteriorly blackened; callus, lateral and anterior part of disc red; remaining part of disc blackish, sometimes suffused with red or with yellowish border anteriorly; extreme posterior border of disc white. Scutellum red, in a few specimens suffused with some black. Corium dark grey to blackish; costal margin, posterior border against membrane, claval margin and claval suture, dirty white; these markings together resemble a pallid cross on hemelytra. Median plate red, corial cleft usually reddish. Membrane dark grey to blackish with pale border distally. Ventral surface red; collar, posterior margins of pro- and mesothorax, and epicoxal lobes white; posterior margin of metathorax, tibiae and tarsi black. Ostiolar peritremes yellowish to red.

Abdomen. — Sternites red, II-VII posteriorly bordered with white except for VI in the male. Male genital capsule (figs. 128, 129) posteriorly with

a shallow, medial excavation; the latter on each side with a very small tubercle and dorsally limited by an erect, narrow capsular lamella. Paramere (figs. 130, 131) with a slightly curved, slender shaft, a distinct neck, and a head with two spurs. Proximal spur recurved; distal spur long, straight, perpendicularly situated on head's axis and with a secondary, small hook

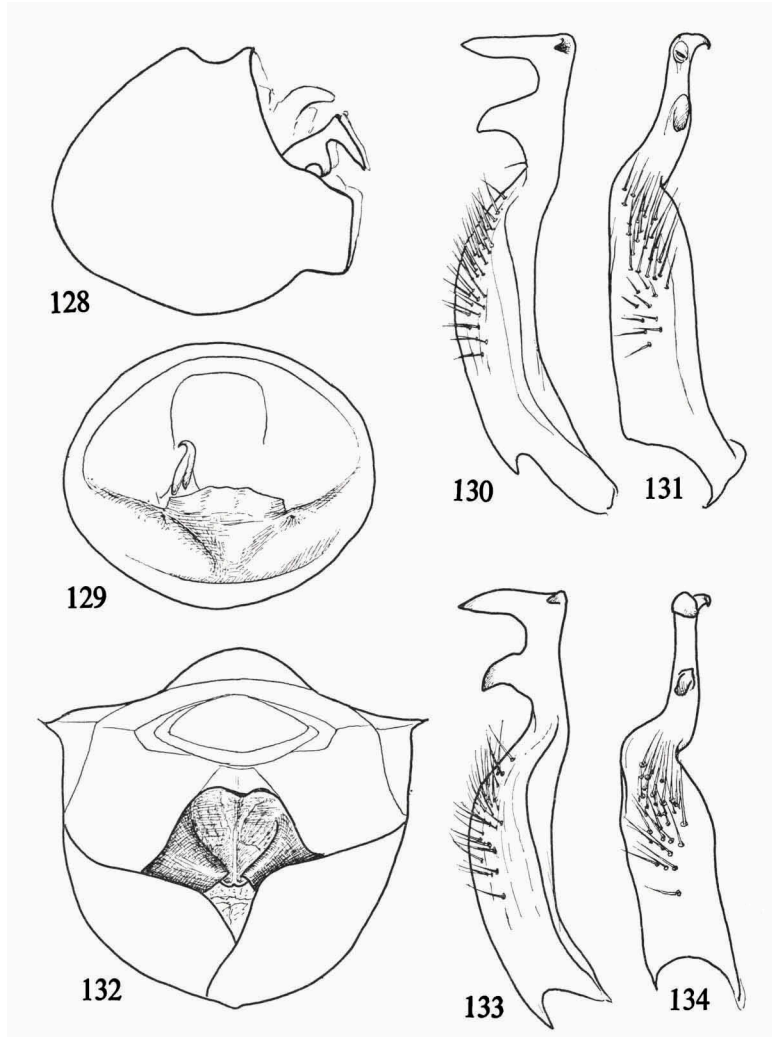


Fig. 128-134. *Dysdercus suturellus* (Herrich-Schäffer). 128-131, male from Florida; 128-129, genital capsule in lateral and posterior view resp.; 130-131, right paramere in lateral and posterior view resp. 132, female from Florida, genitalia in posterior view. 133-134, *D. s. capitatus* Distant, male from Yucatan, right paramere in lateral and posterior view resp.

proximally. Female (fig. 132): distal margin of first gonocoxa moderately reduced, rounded; sclerites of second gonocoxae laterally inserted, conically curved, distal margin sharply concavely sinuated and meso-dorsally extended by a small, plain sclerotized part; 'cones' directed obliquely to midline.

Length of male 10.0-12.5 mm; length of female 11.0-15.0 mm.

Type of *Pyrrhocoris suturellus* Herrich-Schäffer. — Like most of Herrich-Schäffer's type specimens, the type of *Pyrrhocoris suturellus*, which was in the Zoologische Staatssammlung at München, was destroyed during World War II (Dr. H. Freude, in litt.).

Material (distribution: fig. 135).

United States of America. — Florida. "Florida", W. H. Ashmead, 1 ♀; Crescent City, 2.7. Atk., 1 ♀; Lake Worth, 2.ii.1920, Mrs. H. J. Bryant, 2 ♂, 1 ♀ (BM). Royal Palm Park, 23-24.i.1932, A. L. Meinander, 2 ♂, 1 ♀ (det. M. Griffith) (DEI). Hawthorn, 4.xii.1904, 1 ♂, 1 ♀; Metecumbe, xi.1931, Sippmann, 1 ♂, 2 ♀ (1 ♀: "*D. suturellus* H.-S., J. R. de la Torre-Bueno det., 1933, Plesiotype specimen in synopsis

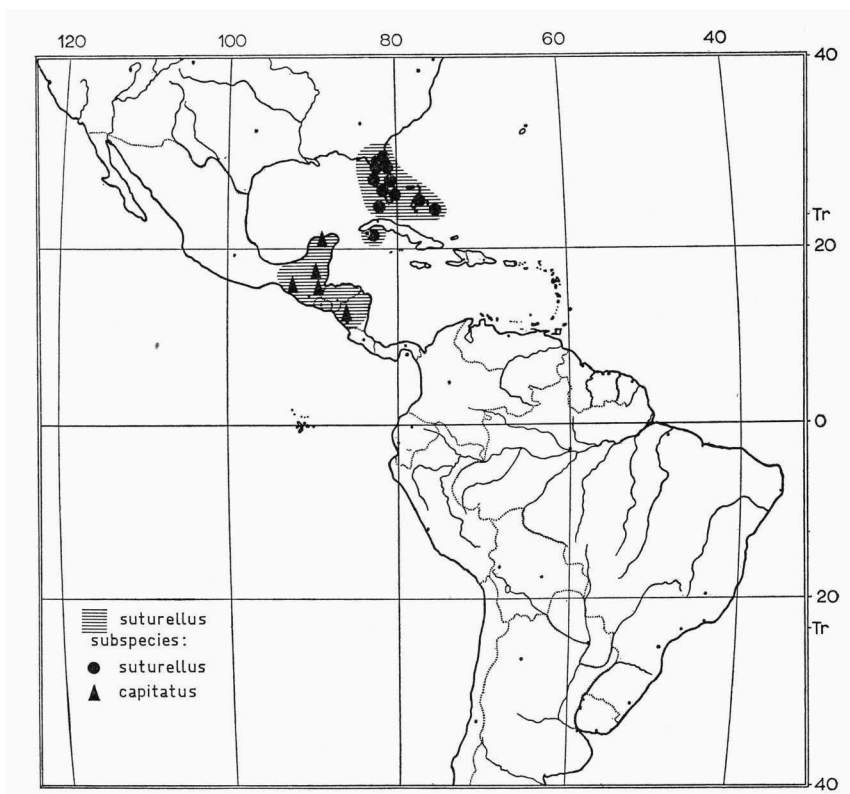


Fig. 135. Distribution of *Dysdercus suturellus* (Herrich-Schäffer).

1941"); St. Petersburg, 21.vi.1919, 1 ♂, 29.vi.1929, 1 ♀, G. Franck; Gulfport, A. G. Reynolds, 3 ♂, 3 ♀; Daytona, 16.xi.1911, G. P. E., 1 ♂; St. Petersburg, no. 3, on herbage, 4 ♀ (J. R. de la Torre-Bueno Coll.); Ft. Meade, 13.viii.1930, L. D. Tuthill, 1 ♂, 1 ♀ (det. R. I. Sailer); Collins Co., 1938, W. Benedict, 1 ♂, 1 ♀ (KU). Kissimmee River, 1 ♂, 1 ♀; Miami, ii.1909, 1 ♂, 1 ♀; Sarasota Bay, J. Wellcot, 1 ♂; Key West, ii.1909, 1 ♂ (E. P. van Duzee Coll.); Gulfport, on *Urena lobata*, 16.i.1915, 4 ♂, xii, 1 ♂, A. G. Reynolds (det. Van Duzee) (Parshley Coll.); Miami, 24.ii.1940, E. Van Dyke, 1 ♂ (CAS). Everglade National Park, 1.xii.1961, P. S. Messenger c.s., 3 ♂, 1 ♀; Florida, Lönnberg, 1 ♀ (NRS). Orlando, xii.1922, W. W. Votters, 2 ♂, 2 ♀ (det. J. L. Stehlík) (MB). Alachua County, x.1938, 1 ♂ (Creighton). Punta Gorda, 5-28.ii.1953, H. Ramstadt, 10 ♂, 18 ♀; Palm Beach, 24.iv.1906, Mrs. H. W. Cory, 1 ♂; Oneco, Manatee Co., 2.iv.1954, A. K. Wyatt, 1 ♂; St. Augustine, C. W. Johnson, 1 ♀ (CNHM). Royal Palm Park, 1916, Mosier, 2 ♀; Ft. Lauderdale, 1.xii.1927, D. M. Bates, 2 ♀; Alachua, Gainesville, 13.x.1923, 1 ♀, 1944, 1 ♂, T. H. Hubbell (MZM). — Georgia. Darien, 3.ix.1908, 1 ♂ (E. P. Van Duzee Coll., CAS).
 Ilha de Pinos, Antilhas, A. Otero, v.1938, 1 ♀ (det. J. L. Stehlík) (ML).
 Bahamas. — New Providence I., 1.ii.1934, 1 ♂, 1 ♀; Clarendotown, Long I., 1.ii.1934, 1 ♂, Utowana Exped. (MCZ).
 Jamaica. — Kingston, 1.viii.1920, C. C. Gowdey, 1 ♀ (BM).

Dysdercus suturellus capitatus Distant

(figs. 133-135; pl. 8 fig. 3)

Dysdercus capitatus Distant, 1883, Biol. Centr.-Amer. Het. 1: 233, pl. 21 fig. 21; type locality: Mexico; holotype ♀, NRS! — Hussey, 1929, Gen. Catal. Hem. 3: 86. — Blöte, 1931, Zool. Meded. 14: 136. — Schmidt, 1932, Wien. Ent. Ztg. 49: 272. — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 22, 31.

Differs from the nominate form in colour only: head black; corium dark grey with a white costal margin; abdomen yellowish white; structural and genital characters identical.

Head. — Upper surface brown to blackish; around eye, antenniferous tubercle, juga, and distal part of tylus often yellowish to brown; antenna brown to black, base paler; head laterally sometimes suffused with red; underside yellowish. Labrum dark, rostrum yellow with segments 3, 4 blackened.

Thorax. — Pronotal collar and extreme posterior margin of disc dirty white; posterior part of former blackened. Callus and lateral margin orange-yellow to red; anterior margin of disc yellowish, remaining part greyish and blackened towards posterior margin. Scutellum orange-yellow. Corium same colour as disc; costal margin whitish and somewhat subhyaline; inner margin of clavus, claval suture, and distal margin of corium along membrane, yellowish but less conspicuously so than in *suturellus*. Membrane grey to blackish, with a white distal border. Ventral surface pale yellow; collar,

posterior pro- and mesopleural margins, and epicoxal lobes white. Ostiolar peritremes yellow. Legs yellow, blackened towards distal parts.

Abdomen. — Sternites yellowish white with white posterior margins. Genital characters as in *suturellus* (figs. 133, 134).

Length of male 11.0-13.0 mm; length of female 12.0-15.0 mm.

Type of *Dysdercus capitatus* Distant. — The author found the type of this subspecies in the Stockholm Natural History Museum: a female bearing the labels: "Hagberg, Mexico" and "capitatus Dist.", presumably in Distant's own handwriting. It agrees perfectly with the original description in *Biologia Centrali-Americana* and with the fact that the specimen was borrowed for examination by Distant from "Mus. Holm.". In addition, the specimen lacks both mid-legs, exactly as depicted on plate 21 fig. 21, of the above mentioned work. Because of these facts the author is fully convinced that this specimen is the holotype.

Material (distribution: fig. 135).

Mexico. — Chiapas, 15.xi.1907, L. Conradt, 1 ♂ (MW). — Yucatan, G. F. Gaumer, 5 ♂, 5 ♀ (KU). Chichén Itzá, 1952, J. & D. Pallister, 1 ♂ (AMNH). Chichén Itzá, 18.iv.1962, F. D. Parker & L. A. Stange, 1 ♀ (Creighton). Chichén Itzá, E. Thompson, 1 ♂ (CNHM). Temax, G. F. Gaumer, 1 ♂, 8 ♀ (BM).

Guatemala. — Petén, Tikal, 7.iv.-12.v.1956, many at light, T. H. Hubbell c.s., 26 ♂, 31 ♀ (MZM), 1 ♂ (USNM).

Nicaragua. — "Nicaragua", 1 ♀ (NRS).

Dysdercus obscuratus Distant

Medium-sized (9.8-15.9 mm); antennal segment 4 entirely black; pronotum without raised lateral margin; head and callus shiny. Species with numerous colour variants, forming distinct geographical races.

Dysdercus o. obscuratus Distant

(figs. 136-142, 145; pl. 8 fig. 4)

Dysdercus obscuratus Distant, 1883, *Biol. Centr.-Amer. Het.* **1**: 230, pl. 21 fig. 9; type locality: Costa Rica; lectotype ♀, BM! — Hussey, 1929, *Gen. Catal. Hem.* **3**: 97. — Blöte, 1931, *Zool. Meded.* **14**: 133. — Torre-Bueno, 1940, *Bull. Brooklyn Ent. Soc.* **35**: 12. — Torre-Bueno, 1941, *Ent. Amer. (n.s.)* **21**: 118. — Hargreaves, 1948, *List Cotton Insects*: 30.

Dysdercus falcatus Schmidt, 1932, *Wien. Ent. Ztg.* **49**: 270; type locality: Chiapas, Mexico; lectotype ♂, MW! (new synonymy).

Head. — Upper surface shiny, usually red but sometimes more or less suffused with black or even pure black, leaving greater part of ventral

surface (gula) reddish. Antenna blackish with red base, segment 4 without a white annulus proximally. Rostrum red proximally, blackish distally.

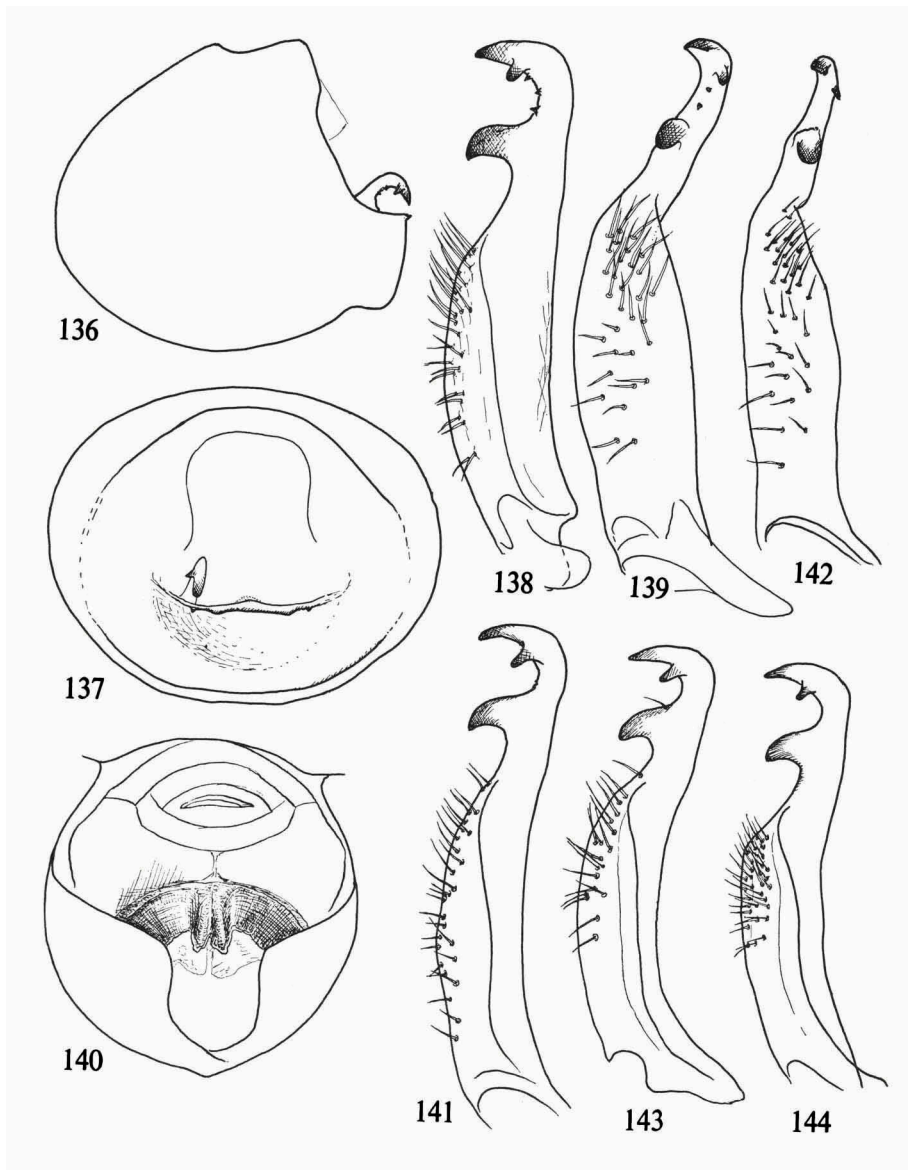
Thorax. — Pronotal collar white; pre-callar sulcus usually blackish; callus shiny, red, its central part sometimes blackened (Central America); lateral margin not enlarged and not reflected, yellow; disc yellow with a transverse crescentic black marking posteriorly, extreme posterior margin yellowish white. Scutellum black. Corium black but costal margin yellow. Membrane black, distal border white. Ventral surface: collar, posterior pleural borders, and epicoxal lobes white; sterna, pleura including metasternal ostiolar peritremes of scent gland, yellowish red, propleura usually red. Coxae and trochanters orange-yellow; femora yellowish red to red, usually blackened distally; tibiae and tarsi brown to blackish.

Abdomen. — Sternites white to yellowish white, anterior margins red, often suffused with black. — Male: anterior coloration in sternites VI, VII strongly developed; sternites VIII, IX yellowish to red, often blackened anteriorly (normally hidden); posterior margin of sternite IX (figs. 136, 137) medially with a semicircular to triangular excavation, limited anterodorsally by a narrow capsular lamella and laterally by a minute tooth. Paramere (figs. 138, 139) short, shaft strongly built without a distinct shoulder; proximal spur dentiform, thick and somewhat recurved; distal spur slightly curved, sharply pointed and laterally provided with a secondary tooth. — Female (fig. 140): first gonocoxa only slightly reduced, distal corner rounded; sclerites of second gonocoxae conically curved, black, glossy, together in midline but not fused; connecting membrane plicate showing a median carina.

Length of male 9.8-14.9 mm; length of female 10.7-15.9 mm.

Lectotype designations of *Dysdercus obscuratus* Distant and *Dysdercus falcatus* Schmidt. — Of *D. obscuratus* Distant the author found in the British Museum three specimens belonging to the type series. One female quite undamaged, and labelled "Cache, Costa Rica, H. Rogers" and also provided with a type label is here designated as the lectotype of *Dysdercus obscuratus* Distant, 1883. The other two specimens, both males, one of them with the same data label as the lectotype and the other from San Juan, Vera Paz, Champion, belong to *D. flavolimbatus* Stål.

The type series of *D. falcatus* Schmidt in the Instytut Zoologiczny, Warsaw, consists of six specimens of which a male and a female bear a red type label. The male specimen whose paramere is shown in figs. 141, 142 is here designated as the lectotype of *Dysdercus falcatus* Schmidt, 1932. It bears the data: "Mexico, Chiapas, L. Conradt S., 20.9.07" as well as Schmidt's identification label.



Figs. 136-144. *Dysdercus obscuratus* Distant. 136-139, *D. o. obscuratus* Distant, male from Vera Cruz, Mexico; 136-137, genital capsule in lateral and posterior view resp.; 138-139, right paramere in lateral and posterior view resp. 140, female from Costa Rica, genitalia in posterior view. 141-142, *Dysdercus falcatus* Schmidt, male, lectotype, paramere in lateral and posterior view resp.; 143, *Dysdercus clavatus* Blöte, male, holotype, paramere in lateral view; 144, *Dysdercus garzkei* Schmidt, lectotype, male, paramere in lateral view.

Material (distribution: fig. 145).

Mexico. — "Mex", 1 ♀, "*D. minus*, Walker's Catal."; "Mexico", Sallé, 1 ♂; Presidio, Forrer, 1 ♂, 1 ♀ (Distant Coll., BM). "Mexico", Hac. Alemania, 1929, 2 ♀ (HZM). — Sinaloa. Mazatlán, i.1917, 2 ♂, 1 ♀, 5.iii.1918, 1 ♂, 2 ♀, 28.vi.1918, 1 ♂, J. A. Kusche (CAS). 20 mi S Villa Union, 31.i.1964, E. I. Schlinger, 2 ♂, 4 ♀ (UCR). — San Luis Potosi. Tamanzunchale, 22.vi.1941, H. Dybas, 1 ♂, 2 ♀ (CNHM). Tamanzunchale, 11-22.xi.1946, E. C. Van Dyke, 2 ♂, 1 ♀; Quinta Chilla, Tamanzunchale, 20.xi.1948, H. B. Leech, 1 ♀ (CAS). Xilitla, 1450 ft, 23.vii.1954, Univ. Kans. Mex. Exped., 1 ♀; Huichihuayan, 25-27.ix.1938, Lipovsky, 3 ♂, 6 ♀; 5 mi S Valles, 13.vi.1952, Hobart c.s., 2 ♂, 1 ♀; El Salto Falls, 15.vi.1956, Beer c.s., 1 ♂ (KU). — Nayarit. Tepic, vii, Schumann, 1 ♂ (Distant Coll., BM). 5 mi S Rio Santiago, 27.xi.1948, E. S. Ross, 2 ♀; Tappan, 26.xi.1947, M. Marquis, 1 ♀ (CAS). Acaponeta, 4.viii.1953, C. & P. Vaurie, 2 ♂ (AMNH). Ahuacatlan, 18-22.vii.1951, 1 ♀ (UCB). — Colima. Colima, xii.1929, S. F. Light, 1 ♂, 1 ♀ (CAS). Armeria, 21.vii.1953, C. & P. Vaurie, 1 ♀ (AMNH). 5 mi S Manzanillo, 21.viii.1956, Beer c.s., 1 ♂ (KU). — Michoacan. 11 mi E Apatzingan, 20.viii.1954, Linsley, 1 ♀ (UCB). — Vera Cruz. Orizaba, xii.1887, H. H. Smith & F. D. Godman, 1 ♂, 5 ♀; Atoyac, iv-v.[1888], H. H. Smith, 1 ♂, 1 ♀ (Distant Coll., BM). El Fortin, 7-8.vii.1941, 5 ♂, 4 ♀, 12-17.viii.1941, 2 ♂, 2 ♀, H. Dybas (CNHM). Atoyac, v-vi.-1906, L. C. Reynolds, 5 ♂, 4 ♀; Rio Mellac near El Fortin, 17.xii.1948, H. B. Leech, 2 ♂, 2 ♀; Orizaba, E. P. Van Duzee Coll., 1 ♂ (CAS). La Buena Ventura, vii.1909, H. G. Barber, 1 ♀ (USNM). 1 mi N Tecolutla,

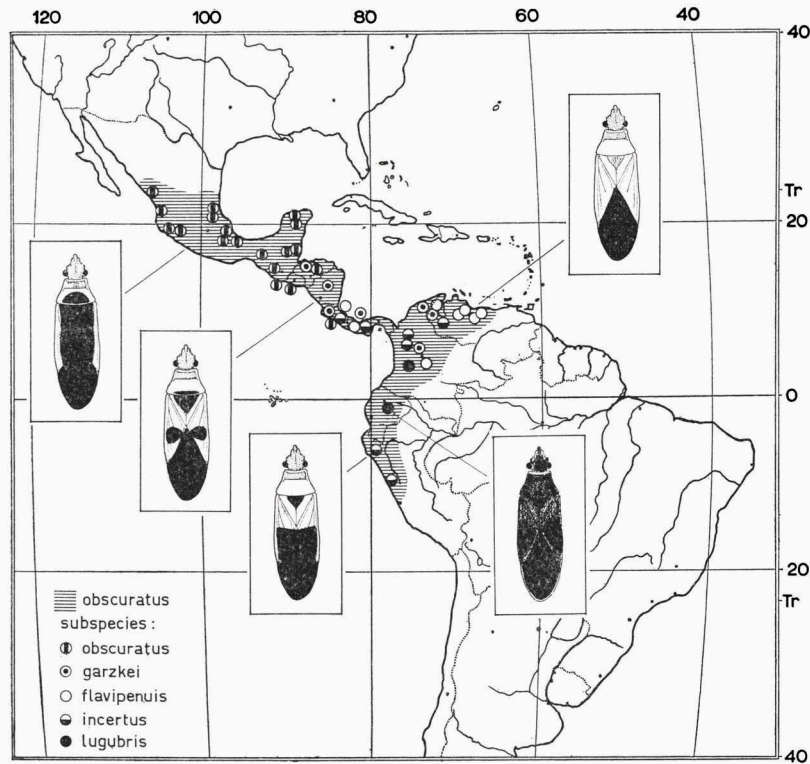


Fig. 145. Distribution of *Dysdercus obscuratus* Distant.

12.vi.1961, 1 ♂, 1 ♀; 12 mi NW San Andrés Tuxtla, 1100 ft, 24.vi.1961, 1 ♂, 1 ♀; 4 mi SW Panuco, 10.vi.1961, 1 ♂, Univ. Kans. Mex. Exped. (KU). San Rafael, Jicaltepec, 3.9.1896, 2 ♂, 3 ♀ (ISU). Orizaba, 1 ♂, 2 ♀, Jalapa, 1 ♂, 1 ♀, Córdoba, 2 ♀, Vera Cruz, 1 ♀, Crawford (POM). Córdoba, San Lorenzo, M. Trujillo, 1 ♀ (BM). Cotaxtla, 15 w black light trap, 28.vi.1962, 1 ♀; 4 mi W Puerto Mexico, 18.iv.1953, Bechtel, 1 ♀ (UCB). — Puebla. Mesa de San Diego, 5.ix.1953, trampa luz, A. Gonzalez G., 1 ♀ (INAC). Necaxa (?), G. Heine, 3 ♀ (DEI). — Chiapas. Chiapa, iv-xi.1907, L. Conradt, 3 ♂, 3 ♀ (lectotype and syntypes of *D. falcatus* Schmidt, MW). — Campeche. 10 mi N Hopelchén, 16.iv.1962, F. D. Parker & L. A. Stange, 1 ♀ (ML). — Yucatan. Temax, 3 ♂, 1 ♀ (BM). Chichén Itzá, E. Thompson, 1 ♂ (CNHM). Chuminopolis, 6.viii.1952, J. & D. Palliter, 1 ♂ (AMNH). "Yucatan", Gaumer, 3 ♂, 1 ♀ (KU).

British Honduras. — Stann Creek Valley, 13.vii.1933, R. S. Pelly, 1 ♀ (BM). Belize, 3 ♂, 2 ♀ (POM).

Guatemala. — Zapote, G. C. Champion, 1 ♀ (BM). Languin, Alto Vera Paz, 1000 ft, 9.vi.1948, R. D. Mitchell, 1 ♀ (CNHM). San José, 4.iv.1955, E. I. Schlinger & E. S. Ross, 5 ♂, 7 ♀ (CAS). Tucuru, 1600 ft, 12.vii.1947, 2 ♂, Ayutla, 13.vi.1947, 2 ♂, 1 ♀, C. & P. Vaurie (AMNH). Panzos, 2 ♀ (ML).

Honduras. — "Hond. Dgs.", Saunders, 1 ♀ (65-13, BM); "Honduras", 45/123, 1 ♂ (BM).

El Salvador. — La Libertad, 15.v.1951, E. S. Ross, 1 ♀ (CAS). Milleflores, on cotton, 8.xi.1924, K. A. Salman, 2 ♂, 2 ♀ (MB). 5 mi N Quezaltepeque, 17.vi.1963, D. Q. Cavagnaro & M. E. Irwin, 2 ♂ (CAS).

Costa Rica. — Cachi (Atl.), 1000 m, v.1905, 1 ♀, ?Cervantes, 150 m, v.1906, 1 ♂, 1 ♀, P. Biolley (Distant Coll.); Cache, H. Rogers, 1 ♀ "type" (lectotype of *D. obscuratus* Distant), 1 ♀ (BM).

Panama. — Fince, 14.vi.1945, E. J. Hambleton, 1 ♂ (USNM).

Locality unknown. — 4-40/356-3, 1 ♀, *D. flavolimbatus*, Walker's Catal. (BM). "Sued Amerika", 1 ♀ (NMB).

Dysdercus obscuratus garzkei Schmidt

(figs. 144-145; pl. 9 fig. 1)

Dysdercus garzkei Schmidt, 1932, Wien. Ent. Ztg. **49**: 268; type locality: Rio Magdalena, Colombia; lectotype ♂, MW! — Lima et al., 1962, Mem. Inst. Osw. Cruz **60**: 22, 38.

Dysdercus garzkei var. *immaculatus* Schmidt, 1932, Wien. Ent. Ztg. **49**: 269; type locality: Rio Magdalena, Colombia; lectotype ♀, MW! — Lima et al., 1962, Mem. Inst. Osw. Cruz **60**: 38.

Dysdercus fuliginosus Schmidt, 1932, Wien. Ent. Ztg. **49**: 269 type locality: Rio Magdalena, Colombia; holotype ♀, MW! (new synonymy). — Lima et al., 1962, Mem. Inst. Osw. Cruz **60**: 22, 37.

Head red; anterior margin of collar yellow, posterior margin brown to blackish; callus and lateral margin of pronotum red, often suffused with black; disc of pronotum and scutellum black. Hemelytra yellow with a large, black spot just behind middle, usually touching lateral edge; anterior half of clavus usually blackened but in some cases yellow (var. *immaculatus* Schmidt).

Lectotype designation of *Dysdercus garzkei* Schmidt. — In the Warsaw Museum collection there are three syntypes of *D. garzkei* Schmidt, one male and two females. The male, which bears a type label, the data "Columbien, Rio Magdalena, E. Pehlke S.", and Schmidt's identification label, is here designated as the lectotype of *Dysdercus garzkei* Schmidt, 1932. Its right paramere is shown in fig. 144. A female distinguished by very dark, almost pure black pronotal callus, pronotal lateral margin and legs, has been described by Schmidt as a separate species, viz., *D. fuliginosus*. This specimen, which the writer examined, belongs without doubt to *D. obscuratus* Distant and the main subspecific pattern is almost identical to that of *garzkei*.

Lectotype designation of *Dysdercus garzkei* var. *immaculatus* Schmidt. — Schmidt (1932: 269) described three females of his *D. garzkei* as var. *immaculatus*, only because they lack the blackish suffusion of the clavus. This character, however, is variable and of minor importance and, therefore, the form does not deserve of a distinct name. Of the three syntypes, a female labelled "Rio Magdalena, Pehlke S., 1914", and "Typus", is herewith designated as the lectotype of *D. garzkei* var. *immaculatus* Schmidt, 1932.

Material (distribution: fig. 145).

Mexico. — Chiapas, 1 ♀, *D. obliquus*, Walker's Catal. (BM).

Honduras. — Rio Clauro, 12.iv.1933, 1 ♂, Tela, Dakota Farm, 1-26.v.1923, 2 ♂, T. H. Hubbell (MZM).

Nicaragua. — Consequina Slope, 1.vii.1932, M. Willows Jr, Templeton Crocker Exped. 1932, 1 ♀ (CAS).

Costa Rica. — Cache, Rogers, 2 ♂ (Distant Coll., BM); Siquirres, H. Pittier, 1 ♀ (Kirkaldy Coll., BM). Guayabo, 19.i.1908, H. Dybas & J. F. Ferry, 1 ♂ (CNHM). Pozo Azul, 5.v.1902, M. A. Carriker, 1 ♂ (USNM). Turrialba, vi.1962, J. Knoke, 18 ♂, 8 ♀ (hybrid population) (ML).

Panama. — Volcan de Chiriqui, 2-3000 ft, G. C. Champion, 1 ♂ (BM). "Panama", 1 ♀ (NMB). Barro Colorado I. vi.1939, J. Zetek, 1 ♂ (USNM). Barro Colorado I., K. E. Frick, 22.xi.1944, 1 ♀ (CAS). Rio Changuena, Bocas del Toro, 2400 ft, 27.ix.1961, G. B. Fairchild, 1 ♂, 1 cop. (ML). Boquete, 20.iii.1923, 1 ♂, Progreso, iv.1923, 2 ♂, 1 ♀ (MZM). Boquete, vi.1939, J. R. Slevin, 1 ♂, 2 ♀ (CAS).

Colombia. — Bogotá, Lindig, 1 ♂ (MZH). "Colombia", acc. 4979, *D. concinnus* Stål var., R. F. Hussey det., 1927, 1 ♀ (AMNH). Bogotá, Jensen-Haarup, 1 ♂ (MC). "Colombia", iv.1939, M. Athen-Dahl, 1 ♂ (ZML). Purnio, O. Bürger, 2 ♂; Sto. Pablo, 1 ♂ (HZM). Bogotá, 1 ♀ (Distant Coll., BM). Rio Magdalena, E. Pehlke, 1 ♂, 2 ♀ (lectotype and syntypes of *D. garzkei* Schmidt), 3 ♀ (lectotype and 2 syntypes of var. *immaculatus* Schmidt), 1 ♀ (holotype of *D. fuliginosus* Schmidt), 1 ♂ (*D. mimus* Say, det. E. Schmidt), 2 ♀ (MW). Rio Frio, 20.vii.1926, 1 ♀, Sevilla, 24.vii.1926, 1 ♂ F. W. Walker (MZM).

Venezuela. — Zulia. Kasmera, 17.xii.1962, R. Lichy & A. Pérez, 4 ♂, 4 ♀ (IZM). — Tachira. Sta. Ana, 13.v.1949, F. Fernández Y., 1 ♂ (small, 9²/₃ mm) (IZM).

Not located. — "158", 1 ♀, *D. obliquus*, Walker's Catal. (BM). ?Ocana, Atkinson, 1 ♀ (92-6, BM).

Dysdercus obscuratus flavipennis Blöte

(fig. 145; pl. 9 fig. 2)

Dysdercus incertus var. *flavipennis* Blöte, 1931, Zool. Meded. **14**: 126; type locality: Panama; holotype, ♂ ML! — Lima et al., 1962 (*flavipennis*), Mem. Inst. Osw. Cruz **60**: 39.

Dysdercus ruficollis; Distant, 1883 (nec Linnaeus); Biol. Centr.-Amer. Het. **1**: 233-234 (pro parte: specimens from Nicaragua and Panama), pl. 21 fig. 9.

A largely yellow form without a black spot on corium; in some cases the absent marking is indicated by a pallid patch or a greasy-looking spot, giving the impression that the dot is present structurally but without its black pigment. Scutellum usually yellowish orange but sometimes darkened or even blackish.

Material (distribution: fig. 145).

Panama. — Barro Colorado I., 22.vi.1936, O. Park, 1 ♀ (CNHM). Barro Colorado I., vi.1939, J. Zetek, 1 ♂, 1 ♀ (USNM). Alhajuela, C. Z., 2.ii.1921, Sanders, 1 ♀ (Usinger). Chiriqui, 2 ♀ (Bredin Coll., DEI). La Chorrera, 23.v.1944, K. E. Frick, 1 ♀; Bananas, 8.7.1931, 1 ♀ (CAS). Lino, 1 ♂ (holotype of *D. incertus* Distant v. *flavipennis* Blöte, Cat. No 4); Chiriqui, 1 ♂ (paratype) (ML). Boquete, iii.1923, 6 ♂, 4 ♀, Progreso, iv.1923, 8 ♂, 4 ♀, F. M. Gaige (MZM). Boquete, vi.1939, J. R. Slevin, 1 ♂ (CAS).

Colombia. — Villavicencio, 10.vii.1938, H. Dybas, 5 ♂, 4 ♀ (CNHM).

Ecuador. — Guayaquil, 1.ii.1946, C. C. Sanborn, 1 ♂, 1 ♀ (CNHM).

Venezuela. — Zulia. Kasmera, Sierra Perija, 12.iv.1963, P. J. Salinas & M. Gelbéz, 2 ♂, 1 ♀; Kasmera, 25.ix.1961, C. J. Rosales, 1 ♂, 1 ♀; Río Escalante á 30 km de Sta Cruz, 26.ix.1951, J. A. Salas, 1 ♀ (IZM). — Portuguesa. Ospino, 7.v.1953, F. Kern, 1 ♀; Ospino, 4.ix.1949, F. Aponte (IZM). — Cojedes. La Sierra, 1100 m, 7.viii.1946, Villages & Gines, 1 ♂, 1 ♀ (CAS). — Carabobo. Aguerre, 14.xi.1947, 1 ♀, Montalban, 18.viii.1951, 1 ♂, 2 ♀, F. Fernández Y.; Trincheras, 350 m, 9.vi.1955, C. J. Rosales, 1 ♀; Cr. Aguirre, 23.xi.1951, F. Fernández Y. & C. J. Rosales, 1 ♀ (IZM). — Aragua. El Limón, 450 m, 27.xi.1950, P. Fenjives, 1 ♂ (IZM). El Potrero, 5.ix.1945, F. Dias & R. Labrador, 1 ♀ (ML). — Distrito Federal. El Valle, 4.ii.1950, 1 ♀ (IZM).

Dysdercus obscuratus incertus Distant

(fig. 143, 145; pl. 9 fig. 3)

Dysdercus incertus Distant, 1883, Biol. Centr.-Amer. Het. **1**: 230, pl. 21 fig. 7, type locality: Costa Rica; holotype ♀, BM! — Hussey, 1929, Gen. Catal. Hem. **3**: 92. — Blöte, 1931, Zool. Meded. **14**: 126, 136. — Schmidt, 1932, Wien. Ent. Ztg. **49**: 274. — ?Torre-Bueno, 1940, Bull. Brooklyn Ent. Soc. **35**: 12. — ?Torre-Bueno, 1941, Ent. Amer. **21**: 116. — Hargreaves, 1948, List Cotton Insects: 30. — Wille, 1951, Ent. Agric. Peru: 16. — Lima et al., 1962, Mem. Inst. Osw. Cruz **60**: 22, 39 (suggested to be a variety of *D. flavipennis* (sic!) Blöte).

Dysdercus clavatus Blöte, 1933, Ann. Mag. Nat. Hist. (10) **11**: 600,601; type locality: Panama; holotype ♂ (paramere: fig. 143), BM! (new synonymy). — Lima et al., 1962, Mem. Inst. Osw. Cruz **60**: 22, 33.

Black spot posterior on pronotum usually narrow, leaving greater anterior part of pronotal disc yellow; scutellum often orange; distal half of corium entirely black, proximal part yellow.

Material (distribution: fig. 145).

El Salvador. — 5 mi N Quezaltepeque, 17.vi.1963, D. Q. Cavagnaro & M. E. Irwin, 3 ♂ (CAS).

Costa Rica. — Guayabo, 19.i.1908, H. Dybas & J. F. Ferry, 1 ♂ (CNHM). Turrialba, 1 ♂ (Schild-Burgdorf Coll., MB).

Panama. — Volcan de Chiriqui, 2-3000 ft, G. C. Champion, 1 ♀ (Distant Coll.); Almirante, 13.ii.1917, C. B. Williams, 1 ♀ (BM). Barro Colorado I., "trap br sugar", xii.1936-i.1937, J. Zetek No 3795, 1 ♀ (BM).

Colombia. — "Colombia", 2 ♀ (Distant Coll., BM). Puerto Berrio Antio, 5.viii.1938, H. Dybas, 1 ♀; Puerto Salgar, Cundinamarca, 31.vii.1938, C. H. Seevers, 1 ♂ (CNHM). "Colombia", 1937, G. Dahl, 1 ♀; San Bartolo y Volcan, 2-26.iv.1936, M. Athon & G. Dahl, 2 ♂, 3 ♀ (ZML). Purnio, O. Bürger, 2 ♂, 1 ♀ (HZM). Bogotá, Lindig, 1 ♀ (NRS). Muzo, Boyaca, 1200 m, 8.ii.1957, J. Foerster, 4 ♂, 2 ♀ (MB).

Ecuador. — Paramba, 3000 ft, iv.1897, dry season, Rosenberg, 3 ♂, 1 ♀ (BM).

Peru. — "Hoch Peru", 1 ♂, 2 ♀; Oxapampa, 1 ♂ (ML).

Bolivia. — Reyes, Beni, "Savannaland", 27-30.xi.1956, L. E. Peña, 1 ♂ (MZM).

Dysdercus obscuratus lugubris Schmidt

(fig. 145; pl. 9 fig. 4)

Dysdercus lugubris Schmidt, 1932, Wien. Ent. Ztg. **49**: 274; type locality: Ecuador, Balsapamba; holotype ♀, MW! — Lima et al., 1962, Mem. Inst. Osw. Cruz **60**: 22, 41.

Dorsal surfaces almost entirely suffused with black but on closer inspection original *incertus*-like pattern usually still visible through the blackish suffusion.

Material (distribution: fig. 145).

Colombia. — Hormiguero, Cauca Valley, 3260 ft, 25.i.1935, 1 ♂, 1 ♀, 7.ii.1935, 1 ♀, S. Quinto (AMNH). "Colombia", Apolinar-Maria, 232, 1 ♀ (CAS).

Ecuador. — Balsapamba, R. Haensch, 2 ♀ (holo- and paratype of the subspecies, MW), 1 ♂, 2 ♀ (DEI), 1 ♂, 1 ♀ (HZM).

Dysdercus mimulus Hussey

A small species (7-11.8 mm); antennal segment 1 short, about as long as 2; antennal segment 4 without a white annulus; posterior band on pronotum, and scutellum black; spurs of paramere short.

Dysdercus m. mimulus Hussey

(figs. 146-151; pl. 10 figs. 1, 2, 4)

Capsus mimus Say, 1832, Heter. N. America: 20 (pro parte: vars. a and b); type locality: Mexico; types lost, neotype ♂, Oaxaca, Mexico, ML!

Dysdercus mimulus Hussey, 1929, Gen. Catal. Hem. **3**: 95, 111. — Blöte, 1931, Zool. Meded. **14**: 128, 133. — Calderon, 1931, Ins. Pest Survey Bull. **11** (10): 686-688. — Pearson, 1932, Psyche **39**: 122. — Schmidt, 1932, Wien. Ent. Ztg. **49**: 270. — Cassidy & Barber, 1939, J. Econ. Ent. **32**: 99, 104, 1 fig. — Torre-Bueno, 1941, Ent. Amer. (n.s.) **21**: 117. — Callan, 1943, Trop. Agric. Trinidad **20**: 113-115. — Callan, 1947, Bull. Ent.

Res. 37: 389-390. — Hargreaves, 1948, List Cotton Insects: 30 (*mimus* auct.). — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 22, 43, pl. 4 fig. 1 (paramere).

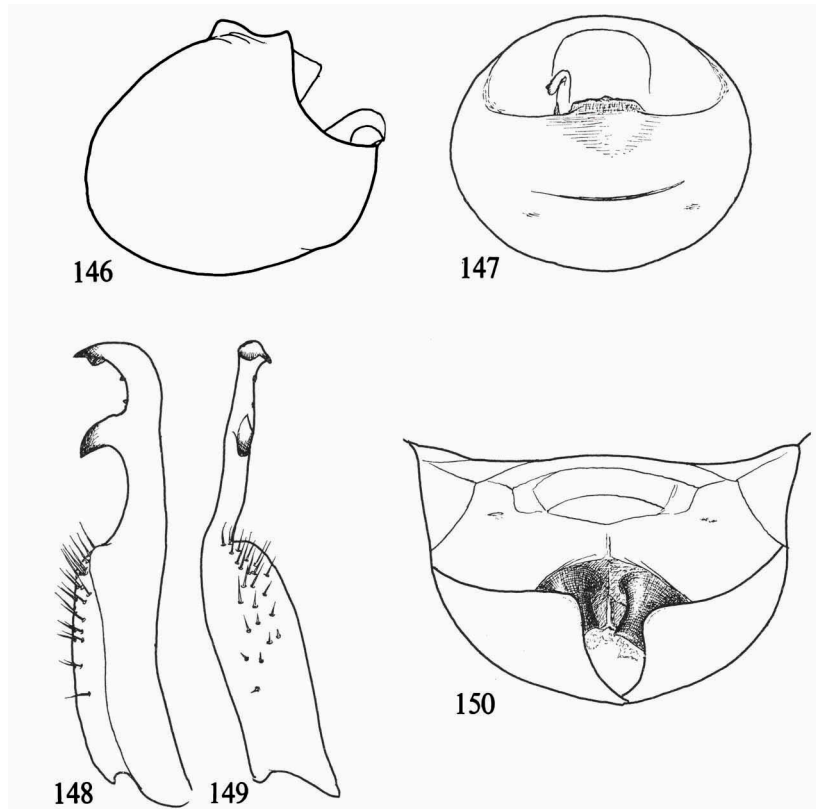
Dysdercus mimus; Stål, 1862, Stettin. Ent. Ztg. 23: 316 (pro parte). — Wolcott, 1933, Econ. Ent. West Indies: 289. — Myers, 1927, Ann. Ent. Soc. Amer. 20: 286. — Barber, 1923a, Univ. Iowa Stud. Nat. Hist. 10 (3): 24. — Anon., 1931, J. Econ. Ent. 24: 1274, 1298.

Dysdercus obscuratus (nec Distant); — Barber, 1925, J. Agric. Res. 31: 1137-1147, figs. — Myers, 1927, Ann. Ent. Soc. Amer. 20: 286. — Gaines, 1957, Ann. Rev. Ent. 2: 333.

Disderus minimus Valdés Ragués, 1910, An Acad. Ci. Habana 44: 433 (lapsus); Mis Trab. Acad., Habana: 203.

Head. — Colour red, more or less blackened above. Antenna entirely blackish. Rostrum red, turning to blackish apically.

Thorax. — Pronotal collar white; callus red; pre- and post-callar sulci as a rule blackish. Scutellum usually black with extreme apex reddish. Corium pale yellow to orange-yellow, often with blackish brown suffusion



Figs. 146-150. *Dysdercus mimulus* Hussey. 146-149, male, neotype; 146-147, genital capsule in lateral and posterior view resp.; 148-149, right paramere in lateral and posterior view resp. 150, allo-neotype, genitalia in posterior view.

varying in intensity and extent, usually leaving costal margin, claval suture, corial cleft, and posterior border along membrane yellowish; pale forms often with more or less distinct black dot near middle of corium. Membrane dark brown to black, distal border pale. Ventral surface: sulcus posterior to collar blackish; sterna and pleura red; posterior pleural flanges and epicoxal lobes white. Legs red, tibiae blackened, tarsi brown to blackish.

Abdomen. — Sternites white to pale yellow, dorso-laterally red; anterior borders narrowly red to blackish. — Male: segment VII largely, segments VI-IX entirely, reddish. Genital capsule (figs. 146, 147) rounded, posterior margin with a small, shallow excavation, dorsally limited by a small, erect lamella. Paramere (figs. 148, 149) small with a slender shaft, a somewhat recurved proximal spur, and a gradually curved, dorso-ventrally flattened distal spur, obliquely truncate at apex. — Female (fig. 150): anterior fasciae of segments VI, VII enlarged. First gonocoxa only slightly reduced, its apical margin produced; sclerites of second gonocoxae convex, apical margins concave, close together but not fused.

Length of male 7.0-9.1 mm; length of female 8.1-11.8 mm.

Neotype designation of *Dysdercus mimulus* Hussey. — Hussey (1929) correctly regarded Say's "Var. a." and "Var. b." of *Capsus mimus* as a distinct species, but he did not designate a type. For the same reasons as those advanced earlier for a neotype designation in *D. mimus* (see p. 32), a neotype is also required for *Dysdercus mimulus* Hussey. A male specimen has therefore been chosen from a remarkably uniform series, agreeing well with Say's original description and originating from the same country: Mexico. The specimens were collected at Oaxaca by Dr. J. C. Schaffner, who kindly put them at my disposal. The neotype is now deposited in the Leiden Museum; its genitalia are shown in figs. 146-149.

Material (distribution: fig. 151).

United States of America. — Texas. Cameron County, 8.3.1928, J. G. Shaw, 1 ♂, 1 ♀; Brownsville, vii, 7 ♂, 5 ♀ (1 ♂: *Dysdercus incertus* Dist., det. R. F. Hussey, 1931, "plesiotype ♂ specimen, synopsis 1941"); Mc Allan, 30.xii.1945, R. H. Beamer, 1 ♂ (KU). Brownsville, 4-5.ii.1921, 5 ♂, 9 ♀, 2.viii.1921, 1 ♀, C. D. Duncan; Brownsville, vi, 1 ♀ (E. P. Van Duzee Coll.); Brownsville, 5.vi.1932, J. O. Martin, 2 ♂, 1 ♀; Thayer, 4.v.1942, B. Broekman, 1 ♂, 1 ♀ (CAS). Brownsville, 21.vi.1934, 2 ♂ (UCB). 10 mi NW Eagle Pass, 8.viii.1959, R. B. Selander & J. C. Schaffner (Schaffner). Texas, vii.1920, F. R. White, 1 ♀; Agr. College, 1 ♀; Brownsville, 2.viii.1906, A. B. Wolcott, 1 ♀ (Drake). Mc Allen, 5.iv.1944, on bean, 1 ♂ (*D. mimus*, det. R. I. Sailer); Progreso, 7.iv.1944, L. Fife, on cotton, 1 ♀ (det. R. I. Sailer) (USNM). Klugsville, 10.xii.1942, W. C. Maxwell, ex orange sunflower, 2 ♂, 2 ♀ (det. R. I. Sailer) (MB). — Florida. Ft. Lauderdale, 1-3.xii.1927, D. M. Bates, 3 ♂, 2 ♀ (det. H. G. Barber) (MZM). Royal Palm Park, 23.i.1932, A. L. Melander, 1 ♂, 2 ♀ (det. Beamer) (DEI), 1 ♀ (det. H. G. Barber) (KU). Royal Palm Park, 22.vii.1948, B. T. Mc

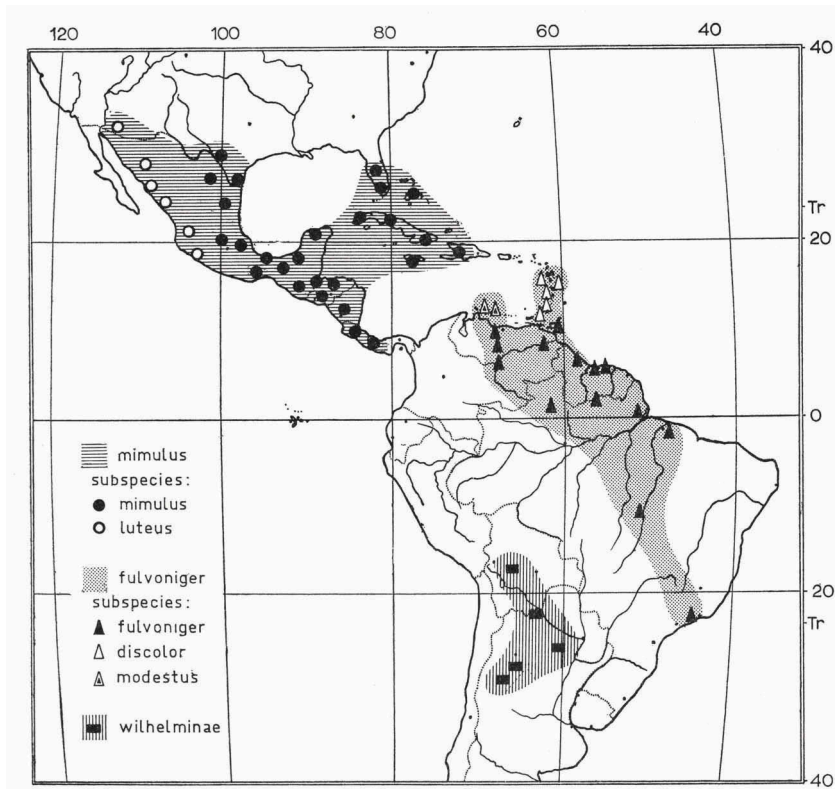


Fig. 151. Distribution of *Dysdercus mimulus* Hussey, *D. fulvoniger* (De Geer), and *D. wilhelminae* nov. sp.

Dermott, 2 ♀ (*D. mimus* (Say), det. H. G. Barber) (KU). Belle Glade, 18.i.1939, Oman, 1 ♂, 1 ♀ (det. Stehlík); Princetown, 16.iii.1946, 1 ♀ (det. C. O. Esselbauch), Homestead, 8.i.1944, 1 ♀, 9.xii.1945, 1 ♂, 1 ♀, C. O. Esselbauch (MB). Miami, 14.i.1937, Zhenzhurist, 2 ♀ (ZIL). Nagales, 7.10.1936, 1 ♂ (USNM).

Mexico. — "Mexico", Cat. no. 1872, 1 ♂ (HZM). "Mexico", 1 ♀ (*D. flavolimbatus* Stål, "Autr. verif. Lethierry", DEI). "Mexico", 1785 (E. P. Van Duzee Coll., CAS). Jalapa, 14 ♂, 7 ♀ (W. H. Muche-Radeberg Ank.); Presidio, 1 ♀ (MD). Tolosa, xii.1898, C. C. Deam, 2 ♀ (*D. flavolimbatus* Stål, det. Drake) (Drake). "Mexico", 2 ♀; "Mexico", Stål, 1 ♂, 1 ♀ (NRS). Camp. Exp. Gro., 15.vi, 1 ♀ (INAM). Presidio, Forrer, 2 ♂ (Distant Coll., BM). "Mexico", 16 ♂, 16 ♀, 1 cop., Joh. Laue (ZSM). "Mexico", Hagberg, ♂ ♂, ♀ ♀; "Mexico", Sallé, 2 ♀ (NRS). — Durango. Durango, J. Gribodo ("*D. flavolimbatus*") (Kirkaldy Coll., BM). El Salto, 13.viii.1959, R. F. Smith, 1 ♂ (UCB). — Nueva Leon. Cola de Caballo, 3000 ft, 6.vii.1959, 3 ♂, 2 ♀; 10 mi S Monterrey, 3000 ft, 5.vii.1959, 2 ♂, 1 ♀, Apodaca, 7.vii.1959, 1 ♂, 2 ♀, R. B. Selander & J. C. Schaffner (Schaffner). Monterrey, 11.iv.1910, 1 ♂ (det. Hussey, 1931, "plesiotype specimen, described for synopsis 14.x.1941"); Linares, iv.1910, 1 ♂ (det. Hussey) (J. R. de la Torre-Bueno Coll., KU). 20 mi W Linares, 8.xi.1946, F. E. Skinner, 2 ♂ (CAS). 4 mi W El Cercado, 6.vi.1951, P. D. Hurd, 1 ♂, 2 ♀ (UCB). 20 mi W Monterrey, 11.viii.1959, L. A. Stange & A. S. Menke, 9 ♂, 7 ♀ (Menke),

1 ♂ (MB). Monterrey, 14-15.vi.1941, H. S. Dybas, at light, 2 ♂, 4 ♀; Hac. Vista HERNOSA, Villa Santiago, 23.vi.1940, Hoogstraal & Knight, 1 ♂, 1 ♀ (CNHM). — Tamaulipas. San José, iv.1910, 6 ♂, 2 ♀ (det. Hussey; J. R. de la Torre-Bueno Coll.); Guemes, Ciudad Victoria, 15 mi N, 6.vi.1961, Univ. Kans. Mex. Exped., 1 ♂, 1 ♀; Hidalgo, 11.x.1938, L. J. Lipovsky, 1 ♂ (KU). El Limon, 20 mi N, 8-10.xi.1946, E. S. Ross, 3 ♂; Crest 1st. ridge W Antiguo Morelos, 18.xi.1948, 6 ♂, 3 ♀, H. B. Leech (CAS). Ciudad Mante, 13.viii.1959, A. S. Menke & L. A. Stange, 1 ♂, 1 ♀ (Menke). — San Luis Potosi. El Salto Falls, 15-17.vi.1956, Beer c.s., 1 ♂, 14 ♀; El Salto, 1800 ft, 8.vi.1961, 13 ♂, 11 ♀, El Salto, 1250 ft, 4.ix.1962, Ordway c.s., caught in Malaise trap, 2 ♂, 1 ♀; El Salto, 11.vii.1961, at light, 1 ♀; El Salto, 1600 ft, 24.viii.1954, 1 ♂, 1 ♀, Tamanzunchale, 21 mi N, 23.vii.1954, 1 ♂, 1 ♀, 3 mi NE Naranjo, 800 ft, 5.ix.1962, 1 ♀, Univ. Kans. Mex. Exped. (KU). Tamanzunchale, 22.xi.1946, E. C. Van Dyke, 1 ♀ (CAS). 14 mi NE Tamuín, 17.viii.1959, R. F. Smith, 1 ♂, 1 ♀; Tamanzunchale, 11.vi.1951, P. D. Hurd, 1 ♂ (UCB). Cañon Galeana, 27.xi.1956, "en hierbas", W. W. Gibson, 1 ♀ (det. Hussey) (INAM). Matlapa, 14.i.1941, C. Wingo, 1 ♂ (MB). Tamanzunchale, 19-21.vi.1941, 2 ♂, 2 ♀, 1 cop., Valle Est., at light, 17.vi.1941, 2 ♂, 1 ♀, Huichihuayan, 20.vi.1941, 2 ♂, H. S. Dybas; Valles, 26.vi.1940, Hoogstraal, 2 ♀ (CNHM). — Aguascalientes. Aguascalientes, 26.vi.1952, E. E. Gilbert c.s., 4 ♂, 4 ♀ (UCB). — Colima. 5 mi S. Manzanillo, 21.vii.1956, Beer c.s., 2 ♀ (KU). Colima, 1 ♀, Staudinger (ZIL). Vulkan Colima, 27.iii.1918, 1 ♂, 1 ♀, 12-28.v.1918, 3 ♀, Joh. Laue (ZSM). Colima Volcano, L. Conrard, 1 ♀ (BM). — Michoacan. Morelia, A. J. Borre, E. Dugès, 1892, 1 ♂ ("*D. flavolimbatus*, var.," Kirkaldy Coll., BM). Uruapan, 18.vii.1936, H. D. Thomas, 1 ♂, 2 ♀; Morelia, 6-9.ix.1938, 6 ♂, 7 ♀, Chinapa, 2200 ft, 5.ix.1938, 2 ♂, 1 ♀, Morelia highway, 20 mi on Chiapa Road, 2500 ft, 6.x.1938, 2 ♂, 3 ♀, H. J. Lipovsky (KU). Apatzingan 11 mi E, 20.viii.1954, E. G. Linsley c.s., 1 ♂, 1 ♀ (UCB). Patzcuaro, v.1901, F. E. Lutz, 1 ♀ (CNHM). — Jalisco. Guadalajara, 2 ♂, 1 ♀ ("*D. flavolimbatus* Stål", Breddin Coll., DEI). Puente Vallarta, 21.vii.1932, M. Willems, Templeton Exped., 1932, 1 ♀; Jiquilpan, 20 mi W, 30.xi.1948, 1 ♀, H. B. Leech (CAS). Plan de Barancas, 5 mi SE, 3.v.1953, R. C. Bechtel c.s., 2 ♂ (UCB). Barranquillos, 3.ii.1964, E. I. Schlinger, 1 ♂ (UCR). Guadalajara, McConnel, 9 ♂, 10 ♀, Crawford, 1 ♂, 4 ♀ (POM). — Vera Cruz. San Rafael, 20.iii.1896, 1 ♀; Tecaltepec, 31.iii.1896, 1 ♀ (ISU). 2 mi W Zamora, 13.vi.1958, J. C. Schaffner, 1 ♀ (Schaffner). Orizaba, 1 ♂ (*D. minus* Say v. *distanti* Bl. det. Tauber, DEI). 1 mi N Tecolutla, 12.vi.1961, 7 ♂, 13 ♀, 4 mi NW Rinconala Antigue, 1350 ft, 22.vi.1961, 4 ♂, 3 ♀, Univ. Kans. Mex. Exped. (KU). 3 mi E Córdoba, 1.i.1941, G. E. Bohart, 3 ♂, 3 ♀; Córdoba, Wickman, 1 ♀ (E. P. Van Duzee Coll., CAS). Cotaxtla, Exp. Sta., 26.vi.1962, D. H. Janzen, 2 ♂, 7 ♀ (UCB). Fortin, 24.vi.1958, 1 ♀, 2 mi W Zamora, 13.vi.1958, 1 ♂, 2 ♀, 4 mi N Vera Cruz, 15.vi.1958, 1 ♂, 1 ♀, 5 mi N San Andreas, 28.xi.1955, 1 ♀, J. C. Schaffner (Schaffner). 30 mi S Acayucan, 21.iv.1962, F. D. Parker & L. A. Stange, 1 ♀; Alazan, 15.viii.1959, L. A. Stange & A. S. Menke, 2 ♂, 2 ♀ (Menke). El Fortin, 8-10.vii.1941, 1 ♀, 1 cop., Atoyac, 14.vii.1941, 1 ♀, Puente Nacional, 3.vii.1941, 1 cop., Tolome, 4.vii.1941, 1 ♀, H. S. Dybas; Córdoba, 11.vii.1936, C. H. Seevers, 1 ♂ (CNHM). Vera Cruz, iii.1938, 1 ♂ (ZSM). San Lorenzo (Córdoba), M. Trujillo, 1 ♂ (MD). Jalapa, 1 ♀ (MC). Orizaba, H. H. Smith & F. D. Godman, xii.1887, 1 ♀; Atoyac, Schumann, 1 ♂; San Lorenzo, M. Trujillo, 1 ♀ (BM). Orizaba, 4 ♂, 2 ♀, Jalapa, 4 ♂, 2 ♀, Crawford (POM). — Distrito Federal. 13.ix.1939, D. M. de Long, 1 ♀ (MB). — Mexico. Valle de Bravo, 7.v.1962, F. D. Parker, 1 ♀ (Menke). — Morelos. Cuernavaca, 1.viii.1938, L. J. Lipovsky, 1 ♂ (KU). Cuernavaca, 9 mi S, 9.xii.1948, H. B. Leech, 1 ♂ (CAS). Cuernavaca, Crawford, 1 ♂ (POM). — Puebla. Puebla, 17 mi S, 27.vi.1957, J. A. Chemsak c.s., 1 ♀; Tehuacan, 25.iv.1953, sweeping alfalfa, R. C. Bechtel & E. I. Schlinger, 2 ♂ (UCB). — Guerrero. Chilpancingo, 4000 ft, vi., H. H. Smith, 1 ♀; Tierra Colorada, 2000 ft, x, H. H. Smith, 1 ♀ (BM). — Oaxaca. Oaxaca, 1 ♀ (J. R.

de la Torre-Bueno Coll., KU). Oaxaca, 5000 ft, 20.vii.1937, M. A. Emburg, 1 ♀ (CAS). Oaxaca, 8.vii.1952, 2 ♂, 2 ♀, Oaxaca, 47 mi SE, 13.vii.1952, 1 ♂, Juchitán, 7-24 mi NE, 18-20.vii.1952, 2 ♂, 3 ♀, E. E. Gilbert c.s. (UCB). Tequisistlan, 7.i.1948, 1 ♂, 1 ♀, Tehuantepec, 13.xii.1947-23.i.1948, 1 ♂, 1 ♀, T. Mc Dougal (AMNH). Oaxaca, 24.xii.1951, on mallow etc., 4 ♂, 4 ♀, Tehuantepec, 28.xii.1951, 2 ♂, J. J. Cendit (UCR). La Ventosa, 50 mi N, 14.xii.1955, 14 ♂, 12 ♀, Tapanutepec, 3 mi NW, 21-22.xii.1955, 11 ♂, 14 ♀, J. C. Schaffner (Schaffner). Zanatepec, 18.xii.1955, J. C. Schaffner, 1 ♂, 1 ♀ (MB). Gamboa, Crawford, 1 ♀ (POM). — Chiapas. La Trinitaria, 15 mi S, 27.vii.1954, A. A. Alcorn, 3 ♂, 1 ♀ (KU). Suchiapas, 17-18.vii.1957, J. A. Chemsak c.s., 2 ♂, 3 ♀; Comitán, 3.iii.1953, 1 ♀, El Jocote 4 mi W, 4.iii.1953, 1 ♂, Las Rosas, 12.iii.1953, 1 ♀, Tuxtla Gutiérrez, 13.iii.1953, 1 ♂, Teopiaca, 13.iii.1953, 1 ♂, Bochil, 16.iii.1953, 1 ♂, 1 cop., Puebla Nuevo, 20.iii.1953, 1 ♀, Soyalo, 7 mi SE, 27.iii.1953, 2 ♂, 1 ♀, R. C. Bechtel & E. I. Schlinger; San Carlos, 5 mi S, 6.iii.1913, R. F. Smith, 1 ♂ (UCB). Tuxtla Gutiérrez, 30.xii.1951, J. J. Cendit, 1 ♂, 1 ♀ (UCR). Cintalapa, 13 mi W, 24-26.xii.1955, J. C. Schaffner, 3 ♂, 1 ♀ (Schaffner). — Tabasco. Frontera, 1897, Townsend, 1 ♀ (ISU). Teapa, ii.[1888], H. H. Smith, 1 ♂, 2 ♀ (MD), 1 ♂, 1 ♀ (NRS), 1 ♂, 1 ♀ (BM). — Yucatan. Chichén Itzá, 29.viii.1936, H. D. Thomas, 5 ♂, 3 ♀, 2 cop. (KU). Chichén Itzá, E. Thompson, 1 ♂, 5 ♀ (CNHM). Temax, Gaumer, 1 ♀, "*D. mimus*, B.C.-A., Hem. I" (BM).

Guatemala. — San Cristobal, Sarg., 1 ♀; "Guatemala", 2 ♂, 3 ♀ (Coll. Breddin, DEI). Jacaltenango Huehuet, 20 mi W, 27.vii.1954, A. A. Alcorn, 1 ♂ (KU). Guatemala City, 29.v.1948, W. D. Clarke, 1 ♂ (CAS). Duenas, 4500 ft, 18.viii.1947, 1 ♂ (dark specimen), Moca Such, 3000 ft, 21.vi.1947, 1 ♂, 1 ♀ (dark), Chichicastenango, 6000 ft, 6.viii.1947, 1 ♀, C. & P. Vaurie (AMNH). Pelopa, 1886, Sarg., 2 ♀ (ZIL). El Naranjo, Coloniba (Quezaltenango), 850 m, E. le Moul, 10 ♂, 16 ♀ (ML). Duenas, 2 ♀, Zapote, 1 ♀, Guatemala City, 1 ♂, 1 ♀, G. C. Champion (BM).

British Honduras. — San Antonio, 4.viii.1931, J. J. White, 1 ♂ (MB).

El Salvador. — Los Planos, 22.vii.1956, J. R. Alcorn, 1 ♂ (KU). E slope Cerro Verde, 3800 ft, 5.vii.1963, 1 ♂, 1 ♀, Quezaltepec, 500 m, 5.vii.1963, 3 ♂, D. Q. Cavagnaro & M. E. Irwin (CAS). Quezaltepec, 2 mi W, 12-24.vii.1961, M. E. Irwin, 3 ♀ (Menke). San Salvador, v-vi.1953, M. Boeseman, 6 ♂, 5 ♀ (ML).

Honduras. — Progreso, 80 ft, 21.vi.1956, "on low herbs in mule pasture, 50 yds from small river", K. A. Gillmore, 4 ♂, 3 ♀, nymphs (Schaffner). Copan, 16.ii.1937, C. Roys, 4 ♂, 2 ♀ (KU). Copan, 7.ix.1955, B. Malkin, 4 ♂, 5 ♀ (UCB). Danli-Chichicaste Paraiso, 6.vii.1948, 2 ♀, San Francisco, Yoro, 26.vii.1948, 1 ♂, 3 ♀, Tegucicalpa, 1.vii.1948, 1 ♂, W. D. Clarke (CAS). El Zamorano, Morazán, 800 m, 1947, P. C. Standley, 1 ♂ (CNHM).

Nicaragua. — La Calera, 2.vii.1954, W. Pfeaffle, 1 ♀ (ISU). S. Maria de Ostuma, near Matagalpa, 1250 m, 4.ii.1953, Croockewit, 1 ♀ (ML). San Marcos, 7 ♂, 3 ♀, Managua, 2 ♂, 2 ♀, Granada, 1 ♀, Chinandega, 18 ♂, 12 ♀, C. F. Baker (POM).

Costa Rica. — Golfito, 30.x.1950, E. S. Ross & A. E. Michelbacher, c.s., 1 ♂; Cartago, 4.xii.1911, W. M. Wheeler, 1 ♂, 1 ♀ (Parshley Coll.); Cote du Tablezo, 1500 m, iv.1905, P. Biolley, 2 ♂ (CAS). "Costa Rica", vi. 1872, 1 ♀, Camilie Van Volxem (MZH). San José, 1 ♂, 2 ♀ (ZSM). Cache, 2 ♀, Irazú, 1 ♀, H. Rogers; San José, 1135-1160 m, iv.1906, P. Biolley, 7 ♂, 3 ♀; San José, H. Pittier, 1 ♂, 1 ♀; "Costa Rica", Van Patten, 1 ♂, 1 ♀ (BM).

Panama. — Chiriquí, E. le Moul, 3 ♂, 3 ♀ (ML). Boquete, Chiriquí Prov., iii.1923, F. M. Gaige, 13 ♂, 11 ♀ (MZM).

Venezuela. — "Venezuela", 1 ♂; F. Schneider, 2 ♀ (W. H. Muche-Radeberg Ank, MD).

Bahamas. — Nassau, xi.1950, N. L. H. Krauss, 1 ♀ (USNM). Arthurs Town, 7 and 23.vii.1935, W. J. Clench, 1 ♀, 1 cop.; Simon's Long I., vii, 2 ♀; Clarence town, Long I., 1 ♂, 1 cop., New Providence I., 1 ♂, 1 ♀, S. Eleuthera, 1 ♂, ii.1934, Utowana Exped. (MCZ).

Jamaica. — St. Ann, road to Holly Mount, 24.ix.1954, 1 ♂, St. Ann, Mt. Diablo, 20.xi.1953, 1 ♂, 1 ♀, St. Thomas, Corn Puss Gap, 9.viii.1953, 3 ♂, 3 ♀, St. Andrew, Tresn River, 20.xi.1952, 1 ♂, St. Andrew, Tacks Hill, 19.iv.1954, 1 ♂, R. P. Bengry; Trelawny, 2 mi N Ramgoat Cave, 26.ix.1954, T. H. Farr, 1 ♂; Manchester, Mandeville, 10.vi.1950, T. A. Dale, 1 ♀; St. James, Greenwood, 12.ii.1947, G. B. Lewis, 1 ♀ (SMJ). "Jamaica", A. Reinecke, 1 ♀; Mandeville, 13.iv.1937, C. Roys, 8 ♂, 3 ♀ (det. H. G. Barber); Baron Hill Trelawny, Lilly Perkins, 2 ♂, 2 ♀ (det. H. G. Barber); Claremont, Baron Hill Trelawny, 3-4.1928, L. G. Perkins, 1 ♂, 2 ♀ (KU). Rock Flat, 25.iii.1906, 12 ♂, 2 ♀, Kingston, iv.1906, 10 ♂, 9 ♀, 2 cop., Mandeville, iv.1906, 1 ♂, 3 ♀, Pt. Antonio, iv.1906, 1 ♂ E. P. van Duzee; "Jamaica", 1 ♂, 2 ♀, A. Reinecke (E. P. Van Duzee Coll.); Liguanea Plain, xi-xii.1911, 1 ♂, 4 ♀, Newton, 3000 ft, i.1912, 1 ♀, C. T. Brues (Parshley Coll., CAS). "Jamaica, on Broom Weed, great numbers", A. H. Ritchie, 1 ♂, 1 ♀; "Jamaica". Mrs. Swainson, 1 ♀; Victoria Town, 15.ii.1921, 1 ♀, Boston, 11.iii.1921, 1 ♀, C. C. Gowdey (BM). Balaclava, i-iii.1909, 9 ♂, 10 ♀, Porto Antonio, i, 4 ♀, A. E. Wight; Mandeville, 23.ii, E. B. Bryant, 1 ♀; Liguanea Plain, xi-xii, 1911, C. T. Brues, 1 ♂ (MCZ).

Cuba. — "Cuba", C. Wright, 1 ♂ (MCZ). Dejean, 1 ♂, Cat. no. 1872 (HZM). Guantanamo, H. Rolle, 2 ♂, 2 ♀ (Bredin Coll., DEI). Pasa Caballo, L. V., 22.vii.1956, 1 ♀, Guanahacabides, Pen., 3-4.vii.1956, 1 ♂, C. & P. Vaurie (AMNH). Boniata, 2.12.1907, 1 ♀ (ML). Vinales, 7 km N, 16-22.ix.1913, 1 ♀ (USNM). Cuba, 1 ♀ (NRS). Hormiguero, St. Thomas-Cruces, 12.ii.1933, 2 ♂, 1 ♀, 10-28.ii.1933, 22 ♂, 12 ♀, Pinar del Rio, 16-29.v.1933, 1 ♂, 1 ♀, San Blas, 1-9.iii.1933, 11 ♂, 3 ♀, Puerta Ancon — San Vicante, 5-8.vii.1933, 1 ♂, 1 ♀, Sta. Clara, Prov. Sta. Clara, 5.iii.-21.iv.1933, 5 ♂, 3 ♀, San Blas — Buenos Aires, 2.iii.1933, 1 ♂, Cacarajicara, forest region, 20-22.vi.1933, 2 ♂, H. J. Mac Gillavry (MA). Guantanamo, E. le Moul, 5 ♂, 5 ♀ (ML). Sta. Clara, 95, R. Combo, 2 ♀ (ISU). Soledad, 2.viii.1929, J. G. Myers, 5 ♂, 4 ♀ (BM). Havana, C. F. Baker, 7 ♂, 3 ♀ (POM). Soledad, Cienfuegos, i-ii.1927, C. T. Brues, 13 ♂, 16 ♀; Central Soledad, i-vii.1932, B. B. Leavitt, 1 ♀; Havana, T. Barbour, 5 ♂, 2 ♀; Baragua, at light, 16.viii.1927, 1 ♀, upper Yara Valley, 18.x.1928, 2 ♂, 2 ♀, Baragua, 24.i.1928, "sweeping grasses", 1 ♀, Central Jaronú, 5.v.1930, "Weeds & grasses", 1 ♀, L. C. Scaramuzza; Whitfield, Blue Mts, 4500 ft, 13-20.viii.1934, P. J. Darlington, 1 ♂ (MCZ).

Hispaniola. — Haïti. "Haïti", 1 ♀ (ZIL). Port au Prince, 23.xii.1940, K. W. Cooper, 2 ♀ (CNHM). Diquini, Petion, 1 ♂, 4 ♀, "Haïti", P. R. Uhler, 1 ♂, 6 ♀; Port au Prince, 2.x.1934, 1 ♂, Mts near Port au Prince, 2000 ft, 2.x.1934, 1 ♀, Ennery, 1000 ft, 6.ix.1934, 1 ♂, 3 ♀, P. J. Darlington (MCZ). — Dominica. Guaimati and Santiago, vii.1925, 4 ♀ (1930.336); De Les'elem (?), 31.vii.1929 (Kirkaldy Coll., BM). Porto Plata, Hurst, 4 ♂, 7 ♀; Trujillo City, 15.ii.1941, C. F. Parsons, 1 ♂; "S. Domingo", 1 ♀; Constanza, 3-4000 ft, 21.viii.1938, P. J. Darlington, 1 ♂ (MCZ).

Locality unknown. — 1 ♂, San José-B. (DEI). 2 ♂, 2 ♀ (ZIL). "Alte Sammlung", 1 ♂, 1 ♀; "W 42", 1 ♀ (ZSM). "39", 12 ♂, 21 ♀, 3 cop. (CNHM). Calders, 1200 ft, Champion, 1 ♀ (BM).

Dysdercus mimulus luteus nov. subsp.

(fig. 151; pl. 10 fig. 3)

Although the colour pattern of the species is variable throughout most of its distributional range, in the western parts of Mexico and in Arizona the specimens are differently and uniformly coloured and can be regarded as belonging to a distinct subspecies.

Head, base of antenna, rostrum, callus, posterior corner of scutellum, pleura, coxae, trochanters, femora, markings on sternites, and the terminalia entirely, bright red; antenna, distal part of rostrum, pre-callar sulcus, a transverse fascia near posterior margin of pronotal disc, scutellum, membrane, tibiae and tarsi dark brown to blackish; disc of pronotum and mesial parts of corium yellow; lateral margin of pronotum and costal margin of corium orange-yellow.

Material (distribution: fig. 151).

United States of America. — Arizona. Tempe, July 3.17, Wheeler leg., Parshley Coll. (CAS), holotype ♂, allotype and two paratypes (♂ and ♀) in the collection of the California Academy of Sciences; one paratype (♂) in the Leiden Museum. Buckeye, 21.vi.1935, H. G. Johnston, 2 ♂, 3 ♀; Socraton, 22.x.1923, 1 ♂ (paratypes, TAMU). Hereford, 10.ix.1945, W. W. Jones, 1 ♀ (paratype, UCB).

Other material belonging to this subspecies but not included in the type series:

Mexico. — Sonora. Guaymas, 11.iv.1921, E. P. Van Duzee, 1 ♀; Alamos, Estrella, 2.x.1933, H. S. Gentry, 1 ♀ (CAS). Obragon, cotton bolls, 1 ♂ (USNM). Valle del Yagui, "en algodón", 31.iii and 26.vii.1958, J. A. Siguentes, 2 ♂ (INAM). Cocorit, 11.vi.1961, F. D. Parker, 3 ♀ (Menke). — Chihuahua. El Limon, Rio Mayo, 20.vii.1935, L. G. Gentner, 1 ♂ (CAS). — Sinaloa. Mazatlán, 22.vii.1959, R. B. Selander & J. C. Schaffner, 3 ♂ (one dark), 1 ♀ (Schaffner). Los Mochis, 15.xi.1947, M. Marquis, 5 ♂, 5 ♀; Villa Roble, 26.v.1925, H. H. Keifer, 9 ♂, 8 ♀; Mazatlán, i.1917, 2 ♀, 5.iii.1918, 11 ♂, 5 ♀, J. A. Kusche; Mazatlán, 27.vii.1928, Venedio, 1 ♂ (CAS). 40 mi N Mazatlán, 27.vii.1952, J. D. Lattin, 1 ♂; Guamuchil, 6.v.1953, E. I. Schlinger, 1 ♂ (UCB). Los Mochis, vi.1922, C. T. Dodds, 2 ♂, 4 ♀ (CAS). 16 mi SE Guamuchil, 6.vi.1961, A. S. Menke, 1 ♂, 4 ♀; 9 mi E Chupaderos, 18.iii.1962, 2 cop., 3 mi N Elota, 1 ♂, F. D. Parker (Menke). Mazatlán, 1 ♂, Presidio, 2 ♂, Ventanas (?), 1 ♂, 1 ♀, Forrer (BM). Mazatlán, near beach, 18.viii.1964, 5 ♂, 5 ♀, Copala, 19.viii.1964, 1 ♂, Rosario, 20 mi SE, 20.viii.1964, 2 ♂, H. R. Burke & J. Apperson (TAMU). Eldorado 3.iii.1924, S. E. Flanders, 1 ♀; 20 mi S Villa Union, 31.i.1964, E. I. Schlinger, 1 ♂, 1 ♀; 20 mi E Villa Union, 1.ii.1964, P. A. Rauch, 1 ♂ (UCR). — Nayarit. Rio de las Canyos, 8 mi NW Acaponeta, 25.xi.1948, H. B. Leech, 1 ♂; Tepic, 15-17.ix.1935, 26 ♂, 20 ♀, 21-24.ix.1935, 2 ♂, B. Malkin; Acaponeta, 15.viii.1960, P. H. Arnaud Jr c.s., 3 ♂, 3 ♀ (CAS). Jesús María, 26.vi-6.vii.1955, 19 ♂, 24 ♀, Aroyo Canaveral, near Jesús María, 15.vii.1955, 1 ♀, San Juan Peyotan, 2.viii.1955, 1 ♀, B. Malkin (UCB). Tepic, 2-7.viii.1947, B. Malkin, 2 ♂, 2 ♀ (AMNH). Ahuacatlán, 13 mi NW, 25.vii.1959, R. B. Selander & J. C. Schaffner, 2 ♂, 4 ♀ (Schaffner). Tepic, Sierra Madre, Richardson, 1 ♀ (BM). Tuxpan, 20.viii.1964, 1 ♂, 2 ♀, Acaponeta, 15 mi S, 20.viii.1964, 1 ♀, St. Line, Guadalajara highway, 21.viii.1964, 1 ♂, 2 ♀, H. R. Burke & J. Apperson (TAMU). — Coahuila. 18 mi N Rodeo, Hidalgo, 25.viii.1958, W. R. Bowen, 1 ♂, 1 ♀ (UCR).

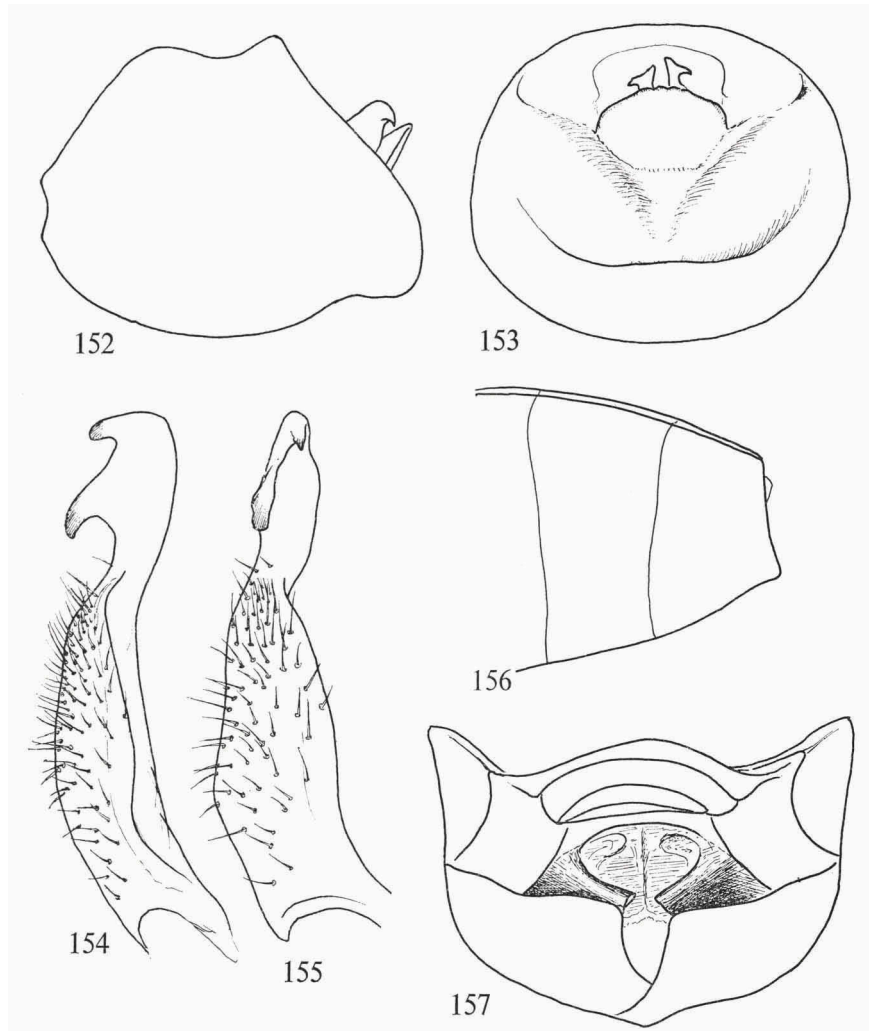
Dysdercus wilhelminae nov. sp.

(figs. 151-157; pl. 11 fig. 1)

Large, mainly yellow species (13.4-18.1 mm); antennal segment 4 with a narrow white annulus proximally; pronotum posteriorly without a black fascia; membrane pale, distal parts of femora not blackened.

Head. — Head and rostrum orange, apex of rostrum blackened; antennal segments 1, 2, 3 red, darkened distally, segment 3 narrowly blackened proximally, segment 4 brownish, proximally with a narrow, yellowish white, ill defined annulus.

Thorax. — Pronotal collar, posterior pleural margins, and epicoxal lobes white; pre-callar sulcus blackened; callus orange with reddish posterior and



Figs. 152-157. *Dysdercus wilhelminae* nov. sp. 152-155, male, paratype; 152-153, genital capsule in lateral and posterior view resp.; 154-155, right paramere in lateral and posterior view resp. 156-157, female from Bolivia; 156, apex of abdomen in lateral view; 157, genitalia in posterior view.

lateral markings; post-callar sulcus blackened laterally; lateral margin of pronotum orange; disc dirty white, posterior margin concolorous, without indication of a blackish transverse fascia. Scutellum orange, anteriorly bordered with black. Corium yellow, proximally and towards costal margin suffused with orange. Membrane pale brownish grey, distal border dirty white. Pleura and sterna orange, sternal carina yellowish; sulcus posterior to collar black; anterior margins of meso- and metapleura including ostiolar peritremes blackened. Legs orange, especially tibiae suffused with red; tarsal segment 1 yellowish darkened distally, segment 3 brown, claws blackish brown.

Abdomen. — Sternites yellowish brown anteriorly, darkened to black laterally, lateral edges reddish. — Male: sternite VI and anterior half of VII, VIII suffused with red; genital capsule (figs. 152, 153) orange-red, posterior margin inflated, medially excavated; excavation dorsally limited by a large, semicircular, erect capsular lamella in front of which the parameres are situated. Paramere (figs. 154, 155) slender, shaft somewhat tapering towards neck, without any trace of a mesial shoulder. Head of paramere laterally gouge-shaped with two recurved spurs, the proximal one larger. — Female: sternite VII narrowed pre-apically as seen in profile (fig. 156). Genitalia (fig. 157): first gonocoxa fully developed, distal margin right-angled; sclerites of second gonocoxae conically curved, laterally inserted and obliquely pointing towards midline, resembling those of *D. fulvoniger* (De Geer).

Length of male 13.4-15.8 mm; length of female 14.2-18.1 mm.

Material (distribution: fig. 151).

Argentina. — Salta. Tartagal, i.1951, 1 ♂; Catamarca. El Rodeo, i.1942, 1 ♀ (paratypes, MB), 1 ♀ (paratype, ML). Catamarca. Ciudad, xi.1945, 1 ♀ (paratype, MB). Tucumán, 21.x.1948, P. Wygodzinsky, 1 ♂, 3 ♀ (paratypes, MACN), 1 ♀ (paratype, ML). — Chaco. Roque, Saenz Peña, 1932, K. J. Hayward, 1 ♀ (paratype, BM). La Rioja, 1104, Pennington No. 323, C. Drake don., 3 ♂, 1 ♀ (holotype ♂, allotype and paratypes, ML).

Bolivia. — Cochabamba, Marcus, 5 ♂, 6 ♀ (paratypes, ML). Parotani, 11.8.1915, Collins & Day, S. A. Exped., 1 ♂, 1 ♀ (paratypes, CNHM). Prov. Sara, Steinbach, 1 ♂, 5 ♀ (paratypes, MW), 3 ♀ (paratypes, MCZ), 3 ♀ (paratypes, ML). Yunga, 1 ♀ (paratype, W. H. Muche-Radeberg Ank., MD). Beni, 1 ♀ (paratype, MACN).

It is a pleasure to the writer to name this new species for his wife, Wilhelmina de Buijzer.

Dysdercus fulvoniger (De Geer)

Medium-sized species (8.5-14.5 mm), antennal segment 4 with a white basal annulus; distal spur of paramere long and sharply pointed; sclerites of second gonocoxae laterally situated.

Dysdercus f. fulvoniger (De Geer)

(figs. 151, 158-164; pl. 11 fig. 2)

Cimex fulvo-niger De Geer, 1773, Mém. Hist. Ins. 3: 340, pl. 34 fig. 21 (here reproduced in fig. 158); type locality: Suriname; holotype ♂, NRS!

Dysdercus fulvoniger; Hussey, 1929, Gen. Catal. Hem. 3: 91, 101 (incorrectly synonymized with *D. ruficollis* (Linnaeus)). — Blöte, 1931, Zool. Meded. 14: 121, 134, 135 fig. 6f (male genital capsule), 136. — Squire, 1939, Bull. Ent. Res. 30: 289, fig. 1. — Callan, 1947, Bull. Ent. Res. 37: 389, 391. — Doesburg Jr, 1960, Meded. Landb.proefst. Suriname 22: 88. — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 22, 37, pl. 2 fig. 1 (paramere, after Pearson, 1932), pl. 3 fig. 9 (paramere). — Vreden, 1964, Meded. Landb.proefst. Suriname 34: 70. — Doesburg Jr, 1966, Stud. Fauna Suriname Guyanas 9: 42-46, figs. 32a, 36-39.

Dysdercus howardi Ballou, 1906b, West Indian Bull. 7: 69, 73; type locality: Trinidad; lectotype ♂, USNM! — Guppy & Thornton, 1911, Board Agric. Trinidad Tobago, Circ. 6. — Urich, 1916, Bull. Dept. Agric. Trinidad Tobago 15: 18. — Barber, 1923a, Univ. Iowa Stud. Nat. Hist. 10 (3): 24. — Withycombe, 1924, Bull. Ent. Res. 15: 171 (pro parte). — Hussey, 1929, Gen. Catal. Hem. 3: 91. — Brindley, 1930, Trans. R. Ent. Soc. London 78: 202, pl. 10 fig. 5. — Blöte, 1931, Zool. Meded. 14: 136 (synonymized with *D. fulvoniger* (De Geer)). — Pearson, 1932, Psyche 39: 114, 125, pl. 4 fig. 1 (paramere). — Wolcott, 1933, Econ. Ent. West Indies: 289. — MacGill, 1935, Bull. Ent. Res. 26: 155-162. — MacGill, 1941, Bull. Ent. Res. 32: 185-194. — MacGill, 1945, Bull. Ent. Res. 35: 301-308, 2 figs. — McGill, 1947, Proc. Zool. Soc. Lond. 117: 124-126. — Callan, 1947, Bull. Ent. Res. 37: 389. — Hargreaves, 1948, List Cotton Insects: 30. — Proctor, 1958, Emp. Cotton Grow. Rev. 35: 107. — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 38.

Dysdercus balloui, in Zool. Rec. 72 (1936): 400 (lapsus for *D. howardi* Ballou).

Dysdercus ruficollis (nec Linnaeus); — Hussey, 1929, Gen. Catal. Hem. 3: 101 (pro parte). — ?Barber, 1923a, Univ. Iowa Stud. Nat. Hist. 10 (3): 24. — Proctor, 1958, Emp. Cotton Grow. Rev. 35: 107. — ?Szumkowski & Fernández Y., 1963, Agron. Tropic., Maracay 13: 85.

Dysdercus fuscofasciatus Blöte, 1931, Zool. Meded. 14: 122 (pro parte).

Head. — Ground colour usually red; antenniferous tubercles with a blackish spot; dorsal surface sometimes suffused with black, rarely entirely black; antenna reddish brown to black, segment 1 more or less red proximally, segment 4 with a white basal annulus; rostrum red to orange, segment 4 largely blackened.

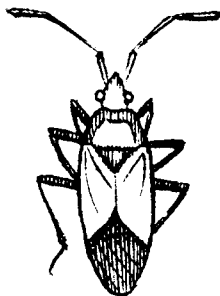


Fig. 158. *Cimex fulvoniger* De Geer, facsimile of De Geer's figure of this species.

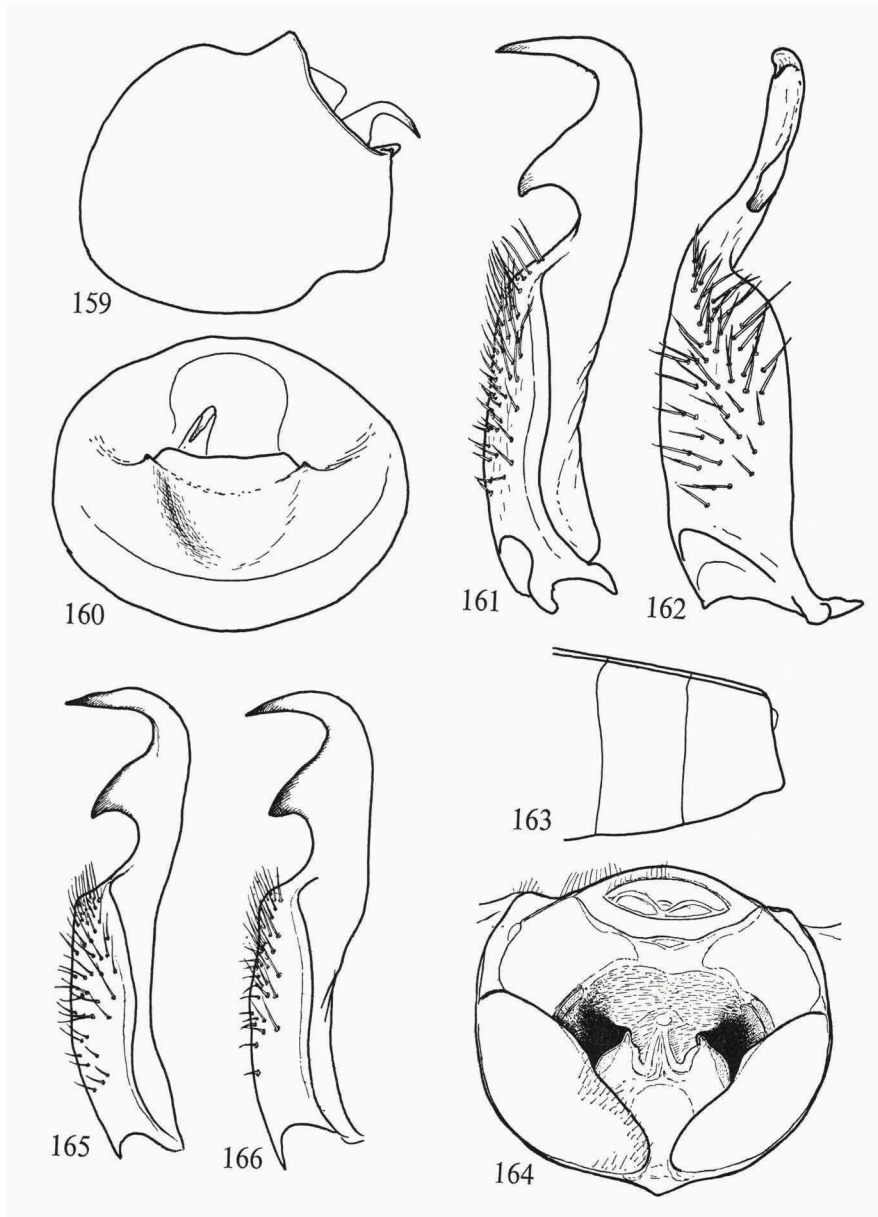


Fig. 159-166. *Dysdercus fulvoviger* (De Geer). 159-162, male from Suriname; 159-160, genital capsule in lateral and posterior view resp.; 161-162, right paramere in lateral and posterior view resp. 163-164, female from Suriname; 163, last abdominal segments in lateral view; 164, genitalia in posterior view. 165, *D. f. discolor* Walker, male from St. Vincent, right paramere in lateral view. 166, *D. f. modestus* nov. subsp., male paratype right paramere in lateral view.

Thorax. — Pronotal collar yellowish white, callus and lateral margin red; disc yellow with a blackish, transverse fascia along posterior margin. Scutellum orange. Corium uniformly yellow, in some specimens costal margin and extreme distal corner slightly blackened, rarely with an indistinct dark spot just behind middle. Membrane blackish with a narrow, light distal border. Ventral surface: epipleuron of pronotum red; collar, posterior pleural margins and epicoxal lobes ivory; sterna, pleura, coxae and trochanters orange to orange-yellow; femora red, blackened distally, sometimes leaving only proximal parts red; tibiae and tarsi reddish brown to blackish.

Abdomen. — Sternites pale yellow with anterior margins narrowly black and lateral margins red. — Male: sternite VI almost entirely, sternite VII only in anterior half orange-red, often suffused with black; anterior black margins of segments VI, VII usually enlarged laterally. Posterior margin of segment IX (fig. 159, 160) with an almost semi-circular excavation limited dorsally by an erect capsular lamella. On each side of this lamella a distinct blackish tooth. Paramere (figs. 161, 162): shaft with a lateral shoulder, head with two spurs; proximal spur large and flat, strongly recurved; distal spur long and acuminate. The parameres in situ directed posteriorly and towards midline. — Female: sternite VII distinctly concavely narrowed pre-apically as seen in profile (fig. 163). First gonocoxa orange-red, posterior margin gradually rounded. Sclerites of second gonocoxae convexly curved, laterally situated, pointing to each other and separated by a large, membranous part of the segment (fig. 164).

Length of male 10.3-12.5 mm; length of female 11.5-14 mm.

Lectotype designation of *D. howardi* Ballou. — The syntypes of this species were distributed to the British Museum and the United States National Museum (Ballou, 1906b: 84). A male specimen in the latter museum is here designated as the lectotype of *Dysdercus howardi* Ballou, 1906. The body and the wings of this specimen are well preserved but other appendages are missing, only the left antenna, two segments of the right one, rostrum, left fore and left hind femora remaining. It is labelled: "Imp. Dep West I No 726 Trinidad Prof. Carmody 6.5.05, Cotype No 9944 U.S.N.M., *Dysdercus howardi* ♂" (Ballou's hand-writing).

Material (distribution: fig. 151).

Venezuela. — Apure. La Vega, Puerto Páez, 4.iv.1957, "en algodón", *G. hirsutum*, F. Kern, 2 ♂, 3 ♀ (IZM). — Guarico. Mesa de Paya, 12.v.1955, J. Loggiodice, 1 ♀ (IZM). — Aragua. Rancho Grande, 1100 m, 7.vi.1955, F. Fernández Y. & C. J. Rosales, 1 ♂ (IZM). Orinoco River, 3 mi above Sta Catalina, 9.ii, N. A. Weber, 1 ♂ (MCZ).

Trinidad. — Trinidad, 6.v.1905, Prof. Carmody, Imp. Dept. West I., No 726 (syntypes of *Dysdercus howardi* Ballou), 1 ♂ "Cotype No. 9944 U.S.N.M." (USNM), 1 ♂ (BM).

Trinidad, i.1905, H. A. Ballou, 1 ♀ (syntype) (BM). Trinidad, 1 ♂ (NMB). Trinidad, L. E. Cheesman, 1 ♀; Trinidad, x.1929-vi.1930, R. A. Lever, 2 ♂, 1 ♀; Fallen, Atkinson, 1 ♀; St. Augustine, xi.1923, 1 ♂, 5.v.1924, 73 ♂, 53 ♀, 23 cop., C. L. Withycombe; Port of Spain, 13.vi., A. Busck, 1 ♂, 1 ♀ (det. R. I. Sailer) (BM). Mt St. Benedict, viii.1929, D. C. Geijskes, 2 ♂, 1 ♀ (det. H. C. Blöte, Cat. Nos. 7, 8, 13); Caspare Island, 14.viii.1929, D. C. Geijskes, 3 ♀ (det. H. C. Blöte, Cat. Nos. 14-16) (ML). Patos Island, 31.xii.1939, E. McC. Callan, 2 ♂; St. Augustine, 9.iv.1943, E. McC. Callan, 1 ♀ (ICTA). San Fernando, 2.ii.1912, on cotton, G. A. K. Marshall, 1 ♂, 1 ♀ (BM).

British Guiana. — Demerary, Cassel, 1 ♀ (ZSM). "British Guiana", A. W. Bartlett, 1909-3, 1026, 2 ♂, 1943-60, 4 ♂, 3 ♀ (BM).

Suriname. — "Suriname", A. Roland, 1 ♂ (holotype of *Cimex fulvo-niger* De Geer (NRS)). "Suriname", Horst, 1 ♂, 1 ♀; "Suriname", Leesberg, 2 ♂, 2 ♀ (ML). "Suriname", A. Agassis, 1 ♀; Paramaribo, Kath. Mayo, 1 ♀ (MCZ). Paramaribo, 1911, W. C. van Heurn, 2 ♀, allotype and paratype of *Dysdercus fuscofasciatus* Blöte, 1931, Cat. Nos. 3 and 4 respectively; Paramaribo, ix.1962, 1 ♂, Paramaribo, Botanical Garden, on ripening fruits of *Hibiscus abelmoschus*, 10.x.1958, many specimens with nymphs, on seeds of *Sterculia carthaginensis* on the ground, 18.iv.1959, great numbers with nymphs, on *Hibiscus cannabinus* ("kenaf") bearing ripening fruits, 24.iv.1959, great numbers, P. H. van Doesburg Jr; Bot. Garden, on kenaf, 14.vi.1960, H. A. van Hoof, 6 specimens; Bot. Garden, on *Bombax globosum*, 13.iv.1950, D. C. Geijskes, 1 ♂; Bot. Garden, 2.v.1963, J. van der Vecht, 1 ♂, 1 ♀; Estate De Morgenstond, on *Hibiscus abelmoschus*, 2.ii.1959, and 8.xii.1959, in great numbers; on same plant, 28.ii.1960, first, very dark specimens after dry season, apparently coming from elsewhere; Estate De Morgenstond, underneath a big *Ceiba pentandra*, 6.vi.1960, P. H. v. Doesburg Jr, 25 specimens; Fernandes Road, 28.vii.1963, J. v. d. Vecht, 1 ♂; Houttuin, 22.vi.1960, P. H. v. Doesburg Jr, 1 ♀; Domburg, on cotton, 17.viii.1941, Uhlenbeck, 1 ♂; Meerzorg, 9.i.1962, 1 ♂, Braamspunt (mouth of Suriname River), on *Thespesia populnea*, 18.xi.1960, 1 ♂, 1 ♀, 3.v.1963, 2 ♂, 1 ♀, Matapica, sea shore, on fruits of *Thespesia populnea*, 3-4.ix.1962, and 18.v.1963, several specimens, P. H. v. Doesburg Jr; Matapica, sea shore, 20.x.1940, D. C. Geijskes, 1 ♂, 1 ♀; Moengo, 10.iv.1939, D. C. Geijskes, 1 ♂; Marowijne River, Galibi, 1.viii.1959, 2 ♂, Albina, on native cotton, 26.vi.1963, several specimens; Coronie, on fruits of *Gossypium barbadense*, 11.iii.1959, 3 ♂, 4 cop.; Wageningen, on herbs on dam of rice polder, 12.xii.1962, 1 ♀; Sipaliwini airstrip near southern border, on *Hibiscus* sp., 13.vi.1963, ♂ ♂ and ♀ ♀, P. H. v. Doesburg Jr (ML).

Brazil. — Amapá. Pôrto Santana, ii-vi.1961, J. C. M. Carvalho, 4 ♂, 2 ♀ (MNR). — Amazon, Rio Branco, 1914-1915, Roman, 3 ♂, 2 ♀ (NRS). "Amazonas", 6.xii.1942, J. C. M. Carvalho (coll. and det.) (MB). — Pará. Igarapéçu, 1912, 1 ♀ (J. R. de la Torre-Bueno Coll., KU). Santarém, 30.i.1896, E. E. Austen, 1 ♀ (ZSP). — Rio de Janeiro. Angra dos Reis, Fac. Japuhya, iii.1951, E. Robello, 1 ♂ (ZSP). — Mato Grosso. Pôrto Velho, Rio Tapirapé, x.1962, R. Pinheiras, 1 ♂, 1 ♀ (CAS).

Not located: "Amer. Merid.", Schmidt, 2 ♀; "Mus. Westerm.", S. America, 1 ♂ (MC). "430 C", 1 ♀ (BM).

Dysdercus fulvoniger discolor Walker

(figs. 151, 165; pl. II fig. 3)

Dysdercus discolor Walker, 1872, Catal. Heter. 5: 190; type locality: "Patria incognita"; lectotype ♂, BM! — Barber, 1923a, Univ. Iowa Stud. Nat. Hist. 10 (3): 23,

25. — Hussey, 1929, Gen. Catal. Hem. 3: 89. — Blöte, 1931, Zool. Meded. 14: 133. — Pearson, 1932, Psyche 39: 115, 116, 125, pl. 4 fig. 3, 5 (paramere). — Squire, 1939, Bull. Ent. Res. 30: 289, 290, fig. 1. — Myers, 1935, Trop. Agric., Trinidad 12: 139-144. — Callan, 1943, Trop. Agric., Trinidad 20: 114. — Callan, 1947, Bull. Ent. Res. 37: 389-391. — Hargreaves, 1948, List Cotton Insects: 30. — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: pl. 2 fig. 3, 5 (after Pearson, 1932) (*D. discolor* treated on p. 34, 35 = *D. chaquensis* Freiberg!).

Dysdercus delauneyi Lethierry, 1881, Ann. Soc. Ent. Belg. 25: 10; type locality: Martinique; lectotype ♂, MNP! — Barber, 1923a, Univ. Iowa Stud. Nat. Hist. 10 (3): 23. — Hussey, 1929, Gen. Catal. Hem. 3: 89. — Wolcott, 1933, Econ. Ent. West Indies: 288-289. — Squire, 1939, Bull. Ent. Res. 30: 289-290, fig. 1. — Callan, 1947, Bull. Ent. Res. 37: 389-391. — Synave, 1967, Bull. K. Belg. Inst. Nat. Wet. 43 (23): 15.

Dysdercus annuliger Uhler, 1893, Proc. Zool. Soc. London 1893: 705 (nomen nudum) — Uhler, 1894, Proc. Zool. Soc. London 1894: 189-190; type locality: Grenada, West Indies; lectotype ♂, BM! — Ballou, 1906, West. Ind. Bull. 7: 54, 65-68 (synonymized with *delauneyi* Lethierry, 1881). — Barber, 1923a, Univ. Iowa Stud. Nat. Hist. 10 (3): 23. — Hussey, 1929, Gen. Catal. Hem. 3: 86, 89.

Differs from the nominate subspecies only in colour. Ground colour of body, including collar, posterior margins of pleura and epicoxal lobes, red; posterior half of pronotum and corium except for proximal part, suffused with black. The genitalia (fig. 165) are almost identical to those of nominate subspecies.

Length of male 9.5-12.0 mm; length of female 11.0-14.5 mm.

Pearson (1932: 125, figs. 1, 5) observes small differences in shape between the parameres of *D. howardi* Ballou (= *D. fulvoviger* (De Geer)) and of *D. discolor* Walker, the proximal spur of the latter being more rounded. In both species, however, the form of this spur is somewhat variable and in *D. discolor* the curvature may even be almost absent. The supposed difference does not seem to be essential. Both subspecies share the characteristic feature of the paramere, i.e. the length ratio between the two spurs.

Lectotype designations of *Dysdercus discolor* Walker, *Dysdercus delauneyi* Lethierry, and *Dysdercus annuliger* Uhler. — *D. discolor* Walker. — From Walker's description it is clear that he had two specimens before him. Both these male specimens are still preserved in the British Museum, one labelled: "4-40/372-3, type" and the other "475 a, *Dysdercus discolor* Walker's Catal.". The former, labelled "type", is here designated as the lectotype of *Dysdercus discolor* Walker, 1872. The type locality is not known, but the specimens are unmistakably from one of the Lesser Antilles. The right paramere of the lectotype is shown in fig. 165.

D. delauneyi Lethierry. — Lethierry described this species from Guadeloupe (one specimen) and Martinique (twelve specimens) but did not designate a holotype. One of his syntypes, a female from Martinique, was found by the author among the material of the Zoologiska Museum,

Helsingfors; two specimens, a male and a female, also from Martinique, are in the Noualhier collection in the Muséum National d'Histoire Naturelle, Paris, and seven syntypes, five males, a female, and one lacking the abdomen, all from the same locality, are in the collection of the Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussel. All these specimens bear a similar green label with "Martinique Delauney" printed on it.

Because Lethierry's collection was incorporated into the Noualhier collection (Dr. J. Carayon, in litt.), the male in this collection is here designated as the lectotype of *Dysdercus delauneyi* Lethierry, 1881.

D. annuliger Uhler. — In the British Museum a female specimen from St. Vincent bearing this locality-name has been labelled "type", but this is incorrect because the species was described from the Island of Grenada, West Indies. In the same collection there are three male and four female specimens obviously belonging to the true type series, taken at the localities mentioned in Uhler's description, viz. St. George's (one male, one female); Balthazar, Windward side (two males, two females); and Mount Gay (one female). Of these syntypes the male from St. George's is here designated as the lectotype of *Dysdercus annuliger* Uhler, 1894.

Material (distribution: fig. 151).

Lesser Antilles. — Montserrat. Imp. Dept. Agr. 1092, 2 ♂ (BM). — Guadeloupe. Grande Terre, St. Anne, sea coast, on *Hibiscus tiliaceus*, 7.vi.1965, D. C. Geijskes (ML). — Dominica. Springfield Estate, on shrubs along road side, 28.v.1965, Mrs. E. Geijskes (ML). — Martinique. vii.1965, D. C. Geijskes, 13 ♂, 10 ♀ (ML). Fort de France, 6.ii.1939, H. W. Cossee, 7 ♂, 7 ♀ (ML). St. Marie, Bondar, 1 ♀ (BM). Martinique, Delauney (syntype series of *Dysdercus delauneyi* Lethierry), 1 ♀ (No 7417, MZH), 1 ♂ (lectotype), 1 ♀ (MNP), 1 ♂ 1 ♀, 1? (BIN). — St. Vincent, 15.ii.1960, H. Mc. Connie, ♂ ♂, ♀ ♀; St. Vincent, 28-31.xii.1924, C. L. Withycombe, 1 ♂ (det. H. C. Blöte) (ML). St. Vincent, H. H. Smith, 1 ♂, 1 ♀; St. Vincent, 13.ii.1924, L. H. Burd, 1 ♀ (det. J. L. Stehlik); St. Vincent, 28-31.vii.1929, C. L. Withycombe, 1 ♂; St. Vincent, 3000 ft, 81, H. H. Smith, *D. annuliger* Uhler, "Type", 1 ♀; Windward side, H. H. Smith, 2 ♂, 1 ♀; St. Vincent, 20.v.1902, C. K. Knowles, 2 ♂, 1 ♀; St. Vincent, 1929-30, R. A. Lever, 1 ♂, 2 ♀; Chimney, 13.v.1938, F. A. S., 2 ♂ (BM). — Santa Lucia. Santa Lucia, vi.1889, G. A. Ramage, 2 ♂, 1 ♀ (pale specimens); St. Lucia, 22.iv.1905, J. C. Moore, 1 ♀ (BM). — Grenadines. Union Island, iv.1937, S. T. Danforth, 1 ♂ (ML), 2 ♂, 1 ♀ (MCZ). — Grenada. Grenada, 25.viii.1891, 9.ix.1891, H. E. Summers, 4 ♂, 5 ♀ (ISU). Mount Gay Estate (Leeward side), H. H. Smith, 1 ♂ (det. H. C. Blöte) (ML), 1 ♀ (BM) (syntypes of *D. annuliger* Uhler). Balthasar (Windward side), H. H. Smith, 23, 1 ♂ (det. Stehlik) (syntype?, P. R. Uhler Coll., MB). St. George's (Leeward side), 212, 1 ♂ (lectotype of *Dysdercus annuliger* Uhler), 1 ♀, Mount Gay, 1 ♀, Balthasar, 2 ♂, 2 ♀, H. H. Smith (syntype series of *D. annuliger* Uhler); Grenada, M. Cameron, 1 ♂, 1 ♀, 1936-555 (BM).

Locality unknown. — "4-40/372-3", 1 ♂ (lectotype of *Dysdercus discolor* Walker), "475 a", 1 ♂ (syntype of *Dysdercus discolor* Walker, BM). "Demerara" (lapsus for Dominica?), Purves, C. v. Volxem Coll., 3612, M. R. Belg., 1 ♂, 1 ♀ (det. H. C. Blöte) (ML).

Dysdercus fulvoniger modestus nov. subsp.

(figs. 151, 166; pl. 11 fig. 4)

On the average somewhat smaller than the two other subspecies and the body more orange-yellow; antenna and tibiae brown; posterior part of pronotal disc suffused with brown to black; corium varies from ochraceous yellow to almost black; in dark specimens the proximal part of the corium also blackened, whereas in *D. discolor* this part remains reddish. Collar, posterior pleural borders, and epicoxal lobes suffused with red. In the male the abdominal sternites VI, VII with anterior borders broadly black. Genital characters in both sexes similar to those of nominate form (fig. 166).

Length of male 8.5-10.0 mm; length of female 10.0-13.0 mm.

Holotype ♂ (pl. 11 fig. 4), and allotype from St. Martha, Curaçao, on *Thespesia*, Oct. 1956, R. H. Cobben; 162 paratypes from diverse localities on Curaçao. Holotype, allotype and ten paratypes deposited in the Leiden Museum; paratypes in the Zoological Museum, Amsterdam, and in the Laboratorium voor Entomologie, Wageningen.

Material (distribution: fig. 151).

Curaçao. — Sint Kruishofje, on bark of a *Ceiba*, 25.iv.1930, H. J. Mac Gillavry, 54 ♂, 30 ♀, 1 cop., 147 larvae; Baai St. Martha, 28.xii.1952, 4 ♂, 5 ♀, 2 cop., 1 nymph, Estate St. Nicolaas, 26.xii.1952, 1 ♂, 1 nymph, Groot St. Joris, 8 ♂, 1 ♀, 8 larvae, B. de Jong (MA). St. Martha, on *Thespesia*, x.1956, 20 ♂, 5 ♀, 6 larvae, St. Martha Baai, 4.ii.1957, 10 ♂, 7 ♀, Cas Chicitoe, on cotton, 18.ii.1957, 3 ♂, 2 ♀, Botanical Garden, St. Catarina, 28.ii.1957, 1 ♂, Hofje Schattegatweg Noord No 121, in fruits of cotton, 9.vi.1957, several larvae, Groot St. Joris, on *Abutilon*, x.1956, 1 ♀, on *Bastardia viscosa*, 20.ii.1957, 1 ♂, 2 ♀, R. H. Cobben; Curaçao, xii.1945, on *Hibiscus rosasinensis*, P. Wagenaar Hummelinck, 1 ♀, 1 nymph (LEW). Curaçao, I.G.11.127 (acquired from Institute St. Jean Berckmans, Zonhoven, 26.i.1937), 1 ♂, 1 ♀ (BIN).

Aruba. — Eagle Petr. Comp., at light, v.1955, P. Wagenaar Hummelinck, 6 ♂, 6 ♀, 7 larvae; Hofje St. José, Palmbeach, 18.iv.1947, R. H. Cobben, 11 ♂, 8 ♀ (LEW).

Locality unknown. — I.G.11.355 (acquired from N. Vincentia, Tilburg, 18.ix.1937), 3 ♂, 7 ♀, 1 nymph (BIN).

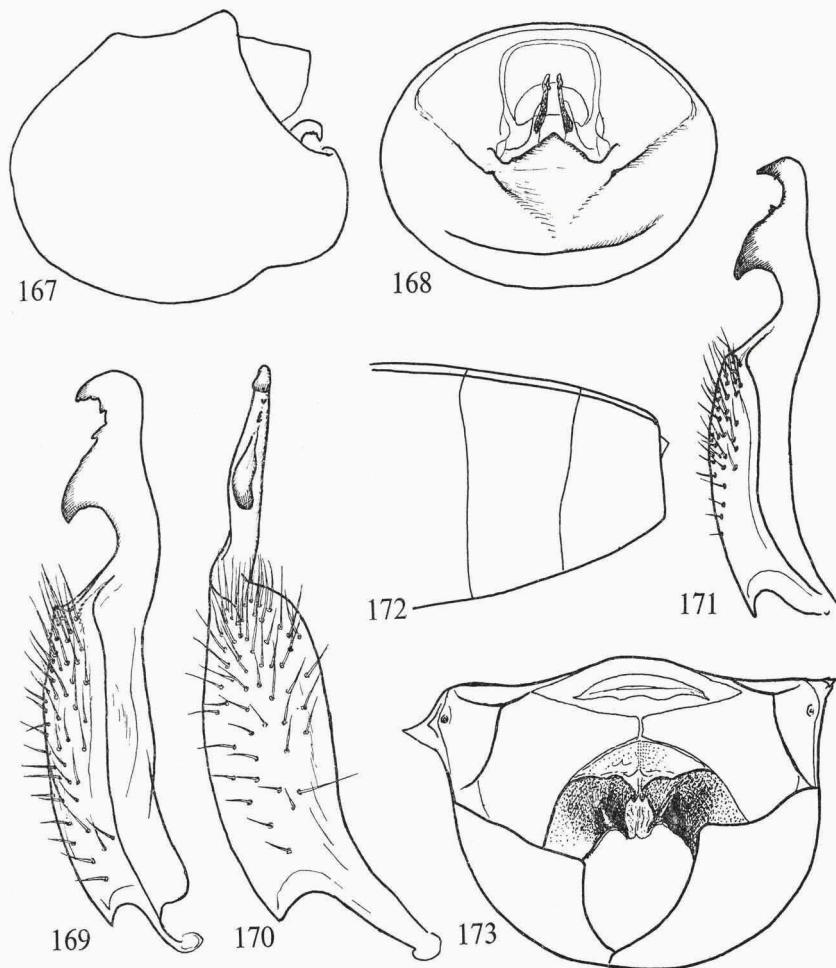
Dysdercus honestus Blöte

(figs. 167-174; pl. 12 fig. 1)

Dysdercus honestus Blöte, 1931, Zool. Meded. 14: 122, 129, 134, 136; type locality: Chapada, Central Brazil; holotype ♂ (fig. 171); BM! — Mendes, 1938a, Rev. Ent., Rio de Janeiro 8: 205. — Mendes, 1938b, Bol. Biol., São Paulo (n.s.) 3: 133. — Mendes, 1939a, Bol. Biol. Sao Paulo (n.s.) 4: 98. — Hargreaves, 1948, List Cotton Insects: 30. — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 20, 38, pl. 3 fig. 10 (paramere). — Szumkowski & Fernández Yépez, 1963, Agron. Tropic., Maracay 13: 85. — Doesburg Jr, 1966, Stud. Fauna Suriname Guyanas 9: 46-49, figs. 40-43.

The typical pale yellow of the body and legs, the white annulus at proximal part of antennal segment 4, and the genital characters specified below, are good features by which to distinguish this species.

Head. — Dorsal surface yellowish orange, ventral surface somewhat paler; first three segments of antenna yellowish brown to reddish brown, distal parts darkened; segment 2 and particularly segment 3 often entirely



Figs. 167-173. *Dysdercus honestus* Blöte. 167, 169, 170, male from British Guiana; 167, genital capsule in lateral view; 169-170, right paramere in lateral and posterior view resp. 168, 171, male, holotype; 168, genital capsule in posterior view; 171, right paramere in lateral view. 172-173, female from Suriname; 172, last abdominal segments in lateral view; 173, genitalia in posterior view.

dark or blackish; segment 4 blackish with a narrow white annulus proximally. Rostrum yellow, blackened towards tip.

Thorax. — Pronotal collar white, callus orange-yellow, transverse pre- and post-callar sulci black; disc pale yellow with narrow, blackish transverse fascia near posterior edge; lateral margin orange-yellow. Scutellum orange-yellow. Corium pale yellow with brownish black membrane, bordered with greyish white distally. Ventral surface: sterna, pleura, and coxae orange-yellow; collar, posterior pleural margins, and epicoxal lobes white. Legs yellowish brown, tarsal segments slightly blackened distally.

Abdomen. — Sternites yellowish white, lateral margins yellow, anterior margins narrowly black. — Male: sternite VI largely, VII anteriorly suffused with yellowish brown, anterior black margins of these sternites enlarged and sometimes suffused with red. Genital capsule (figs. 167, 168) orange; blunt posterior margin medially with a fairly deep, triangular excavation, dorsally limited by a triangular lamella. Paramere (figs. 169, 171) slender, with a curved neck, and a stout, recurved, proximal spur; distal spur small and pointed; between the spurs some irregular small teeth. — Female: sternite VII evenly narrowed posteriorly (fig. 172). Genitalia (fig. 173): first gonocoxa white, distal margin angularly produced (gonocoxa fully developed); sclerites of second gonocoxae separated, conically curved, distal margin blackish and somewhat produced, mesial edge slightly concave, mesio-dorsal corners produced.

Length of male 10.0-14.0 mm; length of female 12.5-15.5 mm.

Material (distribution: fig. 174).

Peru. — Callanga, 1 ♂, 1 ♀, Cumbase, 2 ♂, 1 ♀ (W. H. Mucbe-Radeberg Ank, MD). Callanga, 1 ♂ (ZSM).

Colombia. — Presidio, Rio Magdalena, 8.v.1926, Woronov, 1 ♀ (ZIL).

Venezuela. — "Venezuela", 138, 1 ♀ (MAC). — Apure. La Vega, Puerto Páez, 4.iv.1957, "en algodón", *G. hirsutum*, F. Kern, 4 ♂, 5 ♀; Cabuyare, 16.iv.1953, 1 ♂, 1 ♀ (MAC). — Portuguesa. Camburito, Acarigua, "en *Sterculia apetala*", 18-19.ii.1949, F. Fernández Y., 18 ♂, 38 ♀ (IZM). — Lara. Barquisimeto, "en caña de azúcar", 18.ii.1949, H. C. James, 1 ♀ (IZM). — Yáracuy. Yarratagua, "en caña de azúcar", 14.ix.1949, H. C. James, 1 ♂ (IZM). — Cojedes. La Vigía, "en algodón", 9.xii.1964, J. Andara, 5 ♂, 3 ♀ (IZM). — Carabobo. Guacara, "en algodón", 31.x.1949, J. Avilán, 1 ♂, 2 ♀, 1 cop. (det. R. I. Sailer); Valencia, 15.ii.1949, F. Fernández Y., 1 ♂, 1 ♀; Rio Borburato, 300-600 m, 7.iv.1950, F. Fernández Y. & C. J. Rosales, 1 ♀; Mariaria, "en algodón", 30.vi.1949, F. Fernández Y., 4 ♂, 3 ♀; Las Trincheras, 30.ii.1949, F. Fernández Y. & P. Fenjives, 1 ♀ (IZM). Puerto Cabello, 1 ♀ (NRS). — Aragua. El Limon, 450 m, "en Quimbombo, *Hibiscus esculentus*", 24.ii.1954, R. Requena, 1 ♂ (MAC). El Limon, 450 m, 27.xi.1950, P. Fenjives, 1 ♂, 1 ♀; Maracay, "en algodón", 27.xii.1949, F. Fernández Y., 1 ♂; Maracay, 18.xii.1950, J. R. Requena, 3 ♂, 1 ♀; Gonzalito Cr., Maracay, "en Camoruco", 2.ii.1950, F. Fernández Y., 2 ♂, 8 ♀, 2 cop.; Pifional, Maracay, 450 m, "en semillas de *Sterculia carthaginensis*", 1.x.1945, J. A. González, 1 ♂, 1 ♀; Rancho Grande, 1100 m, 17.vii. 1955, F. Fernández Y. & C. J. Rosales, 1 ♀, 1.v.1951,

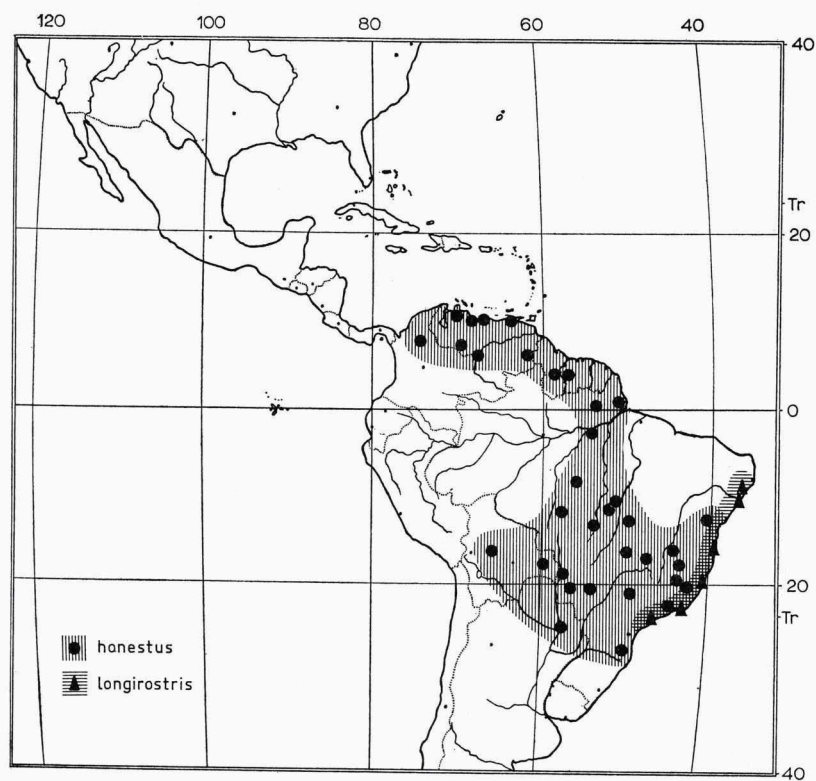


Fig. 174. Distribution of *Dysdercus honestus* Blöte and *D. longirostris* Stål.

F. Fernández Y., 1 ♂, 3 ♀, 13.ix.1953, F. Kern, 1 ♀, 21.v.1958, C. J. Rosales, 1 ♀, 21.v.1953, J. A. González, 1 ♂, 13.v.1949, W. Whitcomb, 2 ♀, 16.vi.1949, "a la luz", F. Fernández Y. & E. F., 2 ♂, 3 ♀; Cumbre Choroni, 1400 m, "en compuesta", 8.iv.1951, F. Fernández Y., 1 ♂, 1 ♀ (exceptionally small, 11.2 mm, scutellum black) (IZM). El Potrero, 5.ix.1945, F. Diaz R. & R. Labrador, 5 ♂ (ML). San Mateo, 5.v.1961, Iriarte, 1 ♂ (MCZ). — Distrito Federál. Caracas, 5.ii.1950, C. Prado, 1 ♀ (IZM). Caracas, van Lansberge, 2 ♀ (allo-, and paratype of *Dysdercus pallidus* Blöte) (ML). — Sucre. La Soledad, 31.iii.1944, F. Fernández Y., 1 cop. (MAC). — Bolivar. Road El Dorado-Santa Elena km 107, 460 m, 16.viii.1957, F. Fernández Y. & C. J. Rosales, 1 ♀ (IZM). Sierra Pacaraima, 1 ♀ (Breddin Coll., DEI). — Sta Clara, S. Joagun, No. 83, 9.ix.1951, W. Withcomb, 1 ♂, 1 ♀ (IZM).

British Guiana. — E. C. Demerara, Mahaica, 31.viii.1926, L. D. Cleare Jr, 748, 1 ♂ (CAD). Upper Rupununi, ii-iii, Ogilvie, 1 ♂, 1 ♀ (MCZ).

Suriname. — Lucie River area, Suriname Exped., vii-viii.1926, D. S. Fernandes, 9 ♂, 9 ♀ (MA).

Brazil. — Amapá. Serra do Navio, iv-vi.1960, Bicelli, 1 ♀ (ZSP). — Pará. Santarém (FAO), 8.xii.1963, G. Marlier, 1 ♂ (BIN). Rio Paru, vii.1952, J. C. M. Carvalho, 5 ♂ (MNR). Cachimbo, 25.ix-x.1958, Traversos c.s., 1 ♂ (IOC). — Goiás, Campanas, i.1936, R. Spitz, 1 ♀ (ZSP). Faz. Cachoeirinha, Itai, x.1962, Exped. Zool. No. 279, 1 ♂;

Leopoldo Bulhões, xi.1937, R. Spitz, 1 ♀ (ZSP). Rio Araguaia, 3 km S Barra do Tapirapé, 9.i.1963, B. Malkin, 2 ♂, 1 ♀ (CAS). Anapolis, 12.xi.1936, G. B. Fairchild, 1 ♂, 2 ♀ (MCZ). — Bahia. Iguassú, vii-viii.1915, A. Roman, Sv. Amaz. Exped., 1 ♂, 6 ♀ (NRS). — Minas Gerais. Lassance, 20-31.i.1939, Martins c.s., 2 ♀ (IOC). Belo Horizonte, on cotton, 6.vi.1944, Parker, 1 ♂, 1 ♀ (MB), 1 ♂ (USNM). Diamantina, 1 ♀ (ZIL). Faz. do Diamante, 1930, 2 ♂, 2 ♀, Viçosa, 1931, 1 ♂, 1 ♀, Mrs. Y. Mexia (CAS). Paracatú, vii.1960, Formosa, 1 ♂, 2 ♀; Carmo do Rio Claro, i.1958, J. C. M. Carvalho & J. Becker, 1 ♂ (pinned together with a ♀ of *D. ruficollis* (L.)) (MNR). Uberaba, E. le Moul, 2 ♀ (ML). — Espirito Santo. Espirito Santo, 1 ♀, allotype (ML). — Rio de Janeiro. Angra dos Reis, x.1952, Ortica, 2 ♂ (MNR). "km 47" [Road Rio de Janeiro-São Paulo], P. Wygodzinsky, 1 ♂ (ML). — São Paulo. Campinas, xii.1935, R. Spitz, 1 ♂ (ZSP). Ilha Seca, 18-26.ii.1940, 3 ♂, 1 ♀ (IOC). Salesópolis, Boraceia, 19.x.1960, K. Lenko, 1 ♀; Faz. Guariroba, N. Granada, iii.1960, J. Lane, 1 ♀ (ZSP). — Sta Catharina. Rio Natal, v. 1947, A. Maller, 1 ♀ (AMNH). — Mato Grosso. Xingu, vi.1953, Alencar, 3 ♂, 3 ♀; Miranda, i.1941, 1 ♂, 1 ♀; Bodoquena, xi.1941, 1 ♀; Zona da N.O.B. [Bodoquena?], Salobra, 18-29.x.1938, 2 ♂ (IOC). São Domingos, x.1949, Werner, 1 ♂, 1 ♀; Posto Garapu Rio, 7.xi.1949, Werner, 1 ♀ (ZSP). Barra do Tapirapé, 1-23.xii.1962, 4 ♂, 5 ♀, 2-12.i.1963, 5 ♂, 8 ♀, Faz. Joao Pinheiros, Rio Tapirapé, 240 km from Barra, 19.xii.1962, 1 ♂, B. Malkin; Pôrto Velho, Rio Tapirapé, R. Pinheiros, x.1962, 3 ♂, 4 ♀, 1-20.xii.1962, 1 ♀, ii-iii.1962, 7 ♂, 5 ♀, B. Malkin (CAS). Cajeres, 2.iv.1959, M. Alvarenga, 2 ♀; Faz. Ric. Franco, 10-11.iii.1961, J. & B. Bechyně, 2 ♀ (MNR). Serra do Urucum, Corumbá, 25.xi.1960, K. Lenko, 4 ♂, 2 ♀ (ZSP). Chapada, 2600 ft, xi.1902, A. Robert, 1 ♂, holotype (BM). Corumbá, xii.1919, G. Pellerano, 1 ♀ (MACN). Mato Grosso, Spencer Moore, 1 ♂, 1 ♀ (96-204, BM).

Paraguay. — Estanca Postillon, near Puerto Max, Rio Paraguay, 9.3.1905, L. des Artz, 1 ♀ (HZM). Asunción, 2 ♀ (Coll. Breddin, DEI).

Bolivia. — Chaco, Reboré, 200 m, ii.1958, J. Foerster, 1 ♀ (MB). Chapare region, upper Rio Chipiriri, 400 m, 29.x, and 20.xii.1953, W. Forster, 2 ♀ (ZSM). Cochabamba, 2500 m, Zischka, 2 ♂ (ML). Prov. Sara, Steinbach, 1 ♀ (MCZ), 2 ♂, 1 ♀ (MW).

Dysdercus longirostris Stål

(figs. 174-179; pl. 12 fig. 2)

Dysdercus longirostris Stål, 1861, Öfvers. Kongl. Sv. Vetén.-Akad. Förh. **18**: 198; type locality: Brazil; holotype ♀, NRS! — Hussey, 1929, Gen. Catal. Hem. **3**: 93. — Blöte, 1931, Zool. Meded. **14**: 133. — Schmidt, 1932, Wien. Ent. Ztg. **49**: 272. — Gonçalves, 1937, O Campo **8**: 52, fig. — Gomes, 1938, O Campo **9**: 58-60, 2 figs. — Mendes, 1938a, Rev. Ent., Rio de Janeiro **8**: 205. — Mendes, 1938b, Bol. Biol., São Paulo (n.s.) **3**: 133. — Mendes, 1939a, Bol. Biol., São Paulo (n.s.) **4**: 98 (*longirostri*). — Lima, 1940, Ins. Brasil **2**: 113, 118-121, figs. 331-333. — Lima et al., 1962, Mem. Inst. Osw. Cruz **60**: 20, 40, pl. 3 figs. 11, 12 (paramere).

A large, dirty yellow species with a long rostrum and without a black spot on corium, most closely related to *D. honestus* Blöte.

Head. — Colour orange to red, often slightly blackened above; first three segments of antenna brown, last segment dark grey to blackish with a white basal annulus; rostrum very long, reaching to base of abdominal segment VI in male and VII in female, light brown, blackish towards apex.

Thorax. — Pronotal collar dirty white; callus orange-yellow, pre- and post-callar sulci black; raised lateral margin yellowish; disc livid to dirty yellow with a narrow, transverse, blackish fascia just before the dirty white posterior edge. Scutellum dirty orange with sides often narrowly blackened. Corium of same colour as disc or slightly more yellowish; costal margin yellowish proximally, median plate orange. Membrane brownish to dark grey. Ventral surface: sterna, pleura, and coxae pale yellowish brown; margins of pleura often blackened; collar, posterior pleural margins, and epicoxal lobes dirty white; ostiolar peritremes yellowish; legs pale brown.

Abdomen. — Sternites yellow, anterior margins blackish. — Male: anterior

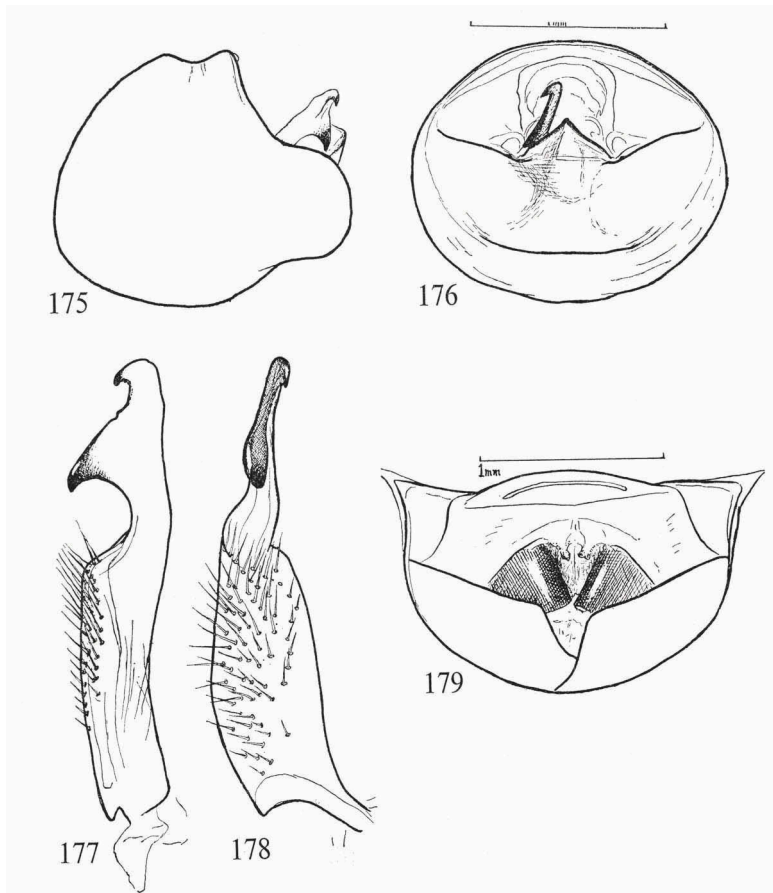


Fig. 175-179. *Dysdercus longirostris* Stål. 175-178, male from Brazil; 175-176, genital capsule in lateral and posterior view resp.; 177-178, right paramere in lateral and posterior view resp. 179, female from Brazil, genitalia in posterior view.

margins of sternites VI, VII enlarged; sternites VI-VIII suffused with brown or black except for posterior margin of VIII. Genital capsule (figs. 175, 176) orange-brown, posterior margin broadly produced, medially with a deep, triangular excavation, limited dorsally by an erect, triangular to semicircular lamella. Paramere (figs. 177, 178) with a densely pilose shaft, broad neck, and a laterally flattened head bearing two spurs; proximal spur large, flat, recurved; apical spur very small and also recurved. — Female (fig. 179): first gonocoxa yellowish, distal margin strongly produced and recurved to segment IX; sclerites of second gonocoxa conically curved, somewhat laterally situated and obliquely directed at the midline.

Upper surface of head, anterior corners of pronotum, sterna, and sides of abdomen minutely pilose.

Length of male 13-15 mm; length of female 15-19 mm.

Type of *Dysdercus longirostris* Stål. — From Stål's description it is clear that this species is based on one female specimen from Brazil. This specimen, examined by the author and complete in all respects, inevitably must be regarded as the holotype.

Material (distribution: fig. 174).

Brazil. — Pernambuco. Pernambuco, 1 ♂, 1 ♀ (Distant Coll.); Fry Coll., 266, 1905-100, 1 ♀; Ed. Luja Monlevade (?), 1932-282, 1 ♀ (BM). — Alagoas. Mangabeira, xi.1952, Camargo-Andr. (ZSP). — Espirito Santo. Vale de Itáunas, R. Engano, ix-x.1944, L. Travassos & N. Santos, 1 ♀ (IOC). Espirito Santo, x.1920-ii.1921, F. Hoffmann, 4 ♂, 2 ♀ (Edm. Schmidt det., 1931) (DEI). Espirito Santo, 2 ♀ (ZSM). Parque Sooretama, Linhares, 13-15.x.1958, D. Zajciv, 1 ♂, 2 cop. (MNR). — Rio de Janeiro. Itatiaia, 700 m, 22.ix.1935, J. F. Zikán, 3 ♀ (IOC). Petrópolis, F. Ohaus, 1 ♀ (MD). Angra dos Reis, Faz. Japuhya, L. T. F. [L. Travassos F.], vii-viii.1945, 3 ♂, 5 ♀ (ZSP). Terezópolis, Barrera, 23.x.1957, Machado c.s., 1 ♂, 6 ♀; Cachoeira de Macaçu, xi.1961, Alunos, 1 ♀; Angra dos Reis, x.1952, J. Oiticica, 1 ♂, 2 ♀; Itatiaia, Park Nat., 7-9.x.1961, O. Mielke, 2 ♀ (MNR). Angra dos Reis, x.1934, D. Mendes, 1 ♂, 1 ♀ (L. O. T. Mendes det.) (ML). Road Rio de Janeiro-São Paulo, km 47, 29.ii.1945, P. Wygodzinsky, 1 ♀ (IZM). — Guanabara. Quinta da Boa Vista, 30.xii.1945, J. C. M. Carvalho (coll. & det.), 1 ♂, 1 ♀ (MB). Corcovado, 25.xi.1952, D. Zajciv, 1 ♂, 4 ♀; Corcovado, x.1958, M. Alvarengo & C. A. C. Seabra, 1 ♂, 2 ♀ (MNR). — São Paulo. Salesópolis, Est. Biol. Boraccia, 27.x.1951, E. X. Rabello, 1 ♀ (ZSP). São Paulo, 20.x.1938, 1 ♀ (MNR). Campinas, x.1938, D. Mendes, 1 ♀ (det. L. O. T. Mendes) (ML). Lagga santa (?), Reinhardt, 1 ♂, 1 ♀ (MC).

Locality unknown. — Carapato Rego., 1935, A. J. Musgrave, 4 ♂ (1935-448, BM).

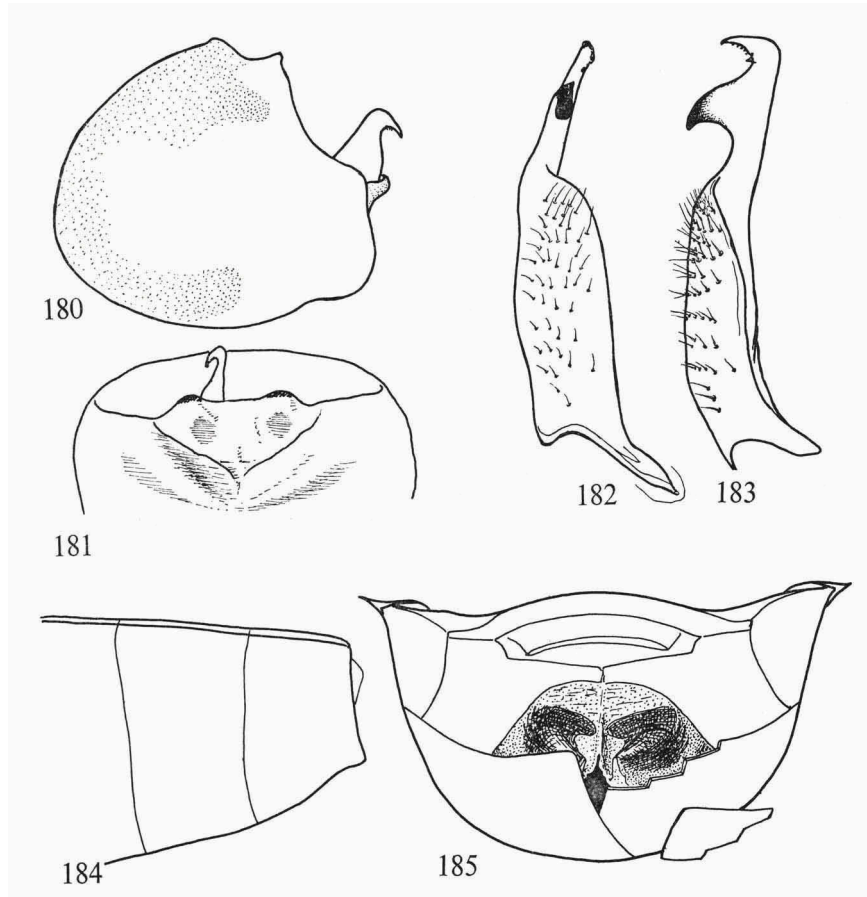
Dysdercus cordillerensis nov. sp.

(figs. 180-185, 196; pl. 12 fig. 3)

Medium-sized to large (11.4-17.9 mm), greyish yellow, without a white annulus at base of antennal segment 4; lateral margins of pronotum and corium yellow.

Head. — Ground colour orange, dorsal surface of antenniferous tubercle and the neck region black; proximal part of rostrum orange, distal half of segment 1 and remaining parts blackened; antenna dark brown to black, segment 4 brown, sometimes with slightly lighter base.

Thorax. — Pronotal collar white; callus orange, transverse sulci black; lateral margin of pronotum yellow to pale orange; disc dirty pale yellow (Ridgway, pl. 40: olive-buff), with distinct dark punctures. Scutellum orange, anteriorly black. Corium of same colour and texture as pronotal disc; costal margin and towards apex yellow to pale orange. Membrane pale brown to blackish, distal border grey. Ventral surface: epipleura of pronotum and



Figs. 180-185. *Dysdercus cordillerensis* nov. sp. 180-183, male from Huanuco, Peru; 180-181, genital capsule in lateral and posterior view resp.; 182-183, right paramere in lateral and posterior view resp. 184-185, female from Abancay, Peru; 184, last abdominal segments in lateral view; 185, genitalia in posterior view.

corium yellow. Collar, posterior borders of pleura, and epicoxal lobes white; pleura orange-red bordered with black. Sterna mainly blackish, median carina white. Ostiolar area including peritremes black. Coxae, trochanters, and femora orange-red to brown; dorsal and distal parts of femora, tibiae and tarsi often blackened.

Abdomen. — Sternites dirty white to yellow, sometimes greenish, anteriorly narrowly bordered with black, especially laterally. — Male: genital capsule (figs. 180, 181) orange-red to red, anteriorly blackened; posterior margin broadly rounded and deeply excavated medially; excavation dorsally limited by a bisinuated capsular lamella; in this lamella at both sides a roundish, subhyaline area. Paramere (figs. 182, 183) with shaft slightly tapering, without shoulder; head with two spurs; proximal spur large, recurved, distal spur smaller; between the spurs a row of fine teeth. — Female (fig. 184, 185) ventral part of sternite VIII enlarged posteriorly, in lateral aspect narrowed just anterior to the posterior margin. First gonocoxa yellow, hardly reduced, distal margin almost right-angled. Sclerites of second gonocoxae conically curved, proximally concave, touching each other; mesial margins concave; membranous part between sclerites with a median and a distal carina. Lateral parts of second gonocoxae and anal area red.

Length of male 11.4-15.7 mm; length of female 14.3-17.9 mm.

Material (distribution: fig. 196).

Peru. — 40 mi W Cusco, subtropical cyn.¹⁾, 4.iii.1951, 23 ♂, 25 ♀ (holotype ♂, allotype, and paratypes, CAS), 3 ♂, 3 ♀ (paratypes, ML). 40 mi E Abancay, 5.iii.1951, 7 ♂, 8 ♀ (paratypes, CAS), 2 ♂, 2 ♀ (paratypes, ML). Abancay, 6.iii.1951, 1 ♂, 1 ♀ (paratypes), Rio Pampas, Highway 7, 8.iii.1951, 1 ♂, 3 ♀ (paratypes), E. S. Ross & A. E. Michelbacher (CAS). Huanuco, Mayo, on *Urocarpidium mathewsii*, 1962, Alza, 1 ♂ (paratype) (presented by Sr. J. E. Gonzales B.) (ML).

Dysdercus maurus Distant

(figs. 186-196; pl. 13 figs. 1, 2)

Cimex ruficollis Fabricius, 1775 (nec Linnaeus), Syst. Ent.: 719 (preoccupied by *Cimex ruficollis* Linnaeus, 1764); type locality: Brazil; lectotype ♂, Banks' coll., BM! — Blöte, 1931, Zool. Meded. 14: 128. — Zimsen, 1964, Type Fabricius: 326 No. 836.

¹⁾ When asked for the meaning of this abbreviation, Mrs. Lois B. O'Brien, Assistant Curator of the Department of Entomology, California Academy of Sciences, kindly supplied (in litt.) the following information: "Dr. Ross says this locality is in a subtropical canyon with mesquite trees [*Prosopis juliflora* D. C., Mimosaceae], rather dry, near the bridge crossing the Rio Apurimac on the road from Cusco to Abancay".

Dysdercus maurus Distant, 1901, Trans. R. Ent. Soc. London **1901**: 590; type locality: Zuipapá, Pernambuco, Brazil; lectotype ♂, BM! — Hussey, 1929, Gen. Catal. Hem. **3**: 93. — Blöte, 1931, Zool. Meded. **14**: 128 (synonymized with *Cimex ruficollis* Fabricius, and with *Dysdercus howardi* Ballou var. *minor* Ballou), 133. — Pearson, 1932, Psyche **39**: 116-119 (redescription), 125, pl. 4 figs. 2, 4 (paramere). — Mendes, 1938a, Rev. Ent., Rio de Janeiro **8**: 205. — Mendes, 1938b, Bol. Biol., São Paulo (n.s.) **3**: 133. — Hambleton & Sauer, 1938, Arq. Inst. Biol., São Paulo **9**: 328. — Mendes, 1939a, Bol. Biol., São Paulo (n.s.) **4**: 98. — Lima, 1940, Ins. Brasil **2**: 113. — Freitas, 1946, Bol. Soc. Agr. Ind. Comerc. Est. Pernambuco **13**: 3. — Callan, 1947, Bull. Ent. Res. **37**: 389, 391. — Hargreaves, 1948, List Cotton Insects: 30. — Proctor, 1958, Emp. Cotton Grow. Rev. **35**: 107. — Lima et al., 1962, Mem. Inst. Osw. Cruz **60**: 22, 41, pl. 2 figs. 2, 4, pl. 3 fig. 13 (paramere). — Doesburg Jr, 1966, Stud. Fauna Suriname Guyanas **9**: 49-52, figs. 32 c, 44-47.

Dysdercus howardi var. *minor* Ballou, 1906b, West Indian Bull. **7**: 70; type locality: Trinidad; lectotype ♂, BM! — Hussey, 1929, Gen. Catal. Hem. **3**: 96, 101 (incorrectly synonymized with *Cimex ruficollis* Linnaeus). — Blöte, 1931, Zool. Meded. **14**: 128. — Squire, 1939, Bull. Ent. Res. **30**: 290. — Callan, 1947, Bull. Ent. Res. **37**: 389. — Urich, 1916, Bull. Dept. Agr. Trinidad Tobago **15**: 18.

Dysdercus pallidus Blöte, 1931, Zool. Meded. **14**: 129, 134, 135 fig. 6 d (male genital capsule); type locality: La Guaira, Venezuela; holotype ♂ (figs. 193-195), ML! — Vivas-Berthier, 1941, Bol. Soc. Venezol. Cienc. Nat. **7**: 118. — ?Hayward, 1942, Est. Exp. Agric. Tucumán, Publ. Misc. **1**: 35. — Doesburg Jr, 1960, Meded. Landb.proefst. Suriname **22**: 88. — Szumkowski & Fernández Yépez, 1963, Agron. Tropic., Maracay **13**: 85.

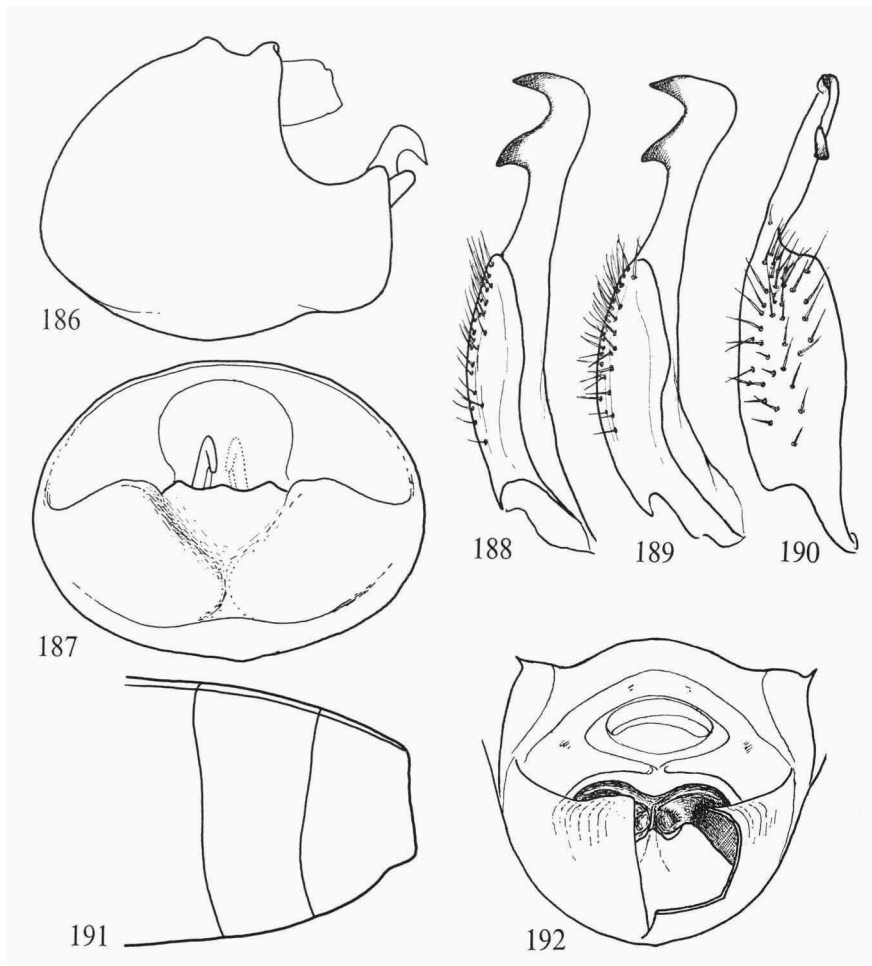
Dysdercus howardi; Withycombe, 1924, Bull. Ent. Res. **15**: 171 (in part: the "dark, non-typical forms").

Small to medium-sized (8-14.4 mm); colour variable, corium usually blackened; callus, lateral margins of pronotum, and usually also the head red; pleura and proximal parts of legs yellowish brown.

Head. — Dorsal surface varies from red to pure black, base of eye remaining red; ventral surface orange or more or less blackish, lateral part of gula remaining yellowish brown. Antenna dark brownish to black; base of segment 1 reddish, base of segment 4 white. Rostrum yellowish red, segment 4 blackened.

Thorax. — Pronotal collar white; callus and lateral margin red; disc grey; transverse sulci of callus and a fascia near posterior margin of disc blackish. Scutellum usually black, sometimes orange or only central part or posterior part orange. Corium dirty yellow to grey with a blackish punctulation, usually also more or less suffused with black except at costal margin; corial cleft and a less distinct area between its apex and internal margin often blackish. Membrane dark greyish brown, distal border whitish. Ventral surface: collar, posterior pleural margins and epicoxal lobes yellowish white; sterna and pleura yellowish brown; anterior margins of pleura, pro- and mesosterna including peritremes of scent gland ostiole often blackened. Legs largely dark brown, only coxae, trochanters and proximal parts of femora more pallid.

Abdomen. — Sternites yellowish white, lateral margins red to brownish; anterior margins of sternites narrowly black laterally. — Male: sternite VI entirely, VII anteriorly suffused with red; segment IX red to brown. Lateral margin of genital capsule (fig. 186) deeply concave, posterior margin interrupted medially by a broad, shallow, semicircular excavation, dorsally limited by a more or less bilobate capsular lamella (fig. 187). Paramere (figs. 188-190) slender with two short spurs; proximal spur sharply recurved



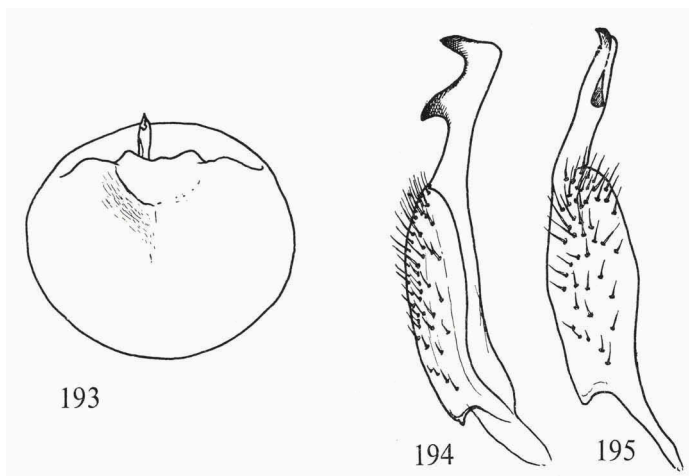
Figs. 186-192. *Dysdercus maurus* Distant. 186-187, male from Surinam, genital capsule in lateral and posterior view resp. 188, male, lectotype, right paramere in lateral view. 189-190, *Cimex ruficollis* Fabricius, male, lectotype, right paramere in lateral and posterior view resp. 191-192, female from Surinam; 191, last abdominal segments in lateral view; 192, genitalia in posterior view.

and pointing in ventral direction, distal spur directed more backwards. — Female: in lateral aspect sternite VII narrowed just anterior to posterior margin (fig. 191); genitalia (fig. 192): posterior margin of first gonocoxa almost rectangularly produced and recurved inwards. Sclerites of second gonocoxae small, flatly convex, limited dorsally by a curved sulcus and mesially by a folded membrane bearing a distinct, median carina.

Length of male 8.0-12.7 mm; length of female 8.5-14.4 mm.

There is some evidence of geographically correlated differences in colour pattern within this species, but variability is so great that division into subspecies poses difficulties. Specimens from Brazil and Colombia often have the head and scutellum black and hemelytra as a rule suffused with black, but pale forms also occur. In Venezuela and Trinidad the colour of the corium tends to be yellowish (*D. pallidus* Blöte), although typical forms are common (less so in Trinidad: var. *minor* Ballou). In Suriname the specimens are as a rule somewhat larger (males 8.4-12.7 mm, females 10.4-14.4 mm); they have the head red and the corium often very dark with a tendency to form a blackish corial spot.

Lectotype designations of *Dysdercus maurus* Distant, *Dysdercus howardi* var. *minor* Ballou, and *Cimex ruficollis* Fabricius. — One male and two females in the British Museum, labelled "Zuipapá. Pernambuco, Distant Coll., 1911-383" are to be regarded as syntypes of *D. maurus* Distant, 1901. The male specimen, which is also provided with a red type label, is here designated as the lectotype of this species. Its right paramere is shown in fig. 188.



Figs. 193-195. *Dysdercus pallidus* Blöte, male, holotype; 193, genital capsule in posterior view; 194-195, right paramere in lateral and posterior view resp.

In the same collection the author found a male and a female, labelled "cotype, no 726, Trinidad, Prof. Carmody 6.5.05, Trinidad 1906-172, *Dysdercus howardi* var. *minor* Ballou", in Ballou's handwriting. The male specimen is here designated as the lectotype of this variety.

In the Banks' collection (British Museum) the author examined the three syntypes of *Cimex ruficollis* Fabricius, 1775, belonging to the same species as Distant's *D. maurus*. The specimens are labelled: "Brazil", "*Cimex ruficollis* Fab. Entom. p. 719.110". A male, also provided with a red type label, is here designated as the lectotype of Fabricius' species. Its right paramere is shown in figs. 189 and 190.

Material (distribution: fig. 196).

Colombia. — Nouv. Grenade de Bogotá à Buenaventura, 14.xii.1877-22.ii.1878, O. Thieme, 1 ♂ (BM). — La Goajira, Stat. 288, 17.i.1937, P. Wagenaar Hummelinck, 1 ♂, 1 ♀ (LEW). Villa Vieja, 11.iv.1945, 4 ♂, 5 ♀; Coyaima, Tolima, xi.1944, R. A.

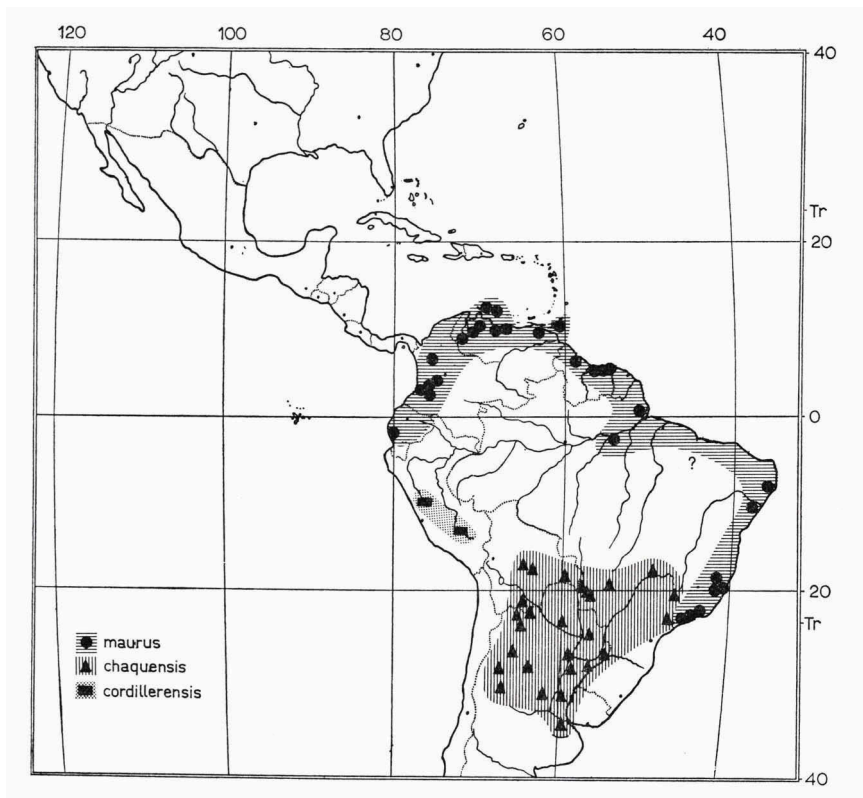


Fig. 196. Distribution of *Dysdercus maurus* Distant, *D. chaquensis* Freiberg, and *D. cordillerensis* nov. sp.

Stirton, 1 ♀ (CAS). Girardot, 360 m, 28.xi.1958, J. Foerster, 1 ♂ (MB). Caldras, 9.v.1914, 2 ♂, 2 ♀, La Cumbre, 15.v.1914, 1 ♂, 2 ♀, 1 cop. (J. R. de la Torre-Bueno Coll., KU). El Tambo, Cauca, Papayan, 1700 m, 15.x.1932, K. V. Sneidern, 1 ♂ (ZML). Cali, iii.1948, 2 ♂, 1 ♀, 2-6.vi.1948, 2 ♂, 2 ♀, E. M. Paulsen (MC).

Venezuela. — Tachira. Coro Churuquara, 24.viii.1951, F. Fernández Y., 3 ♂, 1 ♀ (IZM). — Trujillo. La Gran Parada, 12.viii.1964, E. Osuna & M. Gelbéz, 1 ♂, 1 ♀ (IZM). — Lara. Barquisimeto, 18.ii.1949, "en caña de azúcar", H. C. James, 2 ♂, 3 ♀ (IZM). — Jaracuy. Guama, 26.iv.1951, "en algodón, *G. hirsutum*", W. Whitcomb, 1 ♂ (MAC). — Carabobo. Mariaria, 12.ii.1935, C. G. Salazer, 3 ♀ (IZM). — Distrito Federal. El Valle, 4.ii.1950, F. Fernández Y., 2 ♂, 2 ♀, 2 cop. (IZM). Caracas, x.1926, Woronov, 2 ♂ (ZIL). La Guaira, 27.iv.1900, C. C. Kayser, 1 ♂ (holotype of *Dysdercus pallidus* Blöte) (ML). — Aragua. El Potrero, 5.ix.1945, F. Diaz R. & R. Labrador, 1 ♂ (ML). — NE Venezuela, La Estancia, 29.xii.1955, 8 ♂, 5 ♀ (La Salle Coll.). — Not located: Sta Clara, S. Joaquin, no. 83, "en algodón, *Gossypium hirsutum* L.", 9.ix.1951, W. Whitcomb, 1 ♂ (MAC).

West Indies. — "Antilles", 2 ♂, 1 ♀ (Distant Coll., BM). — Curaçao. Westpunt, 4.ix.1956, R. H. Cobben, 1 ♀ (LEW). — Bonaire. Stat. 186, 23.iii.1937, P. Wagenaar Hummelinck, 1 ♂, 1 ♀ (LEW). — Trinidad. "Trinidad", 14.v.1902, E. P. Van Duzee, 4 ♂, 4 ♀; "Trinidad", 8.viii.1902, Chipman, 1 ♀ (CAS). St. Augustine, 25-26.iii.1941, A. M. Adamson, 2 cop. (ICTA). St. Augustine, 11.v.1919, N. A. Weber, 2 ♂, 2 ♀ (MCZ). "Trinidad", 6.v.1905, Carmody, 726, cotype, 1 ♂, 1 ♀ (lectotype and syntype of *D. howardi* var. *minor* Ballou); San Fernando, 2.ii.1912, on wild mallow, G. A. K. Marshall, 6 ♂, 3 ♀; "Trinidad", 8.iv.1932, A. M. Gwynn, 1 ♀ (BM).

British Guiana. — Georgetown, Botanic Grdns. Expt. Station, on *Malachra capitata*, 12.v.1930, L. D. Cleare Jr, 1 ♀ (ML). "British Guiana", Bartlett, 1 ♂, 2 ♀; Blairmont Plantation, H. E. Box, 3 ♂, 2 ♀ (BM).

Suriname. — Coronie, Road to sea, 13.vi.1948, Suriname Exped. 1948/49, D. C. Geijskes, 1 ♀; Coronie, Ingikondre, 7.vi.1963, D. C. Geijskes, 1 ♀; Coronie, 5.ii.1958, P. H. v. Doesburg Jr, 4 ♂, 1 ♀; Paramaribo, Bot. Garden, on *Bombax globosum* Aubl., 13.iv.1950, D. C. Geijskes, 2 ♂, 2 ♀; Bot. Garden, "on seeds (on the ground) of *Sterculia carthaginensis* Cav.", 18.iv.1959, 2 ♂, 1 ♀, "on kenaf" (*Hibiscus cannabinus*), 20.iv.1959, many specimens, Paramaribo, Estate de Morgenstond, "underneath a kankantree" (*Ceiba pentandra* Gaertn.), 6.vi.1960, many specimens, on *Hibiscus abelmoschus* L., 2.ii.1959 and 28.ii.1960, many specimens, Commewyne River, Katwijk, on *Sida*, 22.vi.1959, several specimens, Matapica, sea shore, "on seed pods of *Thespesia populnea* L.", 3-4.xi.1962, 4 ♂, 4 ♀, 17-19.v.1963, 2 ♂, 2 ♀, Marowijne River, Albina, "on native cotton" (*Gossypium peruvianum* Cav.), 26.vi.1963, 12 ♂, 3 ♀, Marowijne River, Bigiston, "on native cotton", 27.vi.1963, 1 ♂, 1 ♀, P. H. v. Doesburg Jr; Bigiston, 4.iii.1963, 3 ♂, 1 ♀, D. C. Geijskes (ML).

Brazil. — "Brazil", 1 ♂ (lectotype of *Cimex ruficollis* Fabricius), 2 syntypes (Banks' Coll., BM). "Brasilia", Pippingsk, 610, MZH 7387, 1 ♂ (MZH). "Brazil", F. Sahlberg, 1 ♂; "Brasil", Stål, 1 ♀ (NRS). "Brasil", 1 ♂, 1 ♀ (ZIL). "Brasil", 1 ♀ (ZSM). — Amazonas. Manaus, 11.ii.1896, E. E. Austen, 1 ♂ (BM). — Amapá. Pôrto Santana, ICOMI, ii-vi.1961, J. C. M. Carvalho, 5 ♂, 2 ♀ (ML). — Pará. Santarem, 6.iv.1956, C. Elias & O. Roppa, 1 ♀ (MNR). Santarem, E. le Mout, 1 ♂ (ML). Gurupá, 23.i.1896, E. E. Austen, 1 cop. (BM). — Pernambuco. Zuipapá, Distant Coll., BM 1911-383, 1 ♂, 2 ♀ (lectotype and syntypes of *D. maurus* Distant) (BM). Pernambuco, 1.iii.1883, 1 ♀ (det. R. I. Sailer); Bonito Prov., 8.i.1883, "on cotton", 1 ♂, 2 ♀ (det. Stehlik) (MB). — Sergipe. Faz. São José, Riachuelo, 9.xii.1961, J. C. M. Carvalho, 6 ♂, 2 ♀ (MNR). Iguassú, 30.vi-1.vii.1915, A. Roman, Sv. Amaz. Exped., 5 ♂, 2 ♀ (NRS). Agua Preta, 2771, 10.viii.1938, P. Silva, 3 ♂, 1 ♀ (L. O. T. Mendes det. 1938) (ML). — Bahia. Bahia, 1928, G. Bondar, 1 ♀; Bahia, Fallen, 1 ♀ (BM). — Minas Gerais. São José de Lagoa, 10.ii.1939, Martins & Lopes, 1 ♀; Governador Valadares,

ii.1942, Olivéira & Lombardi, 2 ♀ (IOC). Serra do Caparaó, 800-2000 m, Lange-Larsson, 2 ♂ (NRS). Machacalis, xii.1954, 1 ♀ (ZSP). — Espírito Santo. Parque Sooretama, Linhares, 13.x.1958, D. Zajciv, 2 ♀ (MNR). — Rio de Janeiro. Santo Antônio do Imbé, i.1960, M. Alvarenga, 2 ♂; Itacuruçá, J. C. M. Carvalho, 1 ♂; Colubandê, x.1957, H. Schubart, 1 ♂; Niterói, Itaipú, 5.ii.1961, D. Lacombe, 1 ♂; Macaé, Barra do Sana, i.1957, A. L. Castro, 1 ♂ (MNR). Niterói, 18.ii.1925, Holzbauer, 1 ♀ (NMB). Itatiaia, 400 m, 19.ix.1941, J. F. Zikan c.s., 1 ♂, 1 ♀ (IOC). Niterói, 14.iv.1924, Holzbauer, MZH 7390, 1 ♂ (MZH). Niterói, 6.ii.1925, 1 ♀ (NRS). Itacuruçá, 50, J. C. M. Carvalho, 1 ♂, 1 ♀ (MB). Rio de Janeiro, xii.1856, H. Clark, 2 ♀; Rio de Janeiro, C. Darwin, 1 ♂; Rio de Janeiro, x, J. T. Maury, 1 ♂; Rio de Janeiro, 8.viii.1923, L. G. Saunders, 2 ♂, 1 ♀ (BM). — Guanabara. Corcovado, 25.xi.1952, D. Zajciv, 2 ♂; Corcovado, x.1958, M. Alvarenga & C. A. C. Seabra, 1 ♂ (MNR). Rio de Janeiro, F. Sahlberg, 1 ♂; "Rio Jan.", Kinb., 1 ♂ (NRS). Rio de Janeiro, N. Thayer Exped., 4 ♂, 3 ♀ (MCZ). "km 47" (Road Rio de Janeiro-São Paulo), P. Wygodzinsky, 2 ♀ (ML). Rio de Janeiro, Reinhardt, Galathea exped., 1950-52, some specimens (MC). — São Paulo. Pindamonhangaba, iii.1960, J. C. M. Carvalho, 3 ♂, 4 ♀ (MNR).

Dysdercus chaquensis Freiberg

(figs. 196-202; pl. 13 fig. 4)

Dysdercus chaquensis Freiberg, 1948, *Physis* **20**: 121-123, fig. 1; type locality: Chaco, Argentina; holotype, ♂, MACN?, probably lost. — Ruffinelli & Pirán, 1959, *Bol. Fac. Agron. Montevideo* **51**: 32. — Lima et al., 1962, *Mem. Inst. Osw. Cruz* **60**: 31 (erroneously synonymized with *Dysdercus honestus* Blöte).

Dysdercus sp. Freiberg, 1943, *Minist. Agric., Junta Nac. Algodón* **66**: 3-13, 9 figs.

Dysdercus pallidus; Freiberg, 1945, *Bol. Mens. Dir. Algodón* **125-126**: 362.

Dysdercus discolor; Lima et al., 1962, *Mem. Inst. Osw. Cruz* **60**: 32, 34-35, pl. 3 fig. 6.

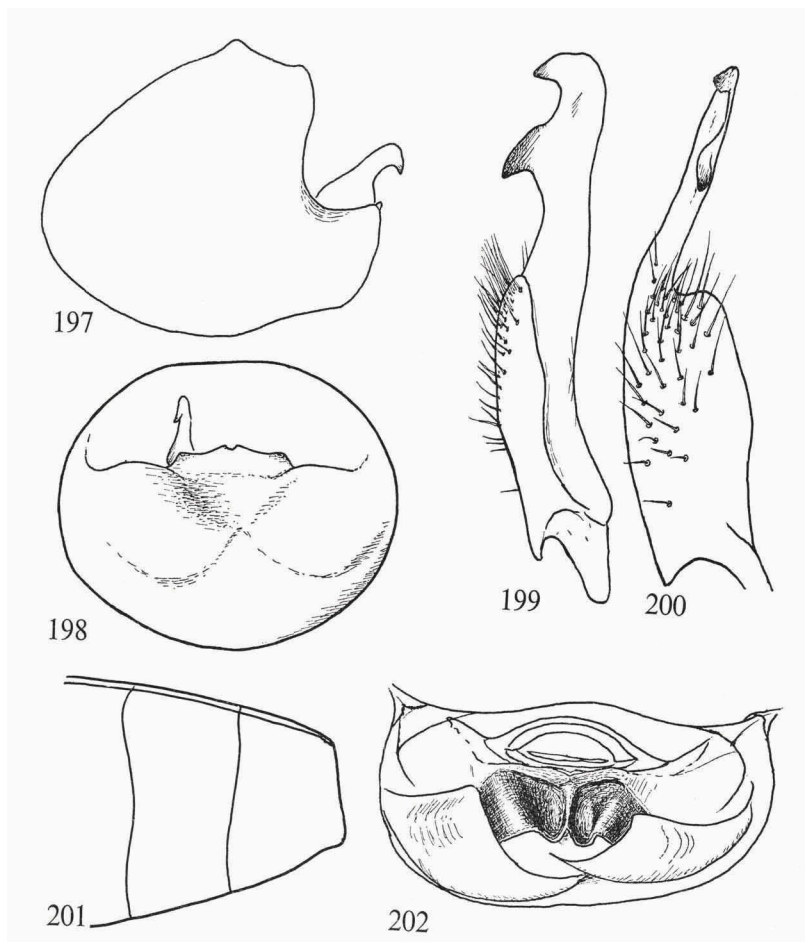
A medium-sized (11.0-15.0 mm), pale species, closely allied to *D. maurus* Distant, but differing slightly in genital characters; lateral margins of pronotum yellowish.

Head. — General colour rather pale orange, usually slightly suffused with black above; ventral surface yellowish; antennal segments 1, 2 yellowish with dark distal parts; segment 3 dark brown to blackish; segment 4 black with a yellowish white proximal annulus; rostrum yellowish orange, black distally.

Thorax. — Pronotal collar white; callus same colour as head; transverse callar sulci blackened; lateral margin yellowish, sometimes tinged with orange; disc dirty pale yellow with a narrow, transverse blackish fascia near posterior margin. Scutellum orange-yellow, sometimes blackened anteriorly and laterally, rarely entirely blackish (some male specimens). Corium pale yellow, proximal part of costal margin darker. Membrane greyish brown to blackish, bordered with white distally. Ventral surface: pronotal epipleuron, sterna, pleura, and coxae orange-yellow; collar, posterior pleural margins, and epicoxal lobes white; sulcus posterior to collar and anterior margins of

meso- and metapleuron blackened. Legs largely orange or yellowish orange, distal parts of all segments darker.

Abdomen. — Sternites yellowish white, anteriorly narrowly black, lateral margins orange-yellow. — Male: sternite VI entirely, VII, IX anteriorly tinged with brownish orange, sternite VI with anterior black fascia larger. In morphology genital capsule (figs. 197-198) similar to that of *D. maurus* Distant; distal margin of capsular lamella slightly produced medially with a small, median indentation; head of paramere (figs. 199-200) a little larger. — Female (fig. 201): posterior margin of sternite VII produced



Figs. 197-202. *Dysdercus chaquensis* Freiberg. 197-200, male from Catamarca, Argentine; 197-198, genital capsule in lateral and posterior view resp.; 199-200, right paramere in lateral and posterior view resp. 201-202, female from same locality; 201, last abdominal segments in lateral view; 202, genitalia in posterior view.

ventro-laterally to a greater extent; genitalia (fig. 202): first gonocoxa as in *D. maurus*; sclerites of second gonocoxae (usually hidden behind first pair) more convex, sulci between these and median carina deeper.

Length of male 11.0-12.5 mm; length of female 12.0-15.0 mm.

Lima et al. (1962: 32, pl. 3 fig. 6) studied the paramere of specimens belonging to this species sent from Argentina by Freiberg. They found in one of Pearson's figures (Pearson, 1932: 125 fig. 5) enough similarity to identify these specimens as *D. discolor* Walker. However, they remarked (p. 35): "porém no desenho de Pearson o dente apical ou distal é algo mais alongado que nos parâmeros de *discolor* por nós examinados". Freiberg, in his description of *D. chaquensis*, does not mention or show the paramere, but the capsular lamella figured by him leaves no doubt about the identity of the species. The shape of this lamella is highly specific, and so is the noted difference in shape of the spurs of the paramere. Even in the female the two species are readily distinguishable by the shape of the first gonocoxa (cf. figs. 164 and 202).

Another species among Freiberg's material was erroneously regarded by Lima et al. as the true *D. chaquensis*. Then, because the parameres of these specimens were found to be identical to that of *D. honestus* Blöte (pl. 3 fig. 10), these authors were led to propose a synonymy of the two species, thereby creating a considerable amount of confusion.

D. honestus and *D. chaquensis* are indeed very similar in appearance, but apart from genital differences, the former can always be easily distinguished by the tibiae, which are unicolorous yellow and not darker distally. In the author's opinion, Freiberg's illustration of the capsular lamella of *D. chaquensis*, though accurate enough to leave no doubt as to the species involved, is incorrect in one detail: the median projection of the lamella ("una cuspido poco marcada") is shown as simple, whereas in fact there are two obvious teeth separated by a small median concavity, as correctly depicted in his earlier studies on this species (Freiberg, 1943: fig. 8-left; 1945: 368 fig. 7). It is of course possible that Freiberg had before him an aberrant specimen, but it is more likely that the pubescence usually covering the median area of the lamella as a small tuft concealed the true shape of this detail.

The location of the type specimens of *D. chaquensis* is unknown. According to Freiberg (1948: 123, and in litt.), the holo- and allotype were sent to the Museo Argentino de Ciencias Naturales, Buenos Aires, but Prof. Dr. A. de Carlo as well as Dr. M. J. Viana (both in litt.) were unable to find them and are strongly inclined to believe that the specimens were lost, probably without even having reached the museum.

Material (distribution: fig. 196).

Brazil. — Minas Gerais. Governador Valadares, ii (or xi?).1942, Oliveira & Lombardi, 2 ♀ (IOC). Monte Alegre, Faz. Sta Maria, 1100 m, 24-30.xi.1942, Zoppei & D'Amica, 1 ♂ (ZSP). Carmo de Rio Claro, 1.1958, J. C. M. Carvalho & J. Becker, 1 ♂ (MNR). — São Paulo. Sorocaba, 15.iv.1961, A. Guedes, 1 ♂ (ZSP). — Mato Grosso. Corumbá, 8.xii.1960, K. Lenko, 1 ♂; Sierra do Urucum, Corumbá, 25.xi.1960, K. Lenko, 1 ♀ (ZSP). Bodoquena, xi.1941, Com. IOC., 2 ♂, 12 ♀; Zôna da N.O.B. [Bodoquena?], Salobra, 18-29.x.1938, 1 ♂ (IOC). Agua Seca, São Domingo, 7.vi.1914, Strelnikov & Tanasiich, 2 ♂, 2 ♀ (ZIL).

Argentina. — "Arg.", O. W. Thomas, 1 ♀ (BM). Dallas, 1 ♀ (ZIL). — Misiones. Santa Pipo, 20-29.x.1951, J. Foerster, 1 ♂, 1 ♀ (MB). T. B. Daguerre, 1 ♂ ("*D. ruficollis* (L.)H.S.", det. J. A. de Carlo) (MACN). — Corrientes. S. Tomé, xi.1925, G. Pellerano, 1 ♀ (MACN). San Roque, 11.1920, 1 ♀ (MB). — Entre Rios. Pronunciamento, ix-x.1964, F. N. Walz, 4 ♀ (ML). — Buenos Aires. C. Bruch, 1890, 1 ♀ (MACN). Pto Madero, 11.ii.1951, J. Foerster, 4 ♂, 7 ♀ (MB). — Santa Fé. Garay, Colonia Mascias, x.1942, 6 ♂, 4 ♀ (MACN). — Santiago del Estero. Eldorado, 1 ♂ (MB). Chaco de Santiago, Wagner, 2 ♀ (NRS). — Chaco. Chaco, Ohnheiser, 1 ♀; Resistencia, iv.1917, 1 ♀ (MB). Chaco, i.1950, Kuniro, 2 ♀ (IPV). — La Rioja. Nudo de Famatina, Trapiche, Durazno, 1600-1800 m, 1-3.i.1931, A. Breyer, 1 ♂, 2 ♀ (MACN). — Catamarca. Concepción, ii.1928, M. Gomez, 3 ♂, 6 ♀ (MACN). Catamarca, iii.1942, 1 ♀; Catamarca, C. S. Reed, 1 ♂ (MB). Catamarca, M. Gomez, 1 ♂, 1 ♀ (MACN). — Tucumán. Tucumán, xi.1960, J. C. M. Carvalho, 1 ♂, 1 ♀ (MNR). Tucumán, 21.x.1948, P. Wygodzinsky, 2 ♂, 2 ♀ (MACN). Tucumán, 12.iv.1913, cotton bolls, A. H. Rosenfeld, 1 ♂, 1 ♀; Tucumán, v.1941, Röhmer, 1 ♂, 1 ♀ (MB). — Salta. Urundel, 18.xi.1948, P. Wygodzinsky, 3 ♂, 3 ♀; Aguas Blancas, Oran, 24.xi.1948, P. Wygodzinsky, 1 ♀ (MACN). Esteco, ii.1938, 1 ♀; Tartagal, i.1951, 2 ♂, 1 ♀ (MB). Urundel, iii.1949, N. Kormilev, 5 ♂, 2 ♀ (MACN). — Jujuy. Ledesma, i.xii.1948, P. Wygodzinsky, 2 ♀ (MACN). Juto, 4.iii.1957, J. Foerster, 2 ♂ (MB).

Paraguay. — Horqueta, 45 mi E Paraguay River, 2-4.iv.1933, A. Schulze, 2 ♂; C. Pfannel-Guaira, 300 m, 3.i.1952, J. Foerster, 6 ♂, 5 ♀ (MB). Paraguayan Chaco, Nanahua, iii.1927, G. S. Carter, 1 ♀ (BM). Quatro Mojones, 28.xi.1936, E. le Mout, 1 ♀ (ML). Sa Trinidad, vi and xi.1914, 2 ♀ (*D. pallidus* Blöte, det. Tacuber) (DEI). Chaco, xi.1956, 1 ♂, 1 ♀ (AMNH). Exper. Sta. Fern. Col. Chaco, 13.ii.1956, "on ground under Bottle Tree", 1 ♂, 1 ♀, "on cotton", 2 ♂, 1 ♀, J. L. Nickel (UCB).

Bolivia. — Chiquitos, Roboré, 20.xii.1953, W. Forster, 3 ♂, 1 ♀ (ZSM). Chaco, Roboré, 200 m, ii.1958, J. Foerster, 1 ♂, 5 ♀; Tarija, Villa Monte, 1.ix.1950, A. Martinez, 1 ♂ (MB). Prov. Sara, Steinbach, 2 ♂ (MW), 2 ♀ (MCZ). 1104, Pennington No 32, 1 ♂; Buena Vista, 400 m, Ichilo, Santa Cruz, Steinbach, 4 ♂, 1 ♀ (ML). "Bolivia", J. Steinbach, 1 ♀ (BM). Santa Cruz, Steinbach, 2 ♂ (ZIL).

Ecuador. — Coastal Plain near Guaquil [Guayaquil?], 10.xii.1934, Mrs. Y. Mexica, 1 ♂, 1 ♀ (CAS).

**Dysdercus ruficollis* (Linnaeus)

(figs. 203-210; frontispiece, pl. 14 figs. 1-4)

Cimex ruficollis Linnaeus, 1764, Mus. Lud. Ulr.: 180; type locality unknown; type MU lost? Neotype ♂, type locality: Brazil, Rio de Janeiro, ML.

Lygaeus annulus Fabricius, 1803, Syst. Rhyng.: 227; type locality: South America; lectotype ♂, MC! — Zimsen, 1964, Type Fabricius: 328 No. 869.

Pyrhocoris annulus; Hahn, 1834, Wanz. Ins. 2: 13, pl. 38 fig. 123.

Astemma annula; Blanchard, 1840, Hist. Ins. 3: 129.

Dysdercus ruficollis; Herrich-Schäffer, 1850, Wanz. Ins. 9: 176. — Hempel, 1908, Publ. Secret. Agric. Comm. Obras Publ., São Paulo (2nd ed.), 23 pp. — Barber, 1923a, Univ. Iowa Stud. Nat. Hist. 10 (3): 24. — Lima, 1927, Seg. Catal. Ins. Plant. Brasil, A.E.S. 8: 69-301. — Hussey, 1929, Gen. Catal. Hem. 3: 101, 109-113. — Blöte, 1931, Zool. Meded. 14: 121, 131-136. — Fonseca, 1934, Arch. Inst. Biol., São Paulo 5: 284. — Lima, 1936, Terc. Catal. Ins. Plant. Brasil: 120. — Monte, 1936, Chac. Quint., São Paulo 53: 452-454, 2 figs. — Mendes, 1937, Bol. Tecn. Inst. Agr. Campinas 23: 8, pl. 1 figs. 1-3, pl. 2 fig. 1. — Mendes, 1938a, Rev. Ent., Rio de Janeiro 8: 205. — Mendes, 1938b, Bol. Biol., São Paulo (n.s.) 3: 133-134. — Mendes, 1938c, Rev. Ent., Rio de Janeiro 9: 215-217. — Mendes, 1938d, J. Hered. 29: 387. — Mendes, 1938e, J. Agron., São Paulo 2: 149-162. — Townsend, 1938b, Rev. Ent., Rio de Janeiro 8: 347-348. — Squire, 1939, Bull. Ent. Res. 30: 289, fig., 291. — Mendes, 1939a, Bol. Biol., São Paulo (n.s.) 4: 98. — Mendes, 1939b, Bol. Tecn. Inst. Agr. Campinas 44: 3-13. — Viégas, 1939, J. Agron., São Paulo 2: 229-258. — Lima, 1940, Ins. Brasil 2: 113-116, 121. — Townsend, 1940, Rev. Ent., Rio de Janeiro 11: 889. — Freiberg, 1943, Minist. Agric. Junta Nac. Algodón 66: 3-13, Bol. Mens. Dir. Algodón 99-100: 360-370. — Freiberg, 1945, Bol. Mens. Dir. Algodón 125-126: 262 ff. — Mendes, 1947, Bragantia 7: 243. — Callan, 1947, Bull. Ent. Res. 37: 389. — Hargreaves, 1948, List Cotton Insects: 30 (in part). — Berry, 1951, Rev. Ent., Rio de Janeiro 22: 329. — Mendes, 1956, Bragantia 15: x-xi. — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 23, 47, pl. 4 figs. 6-9 (paramere). — Doesburg Jr, 1966, Stud. Fauna Suriname Guyanas 9: 55-58, figs 52-55.

Dysdercus caribbaeus Distant, 1901, Trans. Ent. Soc. London 1901: 500; type locality: "Antilles"; lectotype ♂, BM! — Hussey, 1929, Gen. Catal. Hem. 3: 87. — Barber, 1923a, Univ. Iowa Stud. Nat. Hist. 10 (3): 24. — Blöte, 1931, Zool. Meded. 14: 131. — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 48.

Dysdercus clarki Distant, 1902, Ann. Mag. Nat. Hist. (7) 9: 43; type locality: Bahia, Brazil; lectotype ♂, BM! — Hussey, 1929, Gen. Cat. Hem. 3: 87. — Blöte, 1931, Zool. Meded. 14: 131. — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 48, 50. — Pearson, 1932, Psyche 39: 119. — Mendes, 1938b, Bol. Biol., São Paulo (n.s.) 3: 133.

Dysdercus ruficollis var. *albomembranaceus* Blöte, 1931, Zool. Meded. 14: 131, 132; type locality: São Paulo, Brazil; holotype ♂, ML! — Mendes, 1938b, Bol. Biol., São Paulo (n.s.) 3: 133. — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 48, 50.

In the following references virtually the name *D. ruficollis* (L.) is misused wholly or in part.

Walker, 1872, Catal. Heter. 5: 183. — Howard, 1900, Bull. U. S. D.A., Div. Ent. 22: 100. — Kirkaldy, 1902, Entomol. 35: 164. — Osborn, 1904, Ohio Nat. 5: 202. — Townsend, 1913, J. Ec. Ent. 6: 11. — Quaintance, 1913, Proc. Ent. Soc. Washington 15: 59. — Torre-Bueno, 1915, Rept. 1st. (Harvard) Exped. S. Amer.: 219. — Campos, 1919, Rev. Coleg. Vicente Rocafuerte: 58. — Barber, 1924, J. New York Ent. Soc. 32: 136. — Wolcott, 1929, Bull. Ent. Res. 20: 227. — Pope, 1930, Bol. Est. Exp. Soc. Nac. Agr., Lima 3. — Calderon, 1931, Ins. Pest Surv. Bull. 11 (10): 686-688. — Wille, 1934, Minist. Fom., Dir. Agr. Ganad. 28: 1-14. — Anon., 1937, Mem. Est. Exp. Agric. Minist. Fom., Peru 9: 253. — Anon., 1938, Mem. Est. Exp. Agric. Minist. Fom., Peru 11: 363. — Martorell, 1939, J. Agr. Univ. Puerto Rico 23: 188. — Anon., 1941a, Rep. Puerto Rico (fed.) Exp. Sta. 1940: 65-85. — Anon., 1941b, Mem. Est. Exp. Agr. La Molina 7: 321. — Vivas-Berthier, 1941, Bol. Soc. Venezol. Cienc. Nat. 7: 117. — Wille, 1941, Inf. Est. Exp. Agric. 53: 26. — Anon., 1942a, Rep. Puerto Rico (fed.) Exp. Sta. 1941: 19-23. — Anon., 1942b, Mem. Est. Exp. Agr. La Molina 8: 276. — Wille, 1942, Bol. Agric. Ganad., Peru 14: 241-247. — Hayward, 1942, Est. Exp. Agric. Tucumán, Publ. Misc.: 35. — Bartlett, 1943, Rep. Puerto Rico (fed.) Exp. Sta. 1942: 15-16. — Bartlett, 1944, Rep. Puerto Rico (fed.) Exp. Sta. 1943: 24. — Wille, 1944, Bol. Direc. Agric.

Peru 16: 235-236. — Lamas, 1945, Inf. Est. Exp. Agric. La Molina 59: 75. — Wille, 1946, Bol. Est. Exp. Agric. La Molina 29: 33. — Lamas, 1947, Inf. Est. Exp. Agric. La Molina 65: 36. — Wille, 1951, Ent. Agr. Peru: 31. — Simon, 1954, Inf. Est. Exp. Agric. La Molina 90: 22. — Szumkowski & Fernández Yépez, 1963, Agron. Tropic., Maracay 13: 85.

Small to medium-sized (7.5-14.0 mm), largely yellow, with fourth antennal segment annulated; often with black corial spot, male genital segment with simple posterior margin and hook-shaped paramere; second gonocoxae of female close together, each with a medio-ventral indentation.

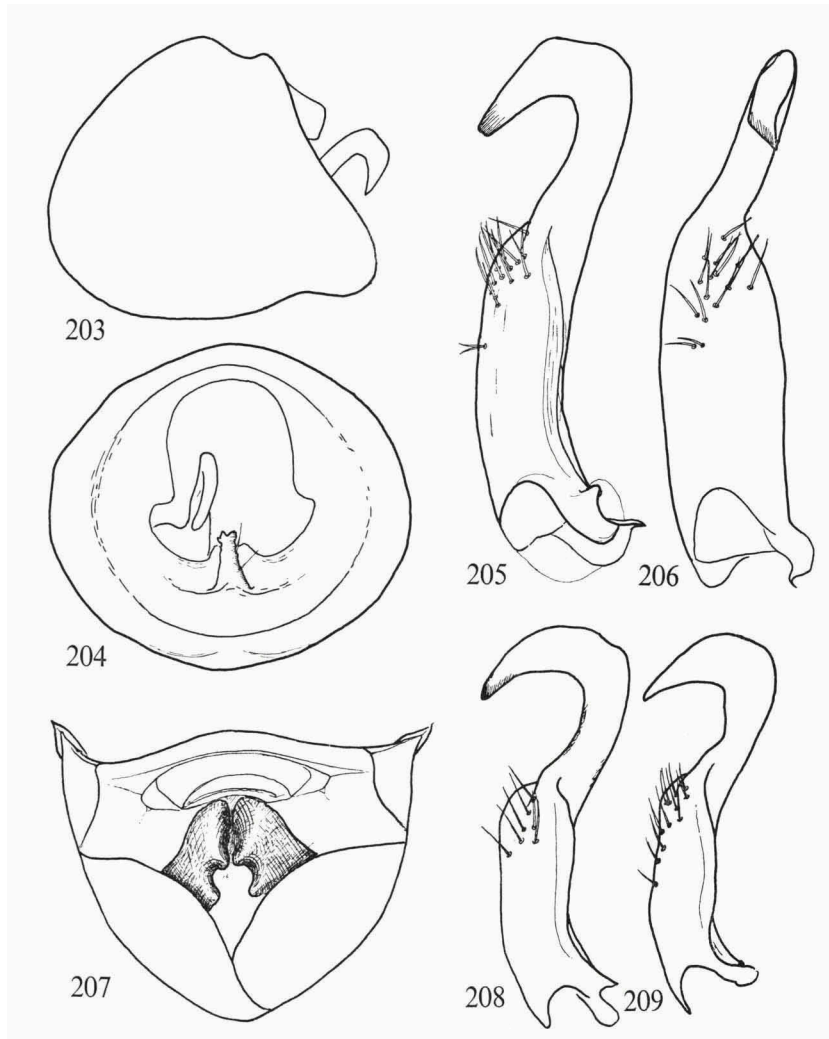
Head. — Dorsal surface usually red, ventral surface orange, often with black markings or black above or even entirely black, margin around eye remaining reddish. Antennal segments 1-3 brownish red to dark piceous; antennal segment 4 dark brown with yellowish white proximal annulus. Rostrum red, segment 4 and often also 1, blackened.

Thorax. — Pronotal collar very variable in colour: white, dirty white to almost blackish, or yellowish, reddish, or white with red posteriorly (Surinam specimens); callus and lateral margin red, post-collar sulcus often black laterally; disc dirty yellow, sometimes blackened posteriorly. Scutellum yellowish red or orange, sometimes suffused with black or entirely black. Corium entirely yellow, often a transverse spot just behind middle and distal corner blackish (f. *annulus* Fabr. = *caribbaeus* Distant); in some specimens the two spots united, making posterior half of corium black (f. *clarki* Distant). Membrane pallid (f. *albomembranaceus* Blöte) to almost black. Ventral surface: collar, posterior pleural margins, and epicoxal lobes white; sterna, pleura, and coxae orange; pronotal epipleuron red. Legs largely red, blackened towards distal part of femora, tibiae and tarsi; occasionally legs blackish with femora reddish proximally.

Abdomen. — Sternites usually yellowish white, anterior margins narrowly blackish; in some specimens lateral margins narrowly bordered with red. — Male: segments VI, VIII, IX and anterior half of VII except for black anterior margins, red; blackish margins of sternites VI, VII larger. Posterior margin of genital capsule (fig. 203) prominent, without any medial excavation. Inner side of posterior margin with an anteriorly projecting process, slightly bifurcate distally (fig. 204). Paramere with a short, slender, sparsely pilose shaft and with one, strongly recurved spur (figs. 205, 206). — Female (fig. 207): first gonocoxa orange and gradually rounded at distal margins; sclerites of second gonocoxae large, convex, medio-ventrally deeply indented, touching each other at the median.

Length of male 7.5-12.0 mm; length of female 9.0-14.0 mm. Pronotal index (width against length) between 1.30 and 1.50.

This species shows great variability in the colour of the head, scutellum, corial markings, and membrane. The blackish suffusions of each of these parts vary extensively and often independently, so that all combinations may occur, even in one population. However, the head is more often suffused with black than the other parts. Furthermore, it is obvious that in the southern



Figs. 203-209. *Dysdercus ruficollis* (Linnaeus). 203-206, male, neotype; 203-204, genital capsule in lateral and posterior view resp. 205-206, right paramere in lateral and posterior view resp. 207, female from Minas Gerais, Brazil, genitalia in posterior view. 208, *Dysdercus caribbaeus* Distant, male, lectotype, right paramere in lateral view. 209, *Dysdercus clarki* Distant, male, lectotype, right paramere in lateral view.

part of its range, i.e. in southern Brazil, Argentina, and Paraguay, the lightest forms are dominant and have a tendency to be larger. Smaller and darker forms occur along the east coast to the north.

Neotype designation of *Cimex ruficollis* Linnaeus. — The alleged type of this species is preserved in the Linnaean collection at Uppsala, and was kindly made available for study by Dr. Å. Holm. However, it does not agree with Linnaeus' description and therefore should no longer be regarded as the type. The red head of this specimen is only slightly suffused with black; what is left of the scutellum is orange, and the membrane is brownish, although all these parts are described as black. Unfortunately, the abdomen is missing, so that identification is no longer possible, but the specimen looks very like *D. fulvoniger* (De Geer). The author suspects the original specimen was lost and later replaced by the present one, which is labelled "rubicollis". In evaluating Linnaeus' description of *Cimex ruficollis*, one part is worth special mention here: "Sexu forte solo a *C. Andreae* diversus" [Perhaps only different in sex from *C. Andreae*]. This statement presumably means that the specimen(s) Linnaeus had before him reminded him in some way of *D. andreae*, which is a small species. In all likelihood, however, Linnaeus never saw an actual specimen of *D. andreae* and knew this species only from the description and illustrations by Sloane (see p. 55). The one species that Linnaeus' description fits reasonably well is the small, most common Brazilian one, the genitalia of which are shown by Lima et al. (1962, pl. 4 figs. 6-9). This view is in full agreement with that of Blöte (1931), Pearson (unpublished), Lima et al. (1962), and Stehlik (according to his identifications).

As it appears desirable to stabilize this situation and since the Brazilian literature on economic entomology frequently includes the name *ruficollis* used in the indicated sense, it seems necessary to designate a neotype here. The specimen selected and deposited in the Leiden museum is a male labelled: "Nova Friburgo, 900 m, 8.ii.1945, P. Wygodzinsky col." to which has been added a red neotype label. The genitalia of this specimen are shown in figs. 203-206.

Lectotype designations of *Lygaeus annulus* Fabricius, *Dysdercus caribbaeus* Distant, and *Dysdercus clarki* Distant. — The Sehested & Tønder Lund collection at Copenhagen contains two male specimens of *Lygaeus annulus* both labelled as in the original description "in America meridionali Dom. Schmidt Mus. Dom. Lund". One of these syntypes has a black head and scutellum and the legs blackened, whereas in the other specimen these parts are red. Only the latter specimen agrees with Fabricius' description,

and is here designated as the lectotype of *Lygaeus annulus* Fabricius, 1803. One of the antennae of this specimen is intact, showing the white annulus of segment 4.

D. caribbaeus Distant. According to the description, Distant had several specimens before him. In the British Museum (Natural History) collection only one of these could be found, a male, which, evidently in error, is labelled "Antilles". This specimen bearing Distant's identification label and a type label, is here designated as the lectotype of *Dysdercus caribbaeus* Distant, 1901. The right paramere of this specimen is shown in fig. 208.

D. clarki Distant. The type series of this species in the British Museum (Natural History) consists of four male specimens, labelled "Bahia 57-57 Dec. 1856 J. Gray". One specimen, bearing Distant's identification label and a type label, is here designated as the lectotype of *Dysdercus clarki* Distant, 1902. The right paramere of this specimen is shown in fig. 209.

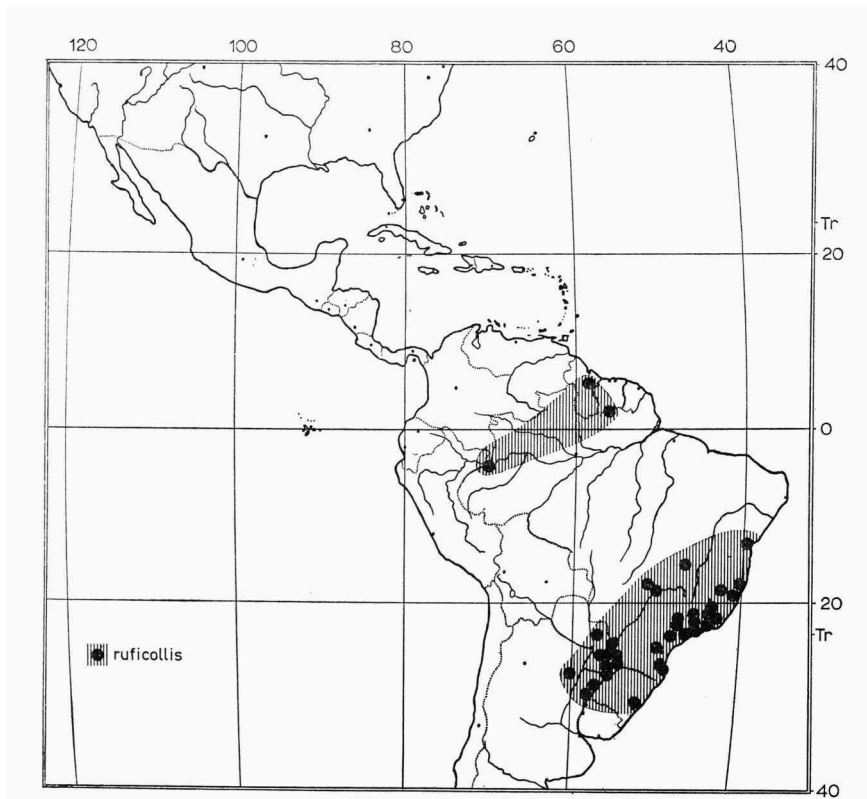


Fig. 210. Distribution of *D. ruficollis* (Linnaeus).

Material (distribution: fig. 210).

British Guiana. — Mallali, 1 ♀ (Breddin Coll., DEI).

Suriname. — Sipaliwini near airstrip, on *Pavonia sessiliflora* H.B.K., vi.1963, P. H. van Doesburg Jr, 10 ♂, 6 ♀, nymphs (ML). "MZH-7416", 1 ♀ (MZH).

Brazil. — "Mang., Ctr. Brasil", 5.v.1917, R. F. Fischer, 1 ♀ (*D. maurus* Distant, det. Tauber) (DEI). Sta Cruz, 1 ♀ (Breddin Coll., DEI), 1 ♀ (MZH). "Brasil", Stål, 1 ♂; Bilbao, 1 ♀; "Brasilia", 1 ♀ (NRS). Diamantina, 1 ♀; "Brasil", 2 ♀ (det. Oshanin) (ZIL). Mendés, E. le Mout, 2 ♂, 5 ♀ (ML). "Brasilia", 6 ♂, 12 ♀ ("Alte Sammlung", ZSM). "Brasilien", 1 cop. (Don. 1927-4, MD). — Amazonas. Benjamin Constant, 18-28.ix.1962, K. Lenko, 4 ♂ (ZSP). — Bahia. "Bahia", 1 ♂, 1 ♀ (NRS). "Bahia", 2 ♀ (ZIL). "Bahia", 10.iii.196, R. H. Beck, 1 ♂, 1 ♀ (CAS). Salvador, 1 ♀ (MNR). "Bahia", xii.1856, J. Gray, 4 ♂ (lectotype and syntypes of *D. clarki* Distant (BM)). — Goiás. Jatahy [Iataí], 1 ♀ (ZIL). Rio Doce, 1 nymph, Mrs. Y. Mexia (E. C. Van Dyke Coll., CAS). — Distrito Federal. Brasilia, vii.1960, Exp. Formosa, 5 ♂, 2 ♀ (MNR). — Minas Gerais. Serro do Caparaó, 800-2000 m, Lange-Larsson, 1 ♀; Serro do Caparaó, 830-2824 m, vi.1934, D. Knudsen, 1 ♀ (MB). Sta Rita Caldas, xii.1953, Pe. Pereira, 1 ♂, 4 ♀ (ZSP). Vicosa, 14.i.1930, 1 ♂, 1 ♀, Mrs. Y. Mexia (E. C. Van Dyke Coll., CAS). Uberaba, vi.1929, E. le Mout, 1 ♀ (ML). Carmo Rio Claro, i.1958, J. C. M. Carvalho & J. Becker, 1 ♂, 3 ♀, 3 cop.; Itajuba, xii.1959, H. Schubart, 1 ♀; Faz. S. José, Conc. Aparecida, ii.1960, J. C. M. Carvalho, 1 cop.; Itajubá, Barreira de Piquete, x.1957, R. Arlé & H. Schubart, 1 cop. (MNR). — Espirito Santo. Corrego Fundo, Sta Cruz, vi.1943, Mudo, 1 ♂, 1 cop. (IOC). Espirito Santo, 2 ♂, 1 ♀ (Breddin Coll., DEI). Parque Sooretama, Linhares, 26.x.1958, D. Zajciv, 2 ♂, 6 ♀ (MNR). Espirito Santo, 1 ♂ (Muche-Radeberg Ank., MD). — Rio de Janeiro. Nictheroy [Niterói], 6.ii.1925, Holzbauer, 1 ♀ (NMB). Rio de Janeiro, H. Donckiet, 1 ♀ (BM). Mangaratiba, iii.1945, D. Machado, 2 ♂, 1 ♀; Petrópolis, 4.iv.1934, P. W., 1 ♂; Angra dos Reis, viii.1933, L. T., 1 ♂; Itatiaia, 12-15.v.1945, J. F. Zikán, 2 ♂, 3 ♀ (IOC). Itatiaia, 25.ii.1928, 1000-2000 m, 1 ♂, 1 ♀, 12.iv.1928, 800-1000 m, 1 ♂, Lahtivirta; Rio de Janeiro, F. Sahlberg, 1 ♂, 1 ♀; Petrópolis, F. Sahlberg, 1 ♂, 1 ♀, Nicteroy [Niterói], 23.i.1925, Holzbauer, 1 cop. (MZH). Rio de Janeiro, F. Sahlberg, 2 ♂, 3 ♀; Rio Jan., Stål, 1 ♀; Rio Jan. Kinb., 4 ♀; Itacuruçá, 50, J. C. M. Carvalho, 4 ♂, 3 ♀ (MB), 2 ♂, 8 ♀ (MNR). Rio de Janeiro, 1 ♀ (Sammlung I. K. H. Prinzessin Therese von Bayern, ZSM). Macaé, Barra do Sana, i.1957, A. L. Castro, 1 ♂, 1 ♀; Muriqui, 15.xi.1958, M. Alvarenga, 1 ♀; Mangaratiba, Parada Ribeira, 21.ii.1959, A. L. Castro, 1 ♂, 2 ♀; Itatiaia, 12-13.x.1957, J. Machado c.s., 2 ♀; Tres Rios, 1949, J. C. M. Carvalho, 1 ♂; Itacuruçá, 21-22.v.1960, 2 ♂; Miguel Pereira, 20.xi.1937, N. Santos, 1 ♂; Cachoeira de Macaçu, 17.xi.1961, D. Alunoz, 1 ♂; Petrópolis, 17.ii.1958, J. C. M. Carvalho & J. Becker, 1 ♂; Petrópolis, i-ii.1958, D. Albuquerque, 2 ♂, 2 ♀ (MNR). Petrópolis, Ohaus, 3 ♂ (MD). Nova Friburgo, 900 m, 8.ii.1945, P. Wygodzinsky, 1 ♂ (neotype of *Cimex ruficollis* Linnaeus), 1 ♂ (ML). — Guanabara. Tijuca, x.1944, J. C. M. Carvalho, 1 ♂ (MB). Corcovado, 1.6.1947, 1 ♂, 30.iii.1947, 4 ♂, 3 ♀, P. Wygodzinsky (ML). São Conrado, 1.x.1959, H. F. Berla, 1 ♀; Vista Chinaza, 1 ♂, 2 ♀, Corcovado, 25.xi.1952, 21 ♂, 23 ♀, 1 cop., Estr. a. Boa Vista, 1 ♂, D. Zajciv; Corcovado, x-xi.1957, M. Alvarenga & C. A. C. Seabra, 2 ♂, 2 ♀; Jacarapaguá, 20.iii.1960, O. Mielke, 4 ♂ (MNR). — São Paulo, 8.xi.1925, Sande, 1 ♀, 1 cop. (Tauber det.) (DEI). St. Paulo, Stål, 1 ♀; São Paulo, 2 ♀ (NRS). São Paulo, Mráz, 1 ♂, 4 ♀ (MB). Piracicaba, G. Bondar, 1 ♂ (ZIL). Barrueri, 30.vii-21.viii.1960, K. Lenko, 10 ♂, 13 ♀; Andes, ii.1955, M. Carrera, 2 ♂, 1 ♀; Juquiá, Faz. Poco Grande, 21-26.vii.1949, 1 ♂, 2 ♀, Ubatuba, 11.vi.1955, 4 ♂, São Roque, 1.x.1945, 1 ♀, F. Lane; Santos, Praia dos Vacas, 29.i.1961, P. Biasi, 1 ♀ (ZSP). Villa Bastos, Sto André, 17-22.ii.1962, L. Stowbunenko, 4 ♂, 3 ♀; Barueri, 23.x.1956, M. A. d'Andretta, 1 ♂, 1 ♀; Sto André, Rio Claro, 18.i.1962, P. Biasi &

Reichhardt, 1 ♂; Itú, 14.viii.1960, U. Martius, 1 ♂, 1 ♀; Sorocaba, 14.x.1960, E. Dente, 1 ♀; Rio Claro, 1.vi.1962, P. De Biasi, 1 ♀; Barra de Una, S. Sebastião, 3.vii.1961, K. Lenko, 1 ♀; Monte Alegre, Faz. Sta Maria, 1100 m, 24-30.xi.1942, Zoppei & F. Lane, 1 ♂, 1 ♀; Monte Alegre, 700 m, Faz. Experimental, 14-27.x.1942, L. Trav. & Almeida, 1 ♀ (ZSP). São Paulo, 15.ix.1900, 1 ♂, Victoria, 15-16.vii.1900, 3 ♂, 2 ♀ (E. P. Van Duzee Coll., CAS). São Paulo, Staudinger 1931, 2 ♂ (holo- and paratype of var. *albomembranaceus* Blöte); Campinas, iv.1937, L. O. T. Mendes, 1 ♂, 1 ♀ (ML). São Paulo, 1 ♂, 1 ♀ (ZSM). Itú, 30.x.1960, Araújo, 1 ♂, 2 ♀; Pindamonhangaba, iii.1960, J. C. M. Carvalho, 1 cop. (MNR). São Paulo, 1 ♂ (W. H. Muche-Radeberg Ank., MD). — Paraná. Dusén, 1 ♂, 2 ♀ (NRS). Paraná, 12 ♂, 4 ♀ (MB). Paraná, 1 ♀ (ZIL). — Sta Catharina. Nova Teutonia, 12.v.1938, 1 ♀, Plaumann (BM). Isabelle, Humboldt, W. Ehrhardt, 2 ♂, 3 ♀, 1 cop. (HZM). Blumenau, 1897, Virgil, 1 ♂, 2 ♀ (det. E. Schmidt); Colonia Hansa, H. Rolle, 1 ♀ (Breddin Coll., DEI). Florianópolis, J. Lane, 1 ♀ (ZSP). Nova Teutonia, 3500 m, 7.viii.1944, F. Plaumann, 2 ♂, 2 ♀ (ZSM). Joinville, Ohaus, 1 ♂; Blumenau, 10 ♂, 5 ♀ (W. H. Muche-Radeberg Ank., MD). Nova Teutonia, iii-iv.1958, 17 ♂, 14 ♀ (MZH). — Rio Grande do Sul. Rio Grande do Sul, 2 ♀ (Breddin Coll., DEI). São Leopold, 1 ♂, 3 ♀ (NRS). Marubino(?), xi.1940, Ramos, 1 ♂ (ZSP).

Argentina. — Misiones. Misiones, J. B. Daguerre, 1 ♂ (det. de Carlo) (MACN). Misiones, C. Berg, 1 ♂ (NRS). Campo Grande, xi.1959, J. Foerster, 1 ♂, 2 ♀; Eldorado, iv-v.1936, 2 ♀; Iguazú, v.1936, 1 ♂; Santa Pipo, 20-29.x.1951, J. Foerster, 2 ♂, 1 ♀; S. Am. Paras. Lab., 4.ii.1942, H. L. Parker, 1 ♂, 3 ♀ (J. L. Stehlík det.) (MB). Bompland, 13-14.i.1927, F. & M. Edwards, 2 ♂, 1 ♀ (BM). Loreto, 1928-29, 2 ♂, 12-13.iii.1930, 1 ♂, 16.i-5.ii.1931, 2 ♂, 2 ♀, A. Ogloblin; Yermal Viejo, 16.iv.1930, A. Ogloblin, 1 ♀ (ZIL). Sta Maria, Concepción, xi.1944, 2 ♂, 4 ♀, 2.iii.1946, 4 ♂, 1 ♀, 20.viii.1947, 6 ♂, 4 ♀, M. Viana (MACN). San Ignacio, iii-iv, Wagner, 1 ♂, 3 ♀ (MZH). — Corrientes. S. Tomé, ii.1925, 1 ♀, iii.1925, 1 ♂, 3 ♀, iv.1925, 1 ♀, x.1925, 1 ♀, xi.1925, 1 ♀, G. Pellerano (MACN). — Santa Fé. Garay, Colonia Mascias, vi.1942, M. Viana, 1 ♂ (MACN). — Alto Paraná. Bemberg, 1-9.xii.1933, K. J. Hayward, 4 ♂; Puerto Aguire, 3-11.i.1934, K. J. Hayward, 1 ♂, 2 ♀ (BM).

Paraguay. — C. Pfannel-Guaira, 300 m, 3.i.1952, 9 ♂, 8 ♀, 15.iv.1950, 1 ♂, J. Foerster; Carmen del Paraná, 2 ♂, 2 ♀ (MB). Pto Bertoni, Alto Paraná, 16.xi.1914, Strelnikov & Tanasiich, 1 ♂, 2 ♀ (ZIL). Horqueta, i-v.1933, A. Schulze, 1 cop. (E. P. Van Duzee Coll., CAS). Col. Independencia, ii.1950, J. Foerster, 1 ♂, 2 ♀ (ZSM).

Locality unknown or uncertain. — Repr. Ciganos Jacarep, Aguá, 13.x.1939, Oliveira, 1 ♀ (det. L. O. T. Mendes); Angra Japuhya, xii.1940, Oliveira & Venfel, 1 ♂, 2 ♀, 1 cop. (IOC). Alagoas Mangabeira, xi.1952, Camargo-Andr., 1 ♂, 2 ♀ (ZSP). Jalapa, Mexico, 1 ♀ (MD). Amer. Merid., Schmidt, 2 ♂ (lectotype and syntype of *Lygaeus annulus* Fabricius) (MC). Antilles, 1 ♂ (lectotype of *D. caribbaeus* Distant) (Distant Coll., BM).

The *Dysdercus albofasciatus* group

Dysdercus peruvianus Guérin Méneville

(figs. 211-218; pl. 12 fig. 4)

Dysdercus peruvianus Guérin Méneville, 1831, Voy. Coquille, Atlas, pl. 12 fig. 16; type locality: Payta, Peru; holotype ♀, MNP! — Hussey, 1929, Gen. Catal. Hem. 3: 99, 110. — Blöte, 1931, Zool. Meded. 14: 130, 133. — Martorell, 1939, J. Agric. Univ. Puerto Rico 23: 188 (wrongly attributed to Linnaeus). — Llanos, 1940, Rev. Fac. Nac. Agron., Colombia 2: 593-608. — Torre-Bueno, 1941, Ent. Amer. (n.s.) 21: 119. — Vivas-Berthier, 1941, Bol. Soc. Venezol. Cienc. Nat. 7: 117. — Hargreaves, 1948, List Cotton

Insects: 30. — Berry, 1951, Rev. Ent., Rio de Janeiro **22**: 329-342. — Dupuis, 1952, Bull. Soc. Zool. France **77**: 450. — Chang, 1954(?), Agronomia, Lima **19** (78): 17-38. — Dupuis, 1955, Mém. Mus. Nat., Paris **6**: 264. — Wille et al., 1955, Inf. Est. Exp. Agric., La Molina **97**: 1-29. — Wille et al., 1959, Inf. Est. Exp. Agric., La Molina **111**: 1-24. — Lima et al., 1962, Mem. Inst. Osw. Cruz **60**: 23, 46, pl. 1 (top) (male genitalia), pl. 4 fig. 4 (paramere). — Herrera, 1962, Agron. Tropic., Bogotá **18**: 30. — Szumkowski & Fernández Yépez, 1963, Agron. Tropic. **13**: 85. — Stehlík, 1965, Acta Mus. Morav. **50**: 212, 213, pl. 1 figs. 1, 3. — Stehlík, 1965a, Acta Mus. Morav. **50**: 254.

Lygaeus peruvianus; Guérin Méneville, 1838, Voy. Coquille, Ins.: 178-179 (description).

Astemma peruvianus; Kirkaldy, 1902a, Fauna Hawaiiensis **3** (2), Hem.: 159.

Dysdercus brevis Blöte, 1931, Zool. Meded. **14**: 117, 135 fig. 6b (male genital capsule), 136; type locality: Brazil, São Paulo; holotype ♂, ML! (new synonym). — Blöte, 1937, Zool. Meded. **20**: 181, 182. — Lima et al., 1962, Mem. Inst. Osw. Cruz **60**: 22, 31.

Dysdercus columbicus Blöte, 1931, Zool. Meded. **14**: 120, 134, 135 fig. 6c (male genital capsule); type locality: Colombia; holotype ♂ (fig. 217), ML! (new synonym). — Blöte, 1937, Zool. Meded. **20**: 181, 182. — Llanos, 1940, Rev. Fac. Nac. Agron., Colombia **2**: 593-608. — Hargreaves, 1948, List Cotton Insects: 30. — Lima et al., 1962, Mem. Inst. Osw. Cruz **60**: 22, 23, pl. 3 fig. 5 (paramere).

Dysdercus mendesi Blöte, 1937, Zool. Meded. **20**: 181-182, fig. (male genital capsule); type locality: Brazil, São Paulo; holotype ♂ (fig. 216), ML! (new synonym). — Mendes, 1938a, Rev. Ent., Rio de Janeiro **8**: 205. — Mendes, 1938b, Bol. Biol., São Paulo (n.s.) **3**: 133. — Mendes, 1938c, Rev. Ent., Rio de Janeiro **9**: 215-217. — Mendes, 1938d, J. Hered. **29**: 387. — Townsend, 1938b, Rev. Ent., Rio de Janeiro **8**: 347-348. — Sauer, 1938, ? — Mendes, 1939a, Bol. Biol., São Paulo (n.s.) **4**: 98. — Mendes, 1939b, Bol. Tecn. Inst. Agron. Campinas **44**: 1-13. — Mendes, 1939c, J. Hered. **30**: 498. — Viégas, 1939, J. Agron., Piracicaba **2**: 229-250, 1 fig., 3 pls. — Mendes, 1940, Ann. Acad. Bras. Sci. **12**: 159-177, 8 figs. — Lima, 1940, Ins. Brasil **2**: 113, 115, 121. — Freiberg, 1943, Minist. Agric., Junta Nac. Algodón **66**: 6 (*mondesi*). — Hargreaves, 1948, List Cotton Insects: 30. — Freiberg, 1948, Physis **20**: 122. — Berry, 1951, Rev. Ent., Rio de Janeiro **22**: 329-342. — Mendes, 1956, Bragantia **15**: ix-xi, 43-54, 7 figs. — Lima et al., 1962, Mem. Inst. Osw. Cruz **60**: 22, 42, pl. 3 fig. 14 (paramere).

Dysdercus sp. Freiberg, 1945, Bol. Mens. Dir. Algodón **125-126**: 373-380, figs. 11-18.

Dysdercus ruficollis; auct. (nec Linnaeus), see p. 138.

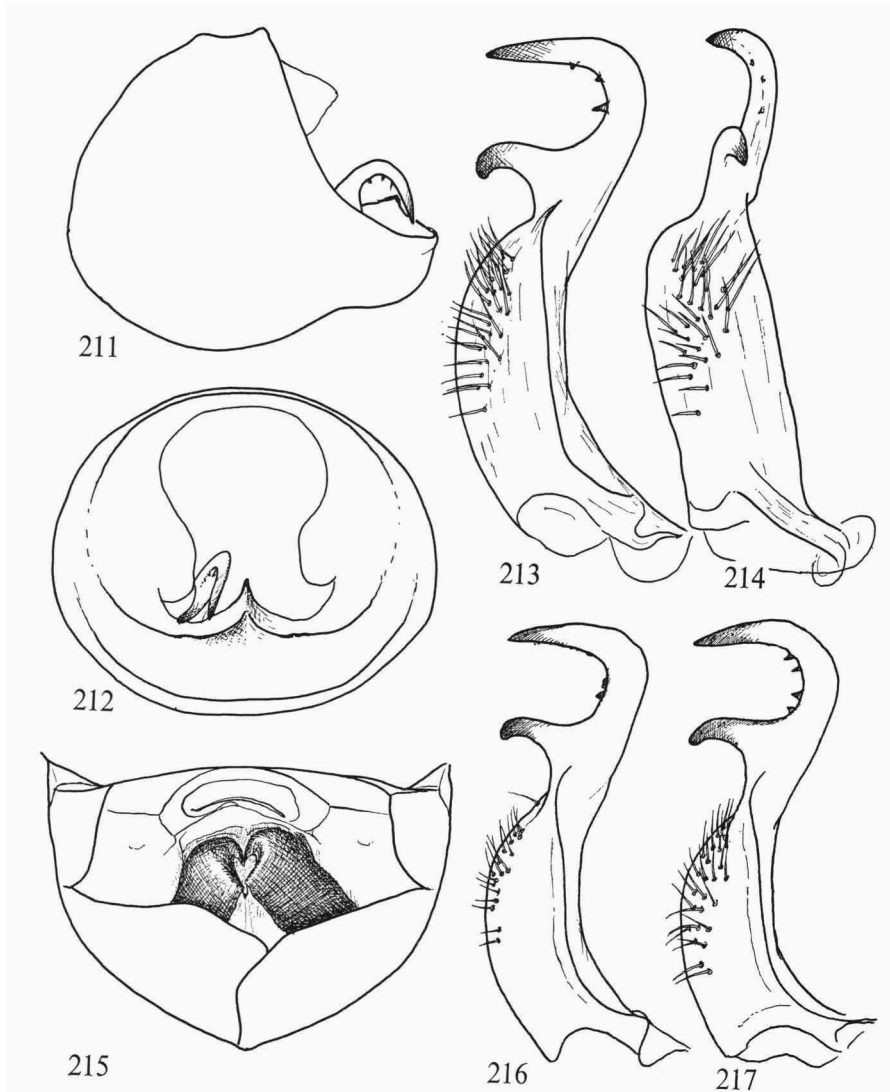
A wide spread species, very variable in size and colour, especially in the extent of black pigmentation; in comparison with e.g. *ruficollis* (L.) more broadly ovate; head always red dorsally with a black neck.

Description of the most melanic specimens (nominat form):

Head. — Ground colour red; postorbital and neck region, buccula, gular sulcus, antenna except proximally, labium except proximally, black; antennal segment 4 usually dark brown except proximally where more or less pallid.

Thorax. Pronotal collar and sometimes extreme posterior margin, yellowish; posterior half of collar as well as the callus including surrounding sulci black; lateral margin brown to blackish; disc ochraceous yellow, in some specimens bordered with red laterally. Scutellum black, posterior apex dark reddish brown. Corium of same colour as disc; membrane blackish with a faint metallic lustre, distal border whitish. Ventral surface: collar, posterior pleural flanges, and epicoxal lobes yellow; sterna including median

carina, ostiolar peritremes, and pleura including adjacent part of pronotal epipleuron, black; remaining part of pronotal- and anterior part of corial epipleuron brown, posterior part of latter black. Coxae proximally dark orange, remaining parts of legs black.



Figs. 211-217. *Dysdercus peruvianus* Guérin Méneville. 211-214, male from Lambayoque, Peru; 211-212, genital capsule in lateral and posterior view resp.; 213-214, right paramere in lateral and posterior view resp. 215, female from Peru, genitalia in posterior view. 216. *Dysdercus mendesi* Blöte, male, holotype, right paramere in lateral view. 217. *Dysdercus columbicus* Blöte, male, holotype, right paramere in lateral view.

Abdomen. — Sternites yellowish to pale reddish brown; posterior margin of sternites VII, VIII yellow; sternite II, anterior margins of sternites III-VII, lateral margin and a contiguous triangular spot on each segment blackish; sternites III-VII with a dark spot medially. — Male: genital capsule (figs. 211, 212) brownish, posteriorly extended; posterior wall of genital cavity sharply edged dorsally; from both sides this edge sinuate inwardly onto the median. Median ridge between parameres enlarged posterodorsally forming a toothed crest. Paramere (figs. 213, 214): shaft moderately setose and with a blunt mesial shoulder; head with two large spurs, often with some teeth along lateral edge between spurs. Proximal spur recurved and rounded distally; distal spur acuminate. Female (fig. 215): first gonocoxa yellowish brown, only slightly reduced, distal margin rounded; sclerites of second gonocoxae shiny black, juxtaposed, and concave at mesial margins.

This darkly pigmented form occurs in Peru and Ecuador. However, from Lima, Peru, the present author has also seen a series of about forty specimens which vary in black pigmentation but apparently represent a local race or at least a distinct population (taken from or cultured on cotton). Red base of antenna very variable in extent, sometimes proximal half of segment 2 also yellowish red; white annulus variably developed, diffuse or well defined. Callus, scutellum and pleura from almost pure red to entirely black. Membrane almost without black pigment, pale grey, in some specimens with only some veins darkened proximally. Rostrum and legs from piceous to wholly red, the latter sometimes red with blackish tibiae and tarsi; abdomen brownish to bright red, sternites with narrow, black borders anteriorly.

In Venezuela, Colombia, SE Brasil, Paraguay and Argentina, specimens are almost without any black suffusions (*D. brevis* Blöte), and the corresponding parts brown to bright red, only last antennal and rostral segments, distal parts of femora and tibiae, tarsi, and proximal angle of membrane adjacent to clavus darkened to piceous. Abdomen brownish to bright red, sternites without dark anterior borders.

Length of male 9.7-13 mm; length of female 10.5-14 mm. Pronotal index (width against length measured at 20 specimens) between 1.50 and 1.70.

The type of *Dysdercus peruvianus* Guérin Méneville. — This species was described from material collected in the course of the voyage round the world by the corvette "La Coquille". The location of the type specimen, which is also the type of the genus, remained unknown, but during a recent visit to the Muséum National d'Histoire Naturelle, Paris, the present writer, to his surprise, found the specimen there. It was perfectly preserved in the old collection of Amyot under a heading label: "Pediriscus Amyot — peru-

vianus Guér. V. Dup. pl. 10 fig. 16. Peru”, and bears the following labels: one reading “Payta du Pérou, Dup.”; another an illegible notation, perhaps “V7”; and the third stating “*Dysdercus peruvianus* guérin, voy de Duperrey, pl. 12 f. 16”.

There can be no doubt that this specimen, a female, is the holotype of the species. Besides the fact that the specimen exactly fits Guérin’s description, including its length (16 mm), it has its fore wings slightly spread, just as shown in Guérin’s plate 12, fig. 16. The specimen is now provided with a holotype label and has been placed in the general collection.

The specimen was taken during the expedition’s stay at Payta, Peru, 10-22 March, 1823. In his narrative of the expedition Lesson (1839) made no mention of collecting of insects, but he did observe that cotton was one of the important crops of the people of Payta. It therefore seems possible that the *Dysdercus* specimen was taken from cotton.

Material (distribution: fig. 218).

Peru. — Payta, [10-22.iii.1823, La Coquille exped.], 1 ♀ (holotype, MNP). “Peru”,

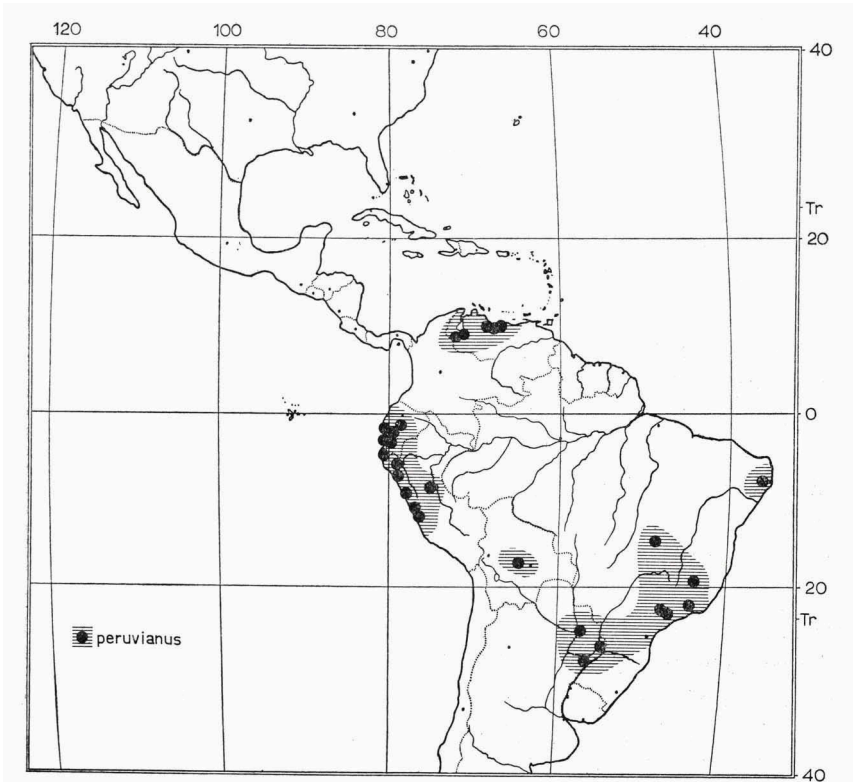


Fig. 218. — Distribution of *Dysdercus peruvianus* Guérin.

6 ♂, 2 ♀ (det. Burke, 1961, TAMU). Callanga, 1 ♂, 2 ♀ (W. H. Muche-Radeberg Ank., MD). Piura, viii.1942, Bosq. 1 ♂, 1 ♀; Piura, 20.vii.1942, SAPL. 1116, P. A. Berry, 2 ♂, 1 ♀ (MB). Lima, 24.ix.1953, M. Alvarenga, 1 ♂ (MNR). Lambayoque, 21-94 mi E Olmos, 18-19.i.1955, 3 ♂, 7 ♀, 5 mi S and 94 mi N Chiclayo, 17.i.1955, 1 ♂, 10 ♀, Lima, 23 mi N Pativilca, 150 m, 15.i.1955, 1 ♀, Lima, 16 mi NW Chancay, 11.ix.1954, 1 ♂, 1 ♀, E. J. Schlinger & E. S. Ross; North Central Coast, 1.iv.1951, A. E. Michelbacher, 2 ♀; 22 mi N Casma, 24.iii.1951, E. S. Ross & A. E. Michelbacher, 1 ♂ (CAS). Cumbase, 1 ♀, paratype of *D. brevis* Blöte, Cat. No. 4; Puerto Inca, Rio Pachytea, 1 ♂, 1 ♀; Lima, 1 ♂ (ML). Lima, vii.28, J. Soukup, 1 ♀ (CNHM). Putze V., 1 ♂, 1 ♀; Mont Philippi, Cat. no. 1864, 2 ♂, 2 ♀ (ZMB). Lima, ii.1919, E. Martinez, 1 ♂, 2 ♀ (MACN). Lima, La Molina, 1962, Gonzalez, 20 ♂, 20 ♀ (ML). Talara, 12.xi.1952, A. Fischer, 8 ♂, 6 ♀; "Peru", 5.i.1936, 7 ♂, 5 ♀, 23-25.i.1936, 5 ♂, 3 ♀, 24-29.viii.1936, 1 ♂, 3 ♀, 14-15.iii.1937, 4 ♂, 2 ♀, 10-16.i.1938, 2 ♂, 5 ♀, E. G. Smyth (J. B. de la Torre-Bueno Coll., KU). Lima, Soukup, 2 ♀ (MCZ). Lobitos, 1925, H. F. Slatery, 1 ♀; La Molina, 8.iv.1954, 2 ♂; San Miguel, 4.vi.1915, O. F. Cook, 1 ♂, 1 ♀ (BM). Lima, Galatea, 1 ♀ (MC).

Ecuador. — Bucay, 310 m, xi.1938, J. Miller, 1 ♀; Machala, 27.ix.1944, E. J. Hambleton, 2 ♀ (det. Stehlik) (MB). Banos, Tungurahua, 1820 m, 11.ii.1955, 1 ♀, Guayas, 20 mi W Guayaquil, 100 m, 28.i.1955, 1 ♂, E. J. Schlinger & E. S. Ross; Puña Is., 9.xi.1950, A. E. Michelbacher, 2 ♂, 7 ♀ (CAS). Guayaquil, 1.ii.1946, C. C. Sanborn (CNHM). SW Ecuador, "in garden", R. W. Barker, 2 ♂, 2 ♀; Guayaquil, 95-76, 1 ♀ (BM). Quito, 28.viii.1921, Vorlech, 1 ♂; Guayaquil, Mus. Westerm., *D. peregrinans* Stål [MS name?], 1 ♀ (MC). Guayaquil, x.1921, "utan för ammen", H. Brattström, 1 ♂; Puna, Callan, 1 ex. (ZML). Guayaquil, 2 ♂, 1 ♀ (MU).

Colombia. — Klug, 2 ♂, holotype and paratype of *D. columbicus* Blöte, Cat. Nos. 1 and 2 (ML).

Venezuela. — Tachira. Tariba, 9.v.1949, "en *Sida* sp.", F. Fernández Y., 1 ♂, 2 cop. (IZM). — Mérida, 2 ♀ (NRS). — Carabobo. Guacara, 27.vi.1943, G. Vivas-Berthier, 1 ♂; Bella Vista, 23.vi.1945, "en algodón", F. Fernández Y. & R. Labrador, 1 ♂, 2 ♀; Mariaria, 30.vi.1949, "en algodón", 9 ♂, 7 ♀, 1 cop., 29.iii.1950, 5 ♂, 1 ♀, F. Fernández Y.; Mariaria, 12.ii.1935, C. G. Salazer 1 ♀; Ag. Chirgua, 19.iii.1950, Penalver, 1 ♂ (IZM). Pto Cabello, 1 ♀ (NRS). — Aragua. Gonzalito Cr., Maracay, 2.ii.1950, 6 ♂, 14 ♀, 7 cop., Maracay, 27.xii.1949, "en algodón", 1 ♂, 1 ♀, San Francisco de Asis, 23.vi.1943, "en socas de algodón", 1 ♂, 1 ♀, F. Fernández Y.; Turmero, 466 m, 27.vii.1945, "en algodón", F. Fernández Y. & R. Labrador, 1 ♀ (IZM). El Potrero, 5.ix.1945, F. Diaz R. & R. Labrador, 19 ♂, 23 ♀ (ML). — Distrito Federal. El Valle, 3.viii.1938, "en *Gossypium hirsutum* L.", A. Escalona, El Valle, C. H. Ballou, Lot. No. 39-10379, 1 ♂ (det. H. G. Barber) (MAC). Caracas, Gollmer, Cat. No. 1868, 1 ♀ (ZMB). El Valle, 13.vi.1938, C. H. Ballou, on *Gossypium hirsutum*, 1 ♂ (USNM).

Brazil. — "Brazil", 1 ♂ (ZIL). — Pernambuco. Betke, 2 ♀, Cat. No. 1864 (ZMB). — Goiás. Leopoldo de Bulhões, xi.1937, R. Spitz, 1 ♀ (ZSP). Annapolis, 12.xi.1936, G. B. Fairchild, 5 ♂, 7 ♀ (MCZ). — Minas Gerais. Lagoa Santa, Reinhardt, 1 ♀ (MB), 1 ♂ (MC). Belo Horizonte, So. Am. Paras. Lab., on cotton, no. 958-36, 1 ♂, 1 ♀ (*D. mendesi* det. Stehlik), No. 953-36, 6.vi.1944, 1 ♂, 1 ♀, Parker c.s. (MB). — Rio de Janeiro, N. Thayer Exped., 3 ♂, 5 ♀ (MCZ). — São Paulo. São Paulo, 1 ♂ (W. H. Muche-Radeberg Ank., MD). Mráz, Mus. Pragense, *D. mendesi*, det. Stehlik, 2 ♂, 2 ♀ (MB). Cantareira, 1169, 1 ♀; São Roque, 1.x.1945, F. Lane, 1 ♀ (ZSP). Piracicaba, Bondar, 2 ♂, 1 ♀ (ZIL). "Brazil", 1 ♂ (ZSM). "Brazil" 1 ♀ Catal. No. 1 (det. H. C. Blöte); "Brazil", 2 ♂, 1 ♀ (holotype ♂, allotype and paratype of *D. brevis* Blöte, Catal. No. 1-3); Campinas, i.1936, L.O.T. Mendes, 4 ♂, 4 ♀ (holotype ♂, allotype and paratypes of *D. mendesi* Blöte, Catal. No. 1-8, ML), 3 ♂, 3 ♀ (paratypes) (BM). Dumont, 11.vii.1923, cotton, G. L. R. Hancock, 2 ♂ (BM). — Roque, "Östand", 4.x.1925, 1 ♂, 1 ♀ (MU).

Paraguay. — Assomption, 22.ii-25.iv.1936, B. Podtiaguine, 1 ♂ (ML). 10.8.1925, F. Schade, 1 ♀ (No. 7392, HZM). Sapucay, vii.1925, E. J. Hammer, 1 ♂, 2 ♀ (MACN).

Argentina. — Santo Tomé, Corrientes, vi.1927, G. Pellerano, 1 ♂ (MACN). Misiones, Pto Victoria, v.1938, S/Algodón, Serjes, 2 ♀ (MB).

Bolivia. — Cristal Mayu, 800 m, Chapare, Cochabamba, 1960, F. Steinbach, 1 ♀ (ML).

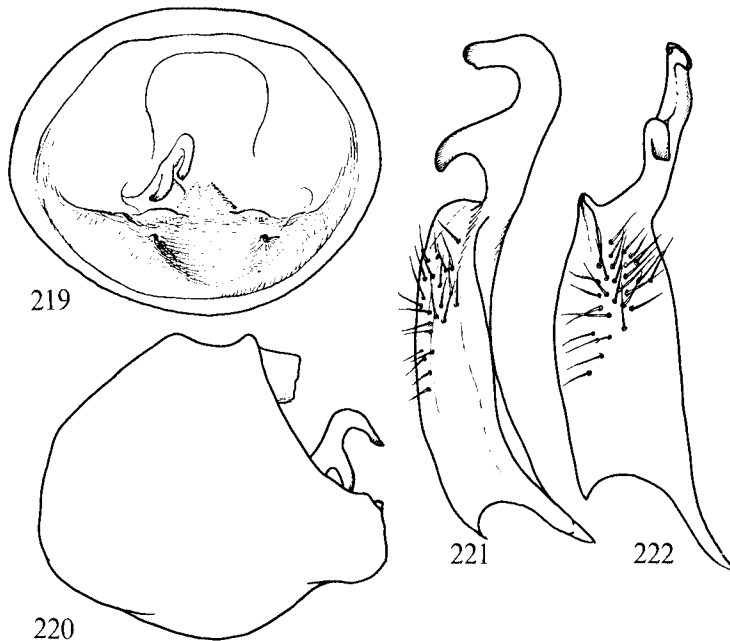
***Dysdercus goyanus* nov. sp.**

(figs. 219-222, 228; pl. 13 fig. 3)

Medium-sized, dirty yellow; head, callus, scutellum, and legs red; proximal third of antennal segment 4 white.

Head. — Dorsal surface red, ventral surface and rostrum orange-red, last rostral segment blackened; antenna dark red to blackish with red base of segment 1 and white proximal third of segment 4.

Thorax. — Pronotal collar dirty yellowish white; anterior callar sulcus blackened; callus red; lateral pronotal margin dirty orange; lateral part of disc yellow to pale brownish; posterior margin narrowly bordered with



Figs. 219-222. *Dysdercus goyanus* nov. sp., male, holotype; 219-220, genital capsule in lateral and posterior view resp.; 221-222, right paramere in lateral and posterior view resp.

yellow. Scutellum red. Corium dirty yellow with reddish median plate. Membrane pale brownish with a narrow, whitish distal border. Ventral surface: posterior pleural borders and epicoxal lobes yellowish white; pleura and sterna brownish orange. Ostiolar peritremes yellow-orange. Femora entirely, tibiae proximally orange-red, distally reddish; tarsi dark brownish orange with blackened last segments; claws black.

Abdomen. — Sternites yellow with intersegmental sulci blackened laterally; lateral margins and anterior parts of sternites IV, V, VII, sternites VI, VIII, IX entirely, suffused with orange. — Male: Rounded posterior margin of genital capsule (figs. 219, 220) interrupted medially by an excavation limited on each side by a black tubercle and dorsally by a bisinuate lamella; this lamella laterally continued as a low crest each side in front of the tubercle. Paramere (figs. 221, 222) with a distinct mesial shoulder and a head with two spurs; proximal spur directed somewhat sideways and recurved; distal spur less recurved and with a obliquely flattened tip.

Length 13.2 mm; width 5.2 mm; width of head including eyes 1.88 mm; length of pronotum 2.32 mm; width of pronotum 3.86 mm.

Material (distribution: only known from the type locality: fig. 228).

Brazil. — Jatahy [Iataí] Prov. Goyas, Brésil, Clermont vend., 1 ♂ (holotype) (ZIL).

The specimen is well preserved; only the right antenna is missing. The female is unknown.

Although *D. goyanus* is quite unlike *D. albofasciatus* Berg in appearance (colour pattern) an affinity is suggested by morphological resemblances in the genital capsule and paramere. *D. goyanus* should be easily distinguished from other yellow species by the large white proximal part of antennal segment 4. However, the large size of this annulus seems remarkable for a *Dysdercus* species, and may be a mere aberration.

***Dysdercus albofasciatus* Berg**

(figs. 223-228; pl. 15 fig. 1)

Dysdercus albofasciatus Berg, 1878, Anal. Soc. Cienc. Argentina 6: 266; type locality: Territorium Misiones (Argentina); lectotype ♀, MACN! — Pennington, 1921, Lista Hem. Het. Argentina: 20. — Hussey, 1929, Gen. Catal. Hem. 3: 84. — Blöte, 1931, Zool. Meded. 14: 117, 133. — Mendes, 1938b, Bol. Biol., São Paulo (n.s.) 3: 133. — Mendes, 1939a, Bol. Biol., São Paulo (n.s.) 4: 98. — Lima, 1940, Ins. Brasil 2: 113. — Berry, 1951, Rev. Ent., Rio de Janeiro 22: 330. — Ruffinelli & Pirán, 1959, Bol. Fac. Agron. Montevideo 51: 32. — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 22, 29, pl. 3 fig. 1 (paramere).

A black species (10.0-13.0 mm) with a white patch on each hemelytron, a black collar, red femora and the abdominal segments II-V yellowish white.

Head. — Dorsal surface dull black; ventral surface often reddish or with more or less distinct reddish markings. Apex of anteclypeus and buccula red; sides of head in front of antenniferous tubercle often rather reddish. Antennal segments 1-3 dark brown to black, last segment brown to greyish brown, with white proximal annulus (1/6). Rostrum usually red, segment 4 and sometimes 2 proximally also blackened. Labrum reddish brown, proximally black.

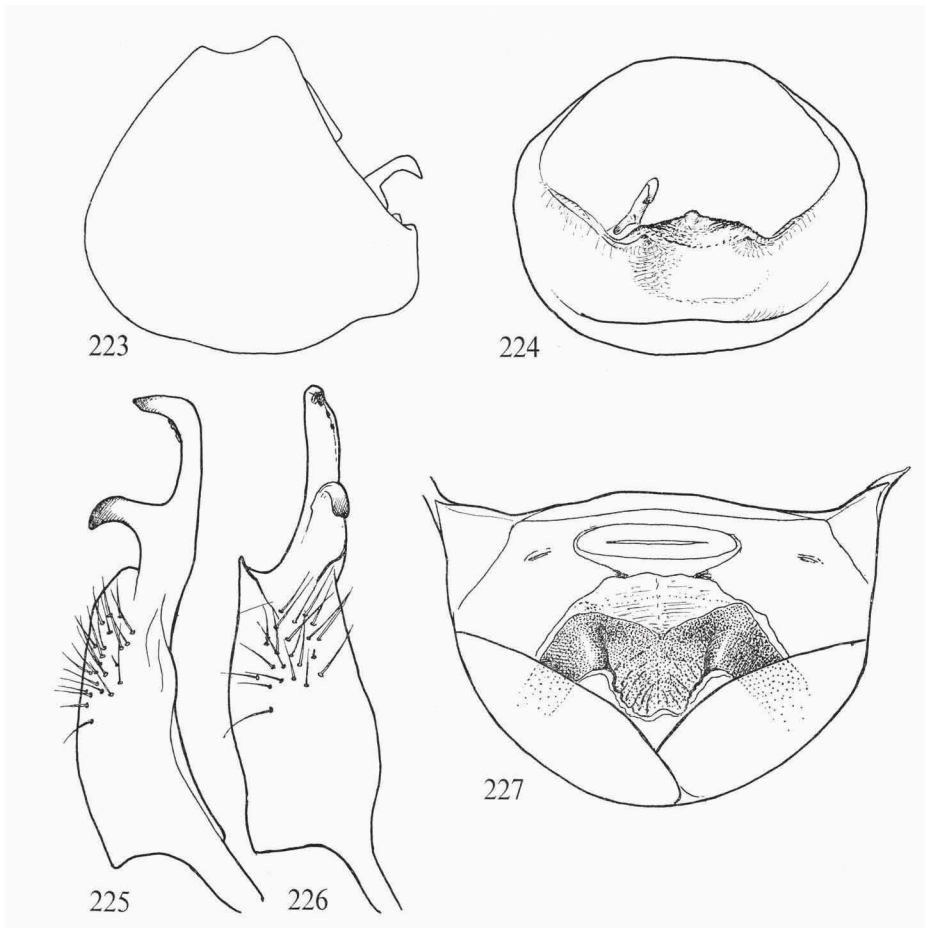
Thorax. — Pronotal callus and lateral margin red; collar and disc black; often these black areas of pronotum united by a more or less narrow, medial blackish band on callus; sometimes entire callus blackish (specimens from Cantareira, São Paulo, = "Var." of Bergroth (1905: 108), Brasilia, Minas Gerais). Scutellum black; anterior angles sometimes reddish; posterior apex yellowish brown. Hemelytron black with red to yellowish brown proximal part and epipleuron; a white to pale yellowish patch in posterior half, extending from costal margin where patch is broadest, to border with membrane; anterior edge of this marking more or less straight or slightly concave. Ventral surface of thorax orange-yellow to red; collar often brownish to black. Ostiolar peritremes, coxae, trochanters, and most of the femora proximally red; remaining parts of legs brown to black.

Abdomen. — Sternites II-V pale yellowish; lateral margins, anterior margins narrowly, and sternites VI-IX entirely red. Sternite VI anteriorly more or less broadly bordered with black or entirely black except for red lateral margin; sternite VII sometimes with anterior margin black laterally. — Male: posterior margin of segment IX (figs. 223-224) rounded, medially with a broad, shallow excavation; the latter dorsally limited by a narrow, erect, lamella with a distinct tooth on each side. Shaft of paramere (figs. 225, 226) broad, with a well-defined mesial shoulder, a stout, recurved, proximal spur and a less developed distal one; the postero-lateral ridge between the two spurs often with some small teeth. In resting position, proximal spur anchored in a groove between lateral end of lamella and adjacent tooth. — Female (fig. 227): first gonocoxa red, distal margin slightly convex; sclerites of second pair of gonocoxae convex and united medially by a broad, sclerotized, and somewhat palmate wrinkled plate.

Length of male 10.0-11.5 mm; length of female 11.0-13.0 mm.

Lectotype designation of *Dysdercus albofasciatus* Berg. — Through the kindness of Dr. M. J. Viana of the Museo Argentino de Ciencias Naturales, Buenos Aires, I was able to study Berg's material of this species, consisting of one male and two female specimens. One of the females is labelled

“Misiones albofasciatus Berg” in Berg’s handwriting. The other two specimens lack any label. Since it is clear that the labelled female is one of the two specimens (syntypes) mentioned by Berg in his description, this specimen is here designated as the lectotype of *Dysdercus albofasciatus* Berg, 1878. The status of the other two specimens is not absolutely clear, but one of them must also be a syntype. To each, the author added a label: Paralectotype? According to Viana (in litt.), the type specimen was collected by Berg himself near Corpus (Misiones), in January, 1877.



Figs. 223-227. *Dysdercus albofasciatus* Berg. 223-224, male from Montevideo, Uruguay, genital capsule in lateral and posterior view resp. 225-226, male from Pelotas, Brazil, right paramere in lateral and posterior view resp. 227, female from Pando, Uruguay, genitalia in posterior view.

Material (distribution: fig. 228).

Brazil. — São Paulo. Cantareira, viii.1958, J. Lane, 2 ♂, 1 ♀ (ZSP). São Paulo, 1 ♂, 1 ♀ (NRS). São Paulo, Montevideo So. Am. Paras. Lab. No. 799-2, x.1942, Parker, 1 ♀ (USNM). Mráz, Mus. Pragense, 4 ♂, 1 ♀ (MB). "Brazil" 14.ix.1906, 1 ♂ (E. P. Van Duzee Coll., CAS). — Paraná. Tucunduva, E. D. Jones, 1 ♀ (BM). Curitiba, xi.1937, Claretiano, 1 ♀ (ZSP). — Sta. Catharina. Nova Teutonia, 300-500 m, iii.1962, 1 ♂, 1 ♀; ii-iii.1963, 1 ♂, 3 ♀, F. Plaumann; Xanxerê, 26.ii.1962, F. Plaumann, 2 ♀ (ML). Nova Teutonia, 3-500 m, 2.vii.1949, F. Plaumann (ZSM). Lages [? Lajes], 1 ♂, 2 ♀ (Distant Coll., BM). — Rio Grande do Sul. Pelotas, 1.xi.1957, C. Biezanko, 1 ♂ (AMNH), 1 ♂ (ML). Pelotas, 5 and 7.ii.1962, 1 ♂, 1 ♀; 31.ii.1962, 1 ♀; 1.iv.1962, 1 ♀; 7.iv.1963, 1 ♀, J. L. Mantovani-Biezanko (ML).

Uruguay. — Sayago (opto de Montevideo), 10.xi.1947, A. Ruffinelli, 1 ♂, 1 ♀ (ML). Montevideo, 19.ix.1954, Chapt. & Ruffinelli, 1 ♂, 1 ♀; Montevideo, iii.1953, Sanguinetti, 1 ♀; Pando, 44-26077, on *Pavonia* sp., 7 ♂, 3 ♀; Pando, Canelones, No. 749-1, Montevideo So. Am. Paras. Lab., 23.iii.1943, on *Sida* sp., Parker, 2 ♂, 1 ♀ (det. R. I. Sailer) (USNM). Montevideo, 19.i.1903, Crawford Exped., H. J. N., 1 ♀ (BM).

Argentina. — Misiones. Misiones, viii-ix.1909, P. Jørgensen, 9 ♂, 9 ♀ (MC). Loreto, iii.1960, F. H. Walz, 3 ♂, 2 ♀ (ML). Bemberg, 14-30.iii.1945, Hayward c.s., 1 ♀;

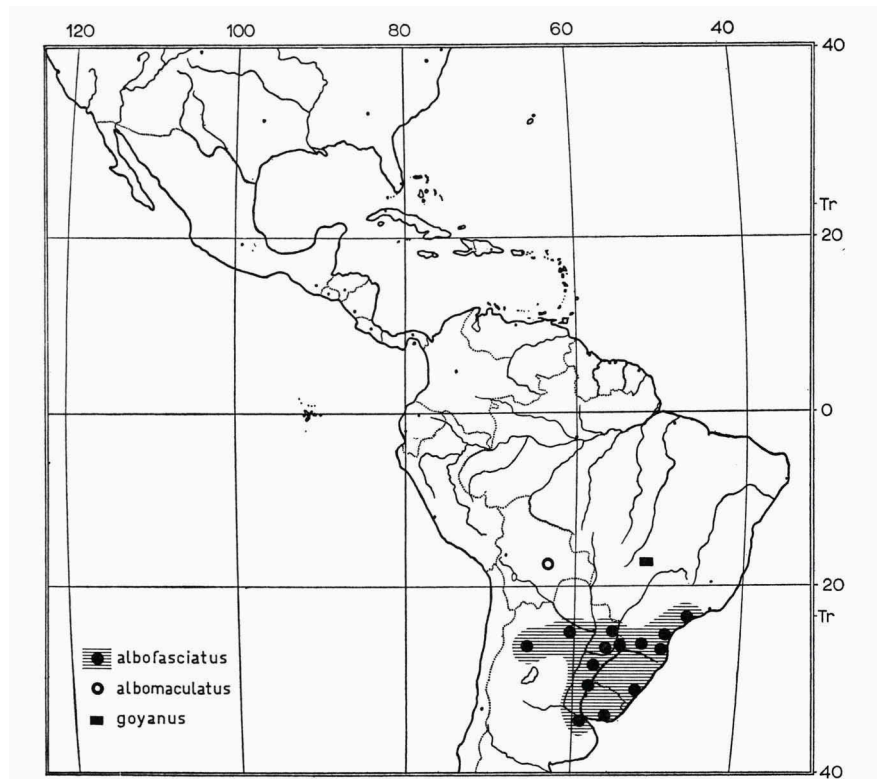


Fig. 228. Distribution of *Dysdercus albofasciatus* Berg, *D. albomaculatus* nov. sp., and *D. goyanus* nov. sp.

Alto Paraná, Puerto Aguire, K. J. Hayward, 31.xii-3.i.1933-4, 1 ♂ (BM). Concepción, Sta Maria, xi.1944, M. Viana, 3 ♂, 3 ♀; Misiones, viii.1931, P. Moreau, 1 ♂ (MACN). — Corrientes. San Carlos, xi.1953, 1 ♂, 5 ♀, J. Foerster (MB). Santo Tomé, ii.1928, G. Pellerano, 2 ♂, 3 ♀ (MACN). — Entre Rios. Concordia, 1 ♂, 1 ♀, J. A. de Carlo (coll. and det.) (ML). — Buenos Aires. Anchorena, 1938, M. J. Viana, 1 ♂, 3 ♀ (L. O. T. Mendes and J. A. de Carlo det.); Isla Martin Garcia, iv.1938, M. J. Viana, 1 ♀ (det. L. O. T. Mendes) (ML), 1 ♂, 3 ♀ (MACN). Punta Lara, 19.i.1952, 4 ♂, 3 ♀, J. Foerster; San Isidro, i.1948, N. Kormilev, 1 ♂, 2 ♀; Olivos, xii.1951, 1 ♀; Ituzaingo, xi.1949, N. Kormilev (MB). Tigre, x.1930, M. J. Viana, 1 ♀ (MACN). — Chaco. Fontana, 1934, T. Meyer, 1 ♂, 1 ♀ (MACN).
 Paraguay. — Itapua, Uega, xii.1954, J. Foerster, 1 ♂, 4 ♀; Hohenau, iii.1953, J. Foerster, 1 ♀ (MB). Hohenau, 1 ♂, 1 ♀ (W. H. Muche-Radeberg Ank., MD). Hohenau, 1 ♂ (det. H. C. Blöte) (ML).

Dysdercus albomaculatus nov. sp.

(figs. 228-233; pl. 15 fig. 2)

Closely allied to *D. albofasciatus* Berg and in appearance similar to this species, but distinguishable by the red collar, the more roundish, white corial marking, the black femora, the orange sternites and details of genital structure.

Head. — Colour black, ventral surface dark brown; antenna black, segment 4 dark brown with a white annulus proximally; tip of clypeus and labrum reddish brown; rostrum dark brown, segment 4 blackish.

Thorax. — Pronotum red with a black basal marking covering almost the whole disc; lateral margin narrowly black. Scutellum black with anterior margin and extreme posterior corner reddish. Corium black, costal margin and epipleuron brownish, a large, more or less roundish patch behind middle of corium, yellowish white; membrane blackish with very narrow greyish border distally. Ventral surface including coxae orange-red; collar, pleura, and coxae more deeply coloured than other parts. Ostiolar peritremes yellowish red.

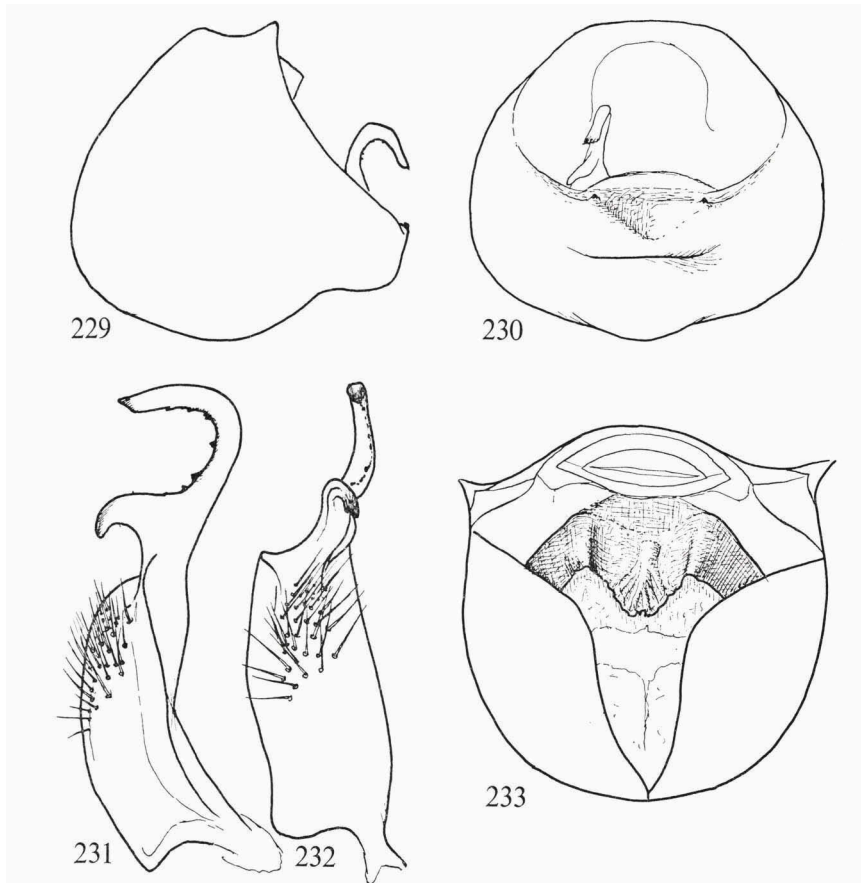
Abdomen. — Sternites orange-red; lateral margins of sternites and dorsally the laterotergites darkened; spiracular margins and last segments scarlet. — Male: anterior margins of sternites III-VII narrowly black laterally; posterior margin of capsule (figs. 229, 230) with a shallow, median excavation limited laterally by a distinct blunt tooth on each side and dorsally closed by a convex transverse lamella. Paramere (figs. 231, 232) shaft with mesial shoulder, head with two well developed spurs: proximal spur strongly recurved and apical one large, hooked, obliquely truncate at tip; inner curvature between spurs sharp laterally and irregularly set with small teeth. — Female (fig. 233): distal margin of first gonocoxa prom-

inently curved; sclerites of second gonocoxae situated dorso-laterally, convexly folded, distal margin concave, medially united with each other by a convex, sclerotized, palmate folding.

Measurements (in mm). — Male (holotype): length 9.3; width 3.38; length of pronotum 1.63; width of pronotum 2.56; width of head including eyes 1.86. Antennal segments 1: 2.10; 2: 1.68; 3: 1.05; 4: 2.44. Labial segments, 1: 1.51; 2: 1.28; 3: 0.81; 4: 1.05. Female (allotype): length 10.7.

Material (distribution: only known from type locality, fig. 228).

Bolivia. — Santa Cruz, 16.x.1957, G. Pinckert, 1 ♂ (holotype), 1 ♀ (allotype, markedly pregnant) (C. Drake don., ML).



Figs. 229-233. *Dysdercus albomaculatus* nov. sp. 229-232, male, holotype; 229-230, genital capsule in lateral and posterior view resp. 231-232, right paramere in lateral and posterior view resp. 233, female, allotype, genitalia in posterior view; in this figure the unusual large appearance of the ventral half is due to the advanced gestation of the specimen.

The *Dysdercus fernaldi* group***Dysdercus immarginatus* Blöte**

(figs. 234-242; pl. 15 fig. 3)

Dysdercus immarginatus Blöte, 1931, Zool. Meded. **14**: 124, 134; type locality: Brazil, São Paulo; holotype ♂, ML! — Hayward, 1942, Est. Exper. Agric. Tucumán, Publ. Misc. **1**: 34. — Lima et al., 1962, Mem. Inst. Osw. Cruz **60**: 22, 39.

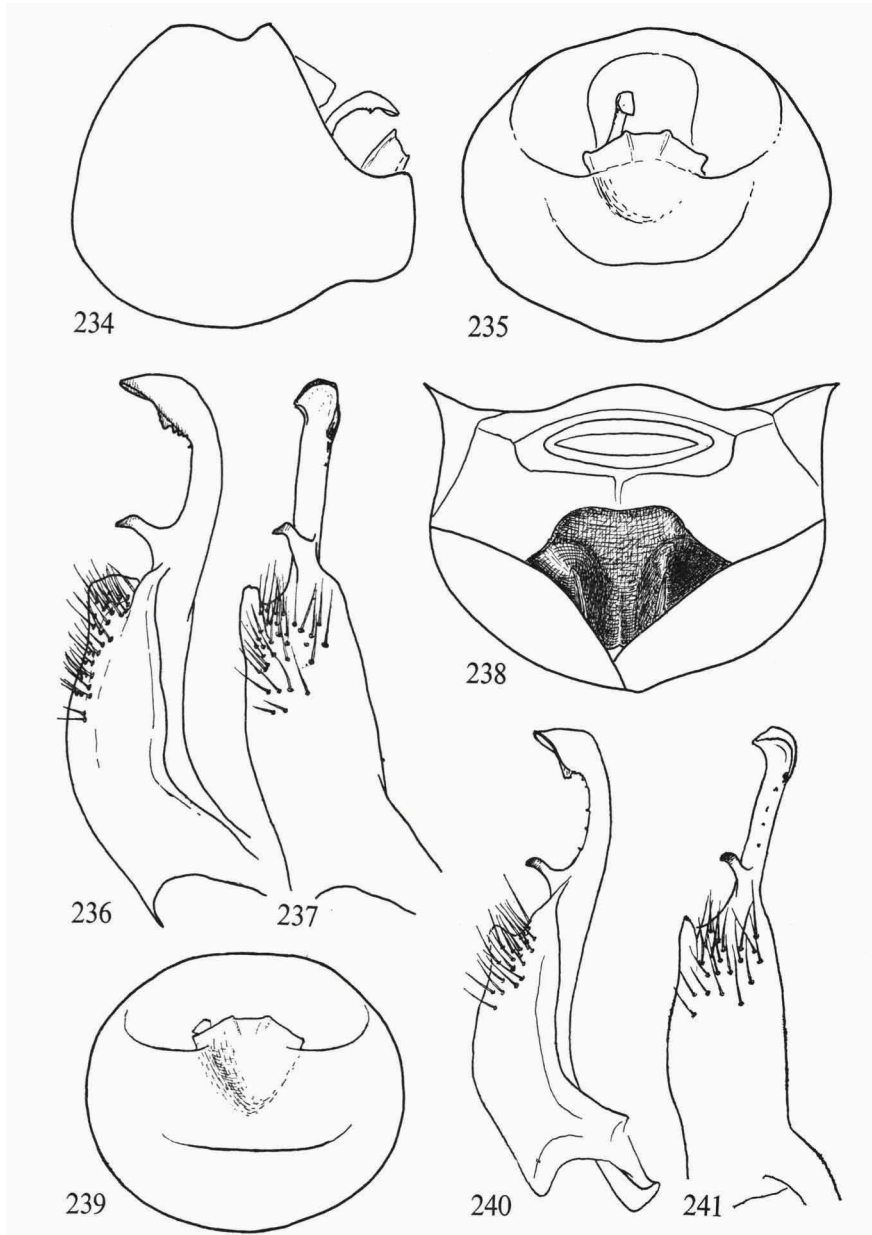
Dysdercus fernaldi (nec Ballou); Pearson, 1932, Psyche **39**: 124, pl. 4 figs. 6, 7 and 8 (paramere). — Lima et al., 1962, Mem. Inst. Osw. Cruz **60**: 36 (pro parte: specimens from Nicterói, Friburgo, Gánea, Sta. Tereza, Guaratiba, Tijuca, Jacarepaguá and Grajaú), pl. 1 lower figure, pl. 2 figs. 6-8 (after Pearson, 1932), pl. 3 figs. 7 and 8.

Medium-sized to large (11.0-16.7 mm); mainly yellow, with a white annulus proximally on antennal segment 4; capsular lamella high (1/3 of width), trapezoidal; second gonocoxae fused and strongly convex laterally.

Head. — Dorsal surface red, usually slightly tinged with black; sometimes neck region, antenniferous tubercle, and side of anteclypeus blackened, rarely entirely blackish above; antennal segments 1, 2, 3 red to dark brown or almost blackish with red base; segment 4 white proximally, black distally; rostrum largely red, with labial segment 4 and labrum blacker.

Thorax. — Pronotal collar yellowish white; callus and lateral margin red; pre- and post-callar transverse sulci sometimes blackened except in midline; disc dirty yellow, often with a grey to blackish transverse band near pale posterior edge. Scutellum more or less pale orange. Corium yellow with an orange tinge proximally. Membrane brownish black with a pale anterior corner and almost lacking pale distal border. Ventral surface: sterna and pleura orange; collar, posterior pleural margins, and epicoxal lobes white; pronotal epipleuron red. Ostiolar peritremes yellowish. Coxae orange, femora, tibiae and tarsi red, each segment darkening distally.

Abdomen. — Sternites dirty white with lateral margins yellow and anterior margins narrowly black. — Male: sternites VI, VII with black anterior margins enlarged, remainder of VI and of anterior half of VII tinged with orange; sternites VIII, IX (figs. 234, 235) orange-red, the latter rounded and somewhat produced posteriorly. Posterior margin broad, with a medial excavation towards genital cavity, separated from this by an erect, angulate lamella; width of this lamella about three times its height (28 : 10). Paramere (figs. 236, 237) with a stout shaft, a well defined mesial shoulder and a slender, curved head bearing two spurs; proximal spur small, slender, and slightly recurved; distal spur broad, gradually curved, and obliquely truncated apically; often with some irregular teeth along lateral edge between spurs. — Female (fig. 238): first gonocoxa orange-red, gradually rounded



Figs. 234-241. *Dysdercus immarginatus* Blöte. 234-237, male, holotype; 234-235, genital capsule in lateral and posterior view resp. 236-237, right paramere in lateral and posterior view resp. 238, female from São Paulo, genitalia in posterior view. 239-241, male from Trinidad; 239, genital capsule in posterior view; 240-241, right paramere in lateral and posterior view resp.

distally; sclerites of second gonocoxae fused medially, forming one broad plate which is strongly convex laterally.

Length of male 11.0-14.2 mm; length of female 13.0-16.7 mm.

Specimens from Bogotá are strongly pigmented with black: neck, antenniferous tubercle, antenna (except for the white annulus), black; legs dark brown to black: Abdomen: sides red to blackish, all sternites anteriorly, especially VI and VII, often broadly blackened, in the male sternites VIII, IX also.

Material (distribution: fig. 242).

Peru — "Peru", 1 ♀ (NRS). Pachitea, 1 ♀ (ZSM). Calanga, 3 ♀ (W. H. Muche-Radeberg Ank., MD). Vilcanota, 1 ♀; "Hoch Peru", 1 ♀ (ML).

Colombia. — Bogotá, 2 ♂ (BM). Analaima, 1916, 1 ♂, 1 ♀, Villavicencio, 1921, 1 ♂, Hno Apolinar-Maria (CAS). Rio Caqueta, vii.1926, Woronow, 1 ♂, 1 ♀ (ZIL). Antioquia, 93, Musay Schlr, 1 ♀; Bogotá, Lindig, 2 ♂, 2 ♀ (NRS). Villavicencio, Meta, 11-14.vii.1938, N. S. Dybas & F. W. Purry, 10 ♂, 8 ♀ (CNHM). Muzo, 1 ♀; Aguacatal, 1 ♀ (W. H. Muche-Radeberg Ank., MD). "Cordillere von Columbien", 231, Bobisch, 1 ♀ (ZMB). Tolima, 2 ♀; Villa Elvira, 1 ♂; S. Antonio, 2 ♂, 1 ♀ (ML).

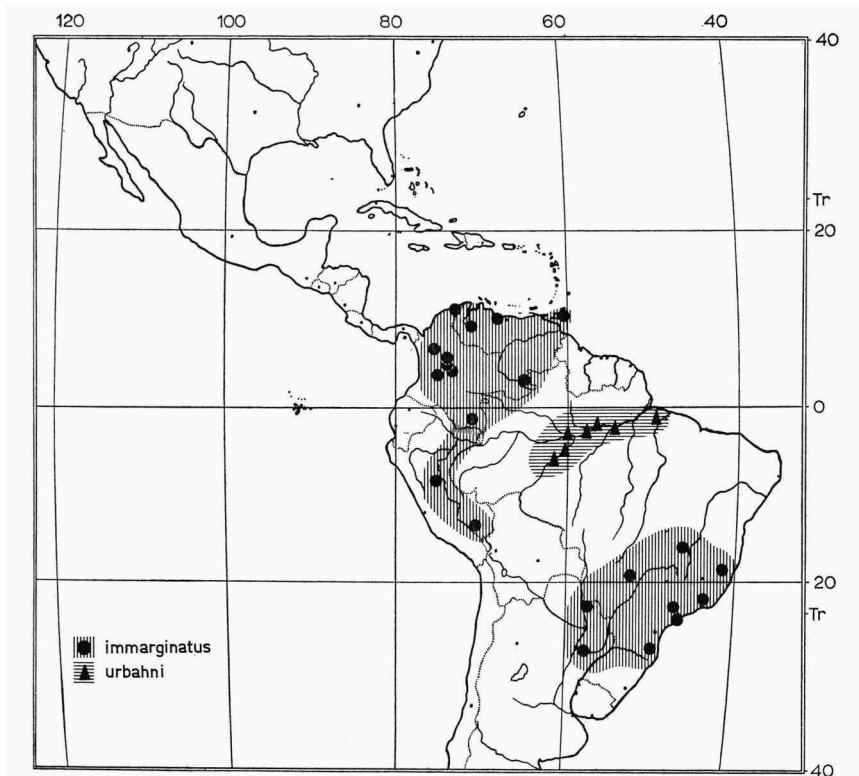


Fig. 242. Distribution of *Dysdercus immarginatus* Blöte and *D. urbahni* Schmidt.

Venezuela. — Merida. Merida, 1 ♂, 1 ♀ (NRS). — Carabobo. Puerto Cabello, 1 ♂ (NRS). — Aragua. Rancho Grande, 25.v.1951, J. R. Reguena, 1 ♀, 5.v.1951, 1 ♂, 1 ♀, 9.vi.1955, 1 ♀, 5.v.1957, 1 ♀, 5.vi.1958, 1 ♀, 22.xii.1963, 1 ♀, F. Fernández Y., c.s. (IZM). Rancho Grande, 15.xi.1959, P. H. van Doesburg Jr, 1 ♀ (ML). — Bolívar. El Dorado-Santa Elena km 107, 406 m, 2 and 14.viii.1957, 2 ♀, 19 and 25.viii.1957, 2 ♂, C. J. Rosales & F. Fernández Y. (IZM).

Trinidad. — Mt. St. Benedict, viii.1929, D. C. Geijskes, 1 cop., 2 ♀ (*D. fulvoviger* De Geer, det. H. C. Blöte, Cat. Nos. 9-12) (ML). Spring Hill Estate, Arima Valley, 1100-2000 ft, 16.i.1954, G. F. Mees, 1 ♂ (figs. 239-241), 1 ♀; Orange Grove Estate, 26.vii.1953, 1 ♂, 10.viii.1953, 1 ♀, G. F. Mees (ML). Trinidad, x.1929-vi.1930, R. A. Lever, 1 ♂, 1 ♀; Trinidad, 21.i.1925, Withycombe, 1 ♀; St. Augustine, xi.1933, on cotton, C. L. Withycombe, 1 ♀ (BM). Trinidad, 4.viii.1902, 3 ♀, 14.ix.1902, 1 ♀, Chipman (CAS). St. Augustine, ix.1956, R. H. Cobben, 1 ♀ (LEW). St. Augustine, 11.v.1919, N. A. Weber, 2 ♂, 2 ♀ (MCZ).

Brazil. — "Brazil", F. Sahlberg, 1 ♂ (NRS). "Brasil", 1 ♀ (*D. austeni* Blöte, det. H. C. Blöte, Cat. No. 2; ML). — Goyas. Goyas, 28.i.1953, M. Alvarenga, 1 ♀; Oliveira, 21.i.1963, N. Papavero, 1 ♀ (ZSP). — Minas Gerais. Paracatú, vi.1960, Exped. Formosa, 1 ♂ (MNR). — Espirito Santo. Espirito Santo, x.1920-ii.1921, F. Hoffmann, 1 ♀ (DEI). Serro do Caparaó, 800-2000 m, Lange-Larsson, 1 ♀ (NRS). Espirito Santo, 1 ♀ (ML). — Rio de Janeiro. Faz. Alpina, Teresopolis, 1000 m, 11.xi.1945, 1 ♀, Nova Friburgo, 900 m, 8.ii.1945, 3 ♂, 10-30.i.1946, 2 ♂, 1 ♀, "km 47" [Road Rio de Janeiro — São Paulo], 1 ♀, P. Wygodzinsky (ML). Itatiaya, 1000-1200 m, 25.ii.1924, Lahtivirta, 1 ♂ (MZH). Rio de Janeiro, Centr. Brasil, K. Fischer, 1 ♀ (DEI). Rio de Janeiro, Stál, 1 ♀ (NRS). Rio de Janeiro, 27.viii.1950, 1 ♂, 1 ♀ (BM). — Guanabara (formerly Distrito Federál). Corcovado, 30.iii.1947, P. Wygodzinsky, 3 ♀ (ML). Corcovado, 25.xi.1952, D. Zajciv, 5 ♂, 1 ♀; Corcovado, x.1958, M. Alvarenga & Seabra, 3 ♀; Botafogo, xii.1953, M. Alvarenga, 1 ♂; Rio de Janeiro, 18.ii.1949, Osvaldo, 1 ♂; Rio de Janeiro, 23.iii.1955, 1 ♀; Açude da Solidão, D. Zajciv, 1 ♀; Inhaúma, v.1937, N. Santos, 1 ♀ (MNR). Petropolis, 800-1000 m, 21-28.xii.1926, F. Ohaus, 1 ♀ (MW). Botafogo, 1911, Percy Sladen Trust Exped., Camelie v. Volxem, 1 ♂ (MZH). Rio de Janeiro, 27.viii.1950, 1 ♂, 1 ♀ (BM). — São Paulo. São Paulo, holotype ♀ (ML). Itú, 30.x.1960, Araújo, 1 ♂ (MNR). Ipiranga, 19.ix.1926, F. Ohaus, 1 ♀ (MW). Rio Branco near Santos, 1 ♀ (det. Tæuber) (DEI). São Paulo, Mráz, 2 ♀ (*D. ruficollis* f. *albomembraceus*, det. J. L. Stehlík) (MB). Eug. Levevre, Cerro Jordão: 1200 m, 28.ix.1962, L. T. F., N. Papavero, c.s., 1 ♂; Praia das Vacas, São Vicente, i.1945, M. Carrera, 1 ♀; São Paulo, Horto Florestál, 21.xii.1961, J. Halik, 1 ♀; Guarulhos, ix.1962, R. Franga, 1 ♀ (ZSP). — Sta. Catharina. Sta. Catharina, Lüderwaldt, 3 ♀ (MW). Colonia Hansa, H. Rolle, 1 ♀ (*D. ruficollis* L., det. Schmidt) (Bredin Coll., DEI), 1 ♂ (KU). Sta. Catharina, 1 ♀ (Muche-Radeberg Ank., MD). Corpura, xi.1947, A. Maller, 1 ♀ (AMNH). Blumenau, 1 ♀ (ML). — Mato Grosso. Santo Domingo, viii.1914, Strelnikov & Tanasiick, 1 ♂ (ZIL). — "S Brasil", 1 ♀ (ML).

Paraguay. — Horqueta, 27.v.1933, A. Schulze, 1 ♀ (E. P. Van Duzee Coll., CAS).

Argentina. — "Argentina", 1 ♀ (Bredin Coll., DEI). Alto Paraná, between Corrientes and Possados, 21.xi-xii.1933, K. J. Hayward, 1 ♂ (BM).

Locality unknown: 1 ♂ (Bredin Coll., DEI). 21-25.i, No. 51, Dd Bm 1926-32, 1 ♀ (BM).

Dysdercus urbahni Schmidt

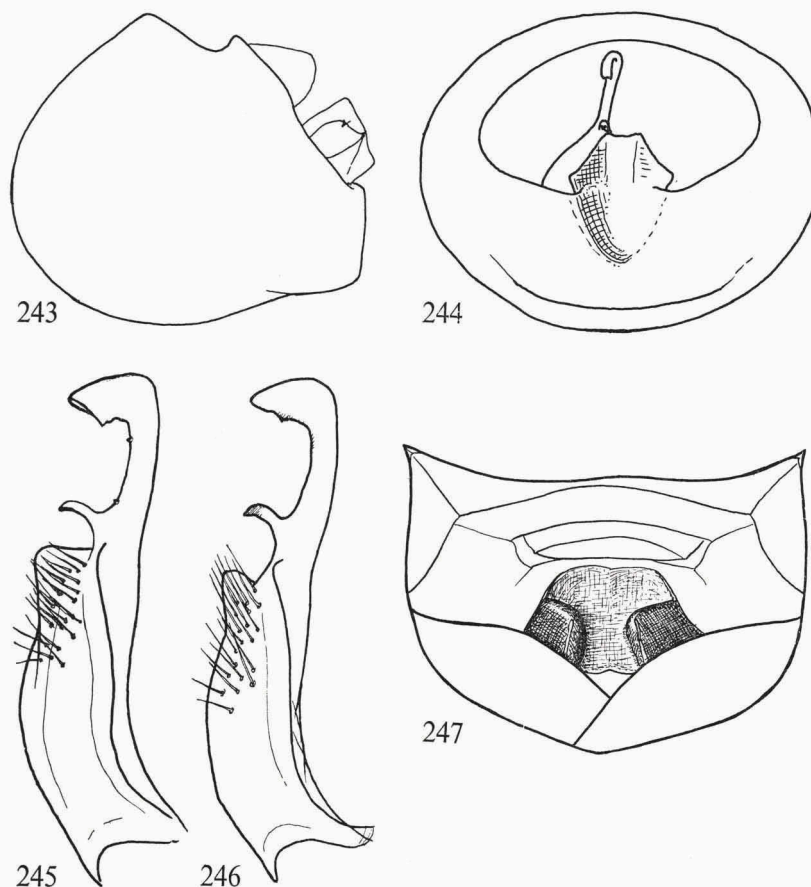
(figs. 242-247; pl. 15 fig. 4)

Dysdercus urbahni Schmidt, 1932, Wien. Ent. Ztg. 49: 273; type locality: Brazil, Santarém, Pará; lectotype ♂, MW! — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 23, 52.

Dysdercus affinis Blöte, 1933, Ann. Mag. Nat. Hist. (10) 11: 601, fig. 2 (capsular lamella); type locality: Brazil, Lower Amazon, Parintins; holotype ♂, BM!, — Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 29.

?*Dysdercus fernaldi*; Lima et al., 1962, Mem. Inst. Osw. Cruz 60: 36 (pro parte: among specimens from Pará and Amazonas).

Structurally closely related to *D. immarginatus* and very similar in habitus; colour differences only slight: corium a deeper yellow, becoming orange towards costal margin and humerus; sterna and pleura yellowish to orange-red, the latter usually blackened anteriorly; white parts tinged with yellow. — Male: Capsular lamella narrower and higher, its width measuring less



Figs. 243-247. *Dysdercus urbahni* Schmidt. 243-244, male, lectotype, genital capsule in lateral and posterior view resp. 245, male, lectotype, right paramere in lateral view. 246, *Dysdercus affinis* Blöte, male, holotype, right paramere in lateral view. 247, *Dysdercus affinis* Blöte, female, allotype, genitalia in posterior view.

than twice its height (21: 12) figs. 243, 244). Paramere (fig. 245) similar to that of *D. immarginatus*, apical spur more recurved. — Female genital characters almost identical with this species; medio-dorsal part of second (fused) gonocoxae narrower (fig. 247).

Length of male 12.0-14.7 mm; length of female 13.0-15.7 mm.

Lectotype designation of *Dysdercus urbahni* Schmidt. — Schmidt based his description on six specimens from "Santarem, Brasilien, 16.v.93", now preserved in the Warsaw Museum. One of these specimens, a male bearing a red type label, is here designated as the lectotype of *Dysdercus urbahni* Schmidt, 1932. The genitalia of this specimen are shown in figs. 243-245.

Material (distribution: fig. 242).

Brazil. — "Brasilien", 1 ♂ (ZSM). — Amazonas. Manaus, vii.1954, 3 ♂, 3 ♀, iv.1955, 7 ♀, 9.ix.1955, 1 ♂, xi.1955, 1 ♂, 30.xi.1955, 4 ♂, 4 ♀, 20.xii.1955, 1 ♀, 13.i.1956, 1 ♂, 1 ♀, 5.iv.1956, 1 ♀, 6.viii.1957, 5 ♂, 10 ♀, x.1957, 1 ♀, 25.x.1957, 21 ♂, 24 ♀, C. Elias & O. Roppa; Reserva Duque, Manaus, xi.1961, R. Arlé (MNR). Manaus, Rio Negro, 6.vii.1941, 1 ♀, Manicoré, Rio Madeira, viii.1941, Parko, 1 ♂ (IOC). Manaus, E. le Moul, 4 ♂, 9 ♀ (ML). Manacapuru, Manaus, vi.1926, 1 ♂, 1 ♀, iii.1928, 1 ♀, S. M. Klages (KU). Rio Autas, viii-ix.1914, Roman, 1 ♂, 2 ♀ (NRS). Manacapuru, x.1936, 1 ♀ (ZSP). Parintins, 4.ii.1896, E. E. Austen, 1 ♂ (holotype of *Dysdercus affinis* Blöte) (fig. 246), 1 ♀ (allotype) (fig. 247) (BM), 1 ♂ (paratype) (ML). Manaus, x-xi.1923, Kuebners, 1 ♂, 3 ♀ (ZMU). Manaus, 20.x.1963, 10 ♂, 14 ♀, Manaus, bords du Rio Negro, x.1963, 12 ♂, 7 ♀, Paraná da Eva, à la lumière, 23.x.1963, 9 ♂, 16 ♀, Careiro, Lac Redondo, 11.ii.1964, 1 ♂, 1 ♀, G. Marlier (BIN). — Pará. Rio Pará, vii.1952, J. C. M. Carvalho, 1 ♀ (MNR). Santarém, 18 ♂, 19 ♀, Rio Trombetas, 3 ♀, E. le Moul (ML). Santarém (FAO), 8.xii.1963, G. Marlier, 15 ♂, 12 ♀; Obidos, 13.i.1936, Croisière du Mercator, W. Adam, 13 ♂, 7 ♀ (BIN). Obidos, 2.ii.1896, E. E. Austen, 1 ♀ (BM).

Dysdercus fernaldi Ballou

Medium-sized species (9.0-12.0 mm) with base of antennal segment 4 white; male genital capsular lamella low; apical spur of paramere cowl-shaped; posterior margin of first gonocoxa of female evenly rounded; sclerites of second gonocoxae fused, flat.

Dysdercus f. fernaldi Ballou

(figs. 248-251, 259; pl. 16 fig. 1)

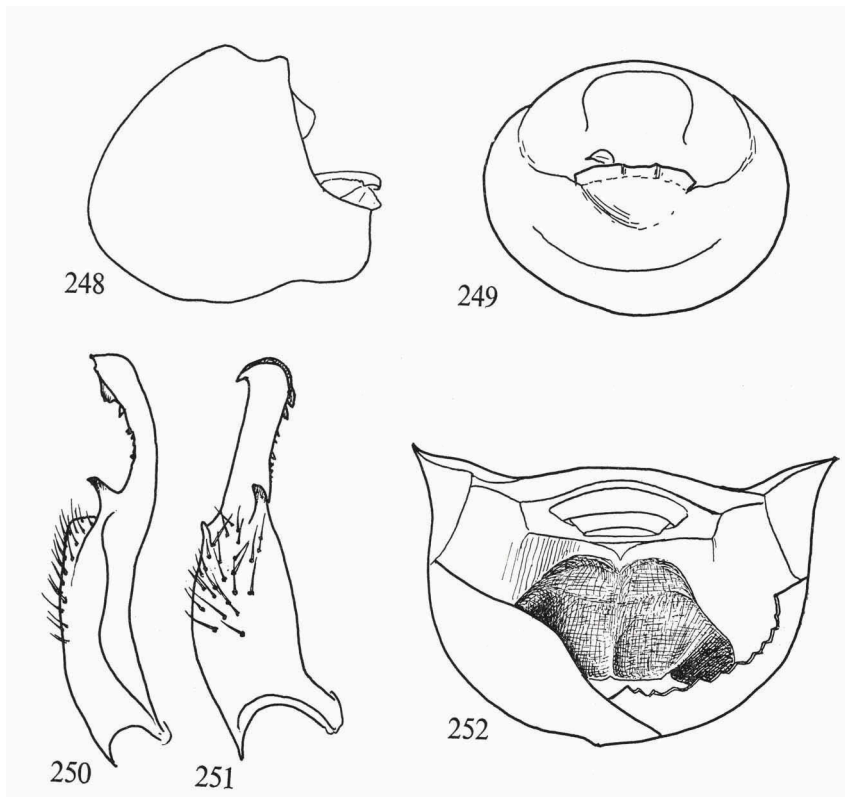
Dysdercus fernaldi Ballou, 1906b, West Indian Bull. 7: 68; type locality: Grenada, B.W.I.; lectotype ♂, BM! — Barber, 1923a, Univ. Iowa Stud. Nat. Hist. 10 (3): 24. — Hussey, 1929, Gen. Catal. Hem. 3: 90. — Blöte, 1931, Zool. Meded. 14: 133. — Pearson,

1932, *Psyche* **39**: 123-126 (pro parte: description on p. 123 and pl. 4 figs. 6-8 are of *D. immarginatus* Blöte). — Wolcott, 1933, *Econ. Ent. West Indies*: 288. — Squire, 1939, *Bull. Ent. Res.* **30**: 289 fig. 1, 290. — Callan, 1947, *Bull. Ent. Res.* **37**: 389, 391. — Hargreaves, 1948, *List Cotton Insects*: 30.

Orange-yellow with disc of pronotum almost entirely blackish.

Head. — Colour orange-red, tylus blackened anteriorly; antenna dark reddish brown to blackish, segment 1 proximally narrowly red, segment 4 proximally yellowish white; labium largely brownish red, labrum, labial segment 4, and middle part of segments 2, 3 more or less piceous.

Thorax. — Pronotal collar yellowish white, often tinged with red, and blackened posteriorly; callus and lateral margin red; pre- and post-callar transverse sulci usually blackened except in midline; ground colour of disc



Figs. 248-252, *Dysdercus fernaldi* Ballou. 248-251, male from Grenada; 248-249, genital capsule in posterior and lateral view resp.; 250-251, right paramere in lateral and posterior view resp. 252, *D. f. fuscofasciatus* Blöte, female from Surinam, genitalia in posterior view.

yellowish white, usually largely suffused with black. Scutellum orange, often blackened at lateral margin. Corium orange-yellow; costal margin, especially proximally, orange; distal corner blackish. Membrane dark brown to blackish; distal border whitish. Ventral surface: pronotal epipleuron red; sterna and pleura orange; collar, posterior pleural borders, and epicoxal lobes white, often tinged with pink. Coxae and trochanters orange; femora dark reddish brown, proximally red; tibiae and tarsi piceous.

Abdomen. — Sternites white to yellowish, lateral margins red, anterior margins blackened. — Male: sternites VI, VII more or less red; sternites VIII, IX (figs. 248, 249) orange; posterior margin of the latter with a semicircular excavation limited dorsally by an erect, narrow lamella with distinct lateral corners, anterior to which the parameres are situated. Paramere (figs. 250, 251) with a short shaft, a distinct mesial shoulder, a slender, somewhat recurved proximal spur, and a short, gradually curved, cowl-shaped distal spur; between the two spurs an irregular row of small teeth along the lateral ridge. — Female (compare fig. 252): sternite VII gradually narrowed posteriorly; first gonocoxa convex distally; sclerites of second pair of gonocoxae fused medially, forming one broad plate, distal margin somewhat raised laterally and extreme lateral corners each ending in a blunt tubercle.

Length of male 9.0-11.0 mm; length of female 10.0-12.0 mm.

Lectotype designation of *Dysdercus fernaldi* Ballou. — In the British Museum I found a male specimen bearing the original label: "726, *Dysdercus fernaldi* Ballou ♂" (his handwriting), and a BM label: "Cotype, Trinidad 1906-172". In the United States National Museum I examined a female labelled: "726, Grenada May 04 Sauters H. A. B. [Ballou], *Dysdercus fernaldi* Ballou ♀" (his handwriting), and: "Type no. 9943 U.S.N.M."; these two specimens are syntypes. Because the male is in better condition, and because the male genitalia have greater diagnostic value than those of the female, this male specimen is here designated as the lectotype of *Dysdercus fernaldi* Ballou, 1906. The specimen is erroneously labelled "Trinidad" in the British Museum because it was received from there, but the type locality is Grenada, as is clear from Ballou's description.

Material (distribution: fig. 259).

Lesser Antilles. — Grenada, 1 ♀ (syntype) (USNM). Trinidad [in error!], 726, 1 ♂ (lectotype) (BM). Grenada, 8.iii.1891, H. E. Summers, 1 ♂, 1 ♀ (ISU). Balthazar (windward side) 2 ♂, 3 ♀, Mount Gay leeward side), 1 ♂, 2 ♀, H. H. Smith (BM), 1 ♂ "det. R. I. Sailer, compared with type; type is ♀; this ♂ agrees in all other respects" (MB).

Dysdercus fernaldi fuscofasciatus Blöte

(figs. 252-259; pl. 16 fig. 2)

Dysdercus fuscofasciatus Blöte, 1931, Zool. Meded. **14**: 121 (descr.), 134, 135 fig. 6c (male genital capsule), type locality: Suriname, Paloemeu, holotype ♂, ML! — Squire, 1939, Bull. Ent. Res. **30**: 281, fig. 1 (distrib.). — Hargreaves, 1948, List Cotton Insects: 30. — Proctor, 1958, Emp. Cotton Grow. Rev. **35**: 107. — Doesburg Jr, 1960, Meded. Landb. proefst. Suriname **22**: 88. — Lima et al., 1962, Mem. Inst. Osw. Cruz **60**: 22, 38.

Dysdercus fernaldi; (nec Ballou, 1906) — Vivas-Berthier, 1941, Bol. Soc. Venezol. Cienc. Nat. **7**: 117. — Dinther, 1960, Bull. Agric. Exper. Sta. Suriname **76**: 31, fig. 8. — Lima et al., 1962, Mem. Inst. Osw. Cruz **60**: 22, 36 (pro parte: mixed up with *D. immarginatus* Blöte and probably also with *D. urbahni* Schmidt; pl. 2 figs. 6-8 (after Pearson) = *D. immarginatus* Blöte). — Vreden, 1964, Meded. Landb. proefst. Suriname **34**: 70.

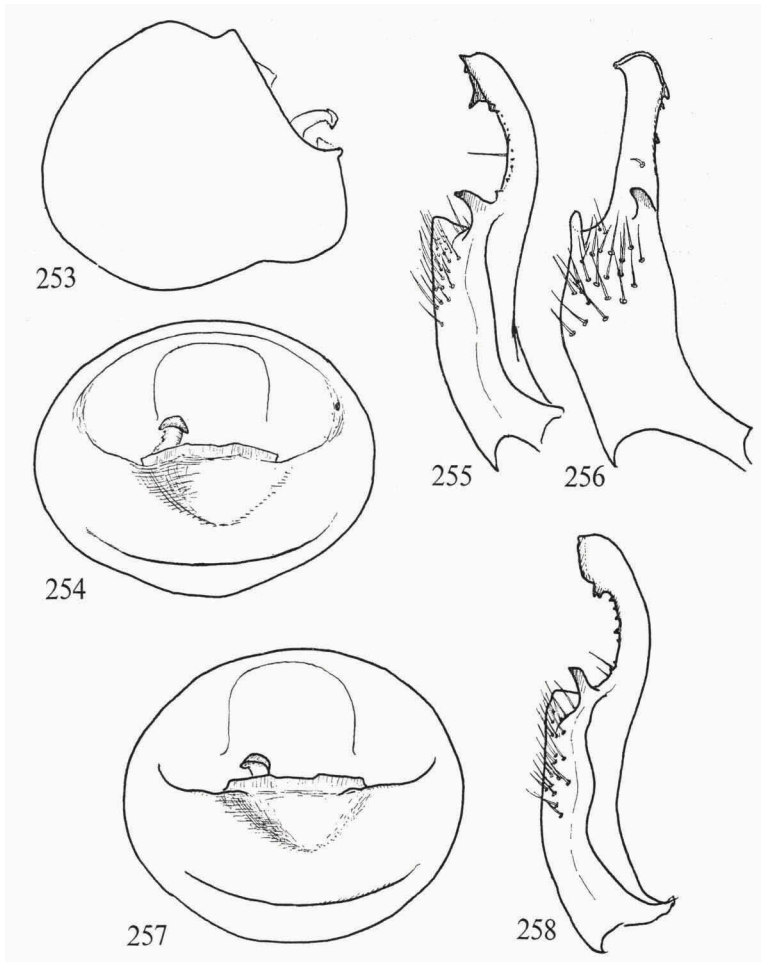
Dysdercus mimus; Schmidt, 1932 (nec Say), Wien. Ent. Ztg. **49**: 265 (pro parte: 3 specimens from Colombia, Rio Magdalena).

Dysdercus austeni Blöte, 1933, Ann. Mag. Nat. Hist. (10) **11**: 601-602 (descr.), fig. 3 (male genital capsule); type locality: Lower Amazon, Parintins; holotype ♂, BM! (new synonym). — Lima et al., 1962, Mem. Inst. Osw. Cruz **60**: 22, 30. — Szumkowski & Fernández Yépez, 1963, Agron. Tropic., Maracay **13**: 85.

Head. — Ground colour red, often with black markings on clypeus, antenniferous tubercles, frons, and neck region; upper surface sometimes almost entirely blackish; antenna brown to black, segment 1 narrowly red proximally, segment 4 with a white annulus proximally. Labrum yellowish brown, base black, labium red, segments 1, 3 often slightly darker; segment 4 black; genae often darkened; ventral surface of head orange-red.

Thorax. — Collar of pronotum white, its posterior margin usually dirty white to blackish; callus and lateral margin red, anterior half of this margin with narrow black border; post-callar transverse sulcus usually black except in mid-line, this black sometimes more or less expanding anteriorly over callus; disc yellow with a more or less broad, transverse, blackish band near posterior border. Scutellum yellow, lateral margin often blackened. Corium yellow, corial cleft, costal margin, and distal corner often more or less blackish. Membrane blackish with distal margin paler. Ventral surface: sterna and pleura orange; collar, posterior pleural margins, and epicoxal lobes white. Epipleuron of pronotum red with a narrow blackish edge. Sulcus posterior to collar and anterior margins of meso- and metapleura often blackish. Coxae, trochanters, and proximal parts of femora red, femora darker distally; tibiae and tarsi reddish brown to black.

Abdomen. — Sternites pale yellow, lateral margins suffused with red; anterior margins of sternites narrowly darkened laterally, especially on sternites VI, VII. — Male: sternite VI entirely, sternite VII on its anterior half, deep red. — Female: sternites VI, VII rather reddish. Sclerites of



Figs. 253-258. *Dysdercus fernaldi* Ballou. 253-256, *D. f. fuscofasciatus* Blöte, male, holotype; 253-254, genital capsule in lateral and posterior view resp.; 255-256, right paramere in lateral and posterior view resp. 257-258, *Dysdercus austeni* Blöte, male, holotype; 257, genital capsule in posterior view; 258, right paramere in lateral view.

segments VIII, IX red. Male and female genital characters (figs. 252-258) as in nominate form.

Length of male 10.5-12.5 mm; length of female 12.0-14.0 mm.

Material (distribution: fig. 259).

Venezuela. — Aragua. Ribera, Lago Valencia, 16.x.1959, Quimbombó (*Hibiscus esculentus*), J. R. Requena, 15 ♂, 4 ♀ (MAC). Maracay, 450 m, 1.x.1945, en algodón, F. Fernández Y. & F. Díaz R., 1 cop.; Hda Santa Maria, Carrt. Cagua — Villa de Cura, 2.iv.1962, P. J. Salinas & M. Gelbéz, 1 ♂ (IZM).

British Guiana. — Demerara, Harpee, 1878, Sharp, 2 ♀ (paratypes of *D. fuscofasciatus* Blöte), 1 ♀ (BM).

Suriname. — Paramaribo, 28.x.1957, 1 cop., 26.xi.1957, 1 ♀, 8.xii.1959, 1 ♂, 1 ♀, P. H. van Doesburg Jr; Paramaribo, Bot. Garden, on *Bombax globosum*, 13.iv.1950, D. C. Geijskes, 1 ♂, 1 ♀; Bot. Garden, on *Hibiscus bifurcatus*, 11.v.1960, 1 ♀, Estate Morgenstond, 7.v.1959, 1 ♀, Estate Morgenstond, on *Hibiscus abelmoschus*, 2.ii.1959, many ♂ and ♀, Estate Morgenstond, underneath a big *Ceiba pentandra*, 6.vi.1960, many specimens with nymphs, Estate Clevia, on Malvaceae, 26.i.1959, 1 ♀, Commewijne, Marienburg, 23.vi.1963, 1 ♀, P. H. van Doesburg Jr; Commewijne, 1911, W. C. van Heurn, 1 ♂; Coppename, Road to Coppenamepunt, km 80 and 96, on *Hibiscus tiliaceus*, 12.iii.1959, many specimens, Coppenamepunt, on *H. tiliaceus*, 10.iii.1959, 1 ♂, Road to Coronie, on flowering Polygonaceae in water, 14.x.1959, 3 ♂, 6 ♀, Coronie, on *H. bifurcatus*, 3.iv.1959, 3 ♀, 2 cop., Suriname River, Afobaka, near river bank, on *H. bifurcatus*, 13.viii.1961, 3 ♂ (two of them very small), and 25.xi.1962, 1 ♀, Kabel, 19.x.1958, 1 ♂, Marowijne River, Galibi, on *H. bifurcatus*, 1.viii.1959, 1 ♂, 2 ♀, Bigiston, on native cotton, *Gossypium peruvianum*, 27.vi.1963, 2 ♂, 2 ♀, P. H. van Doesburg Jr; Paloemeu, v-vi.1961, H. A. Beatty Exped., Mohmin, 2 ♂, 2 ♀; Tapanahoni Exped., ix.1904, A. J. van Stockum, 1 ♂ (holotype of *Dysdercus fuscifasciatus* Blöte) (figs. 253-256), 1 ♂ (paratype); Litani River, Jakoetokondre, 24.iv.1960, Saxton, 1 ♀ (ML).

French Guiana. — Cayen, 1 ♀ (ZIL).

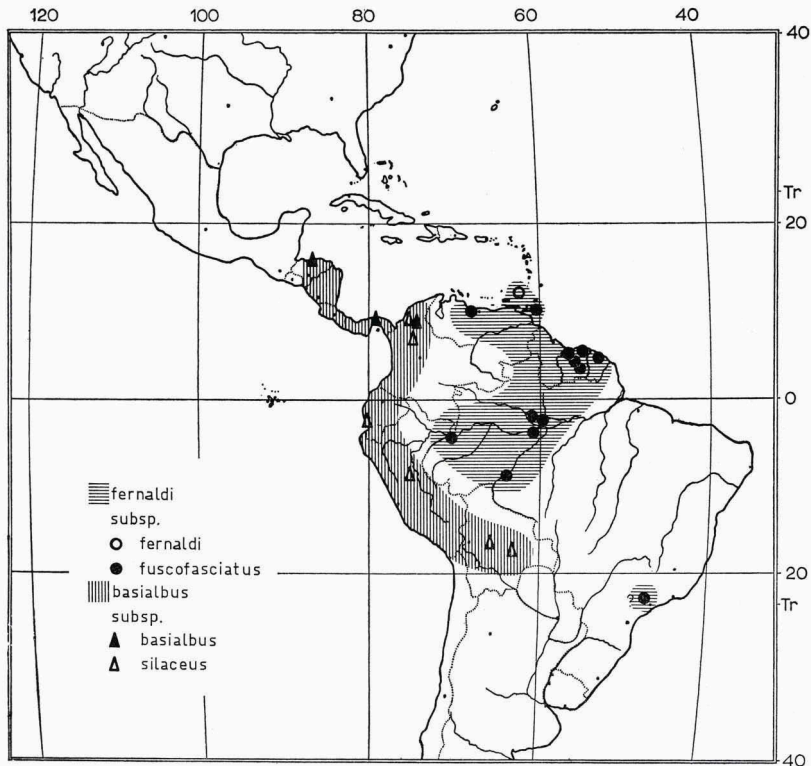


Fig. 259. Distribution of *Dysdercus fernaldi* Ballou, and *D. basialbus* Schmidt.

Brazil. — Pará. 7.i.1896, E. E. Austen, 1 ♂ (BM). — Amazonas. Parintins, Lower Amazon, 4.ii.1896, E. E. Austen, 1 ♂ (holotype of *Dysdercus austeni* Blöte, figs. 257, 258), 1 ♀ (allotype) (BM). Madeira River, Distant Coll., 1 ♀ (paratype of *D. austeni* Blöte) (ML). Manaus, Manacapuru, iii.1926, S. M. Klages, 2 ♂, 1 ♀ (KU). Manaus, 6.vii.1958, 1 ♂, 30.xii.1955, 1 ♂, 2 ♀, 16.i.1956, 1 ♂, 22.ii.1956, 1 ♀, C. Elias & O. Roppa; Rio Purus, 31.i.1955, C. Elias & O. Roppa, 5 ♂, 6 ♀ (MNR). Rio Autaz, Cururu, 24.ix.1914, "Hemipter fr. gulblommig bomultsbuske, tagen på em", A. Roman, 8 ♂, 5 ♀ (NRS). Amazon, 6.xii.1949, J. C. M. Carvalho, 1 ♀, *D. fulvoviger* De Geer, det. J. C. M. Carvalho 1951; Manaus, Rio Negro, 8-24.iv.1941, Parker, 1 ♀, *D. fulvoviger* De Geer, det. J. C. M. Carvalho, 1951 (MB). Benjamin Constant, 18-28.ix.1962, K. Lenko, A. Silva, 4 ♂, 2 ♀; Pôrto Velho, Guaporé, x.1954, S. P. Pereira c.s., 1 ♂ (ZSP). Pôrto Velho, Standford Exped., Mann & Baker, 1 ♂ (MCZ). São Paulo, Guarujá, 3.xii.1939, F. Lane, 1 ♂ (ZSP).
Patria?. — 1 ♂, "alte Sammlung" (ZSM).

Dysdercus basialbus Schmidt

Closely related to *D. fernaldi* Ballou; antennal annulus narrow. Male capsular lamella low trapezoidal, without a lateral angle.

Dysdercus b. basialbus Schmidt

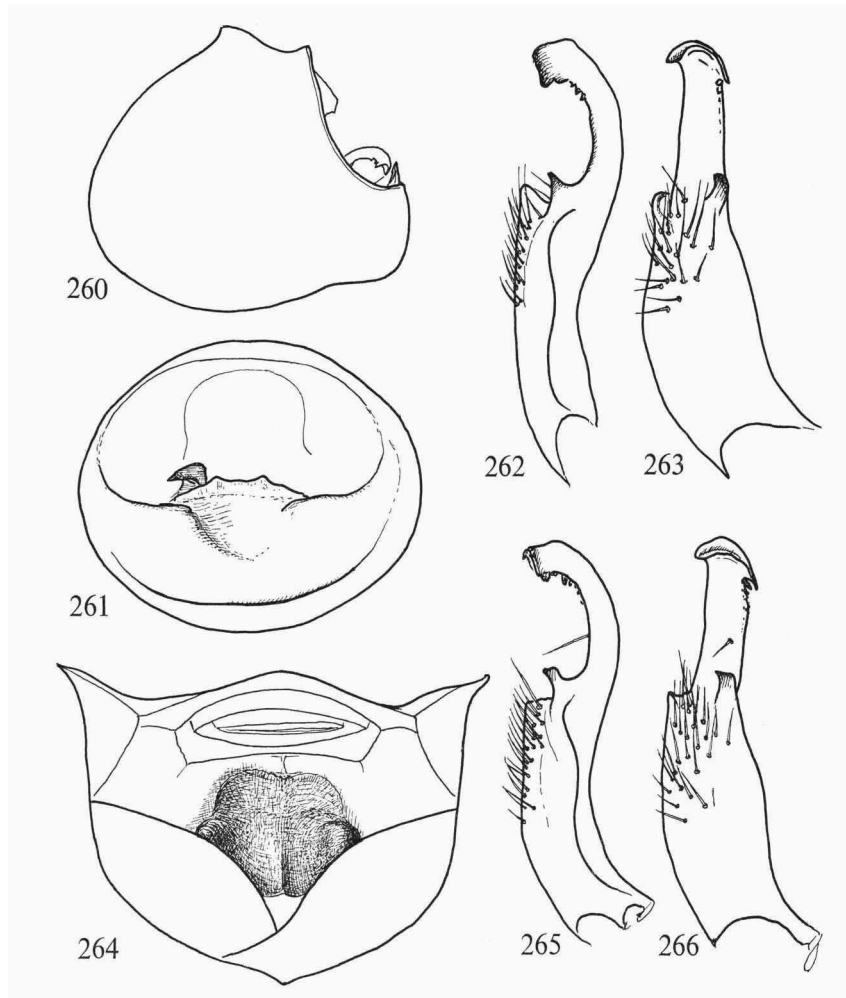
(figs. 259-266; pl. 16 fig. 3)

Dysdercus basialbus Schmidt, 1932, Wien. Ent. Ztg. 49: 268; type locality: Colombia, Rio Magdalena; holotype ♀, MW1

Head. — Colour orange-red to red; antennal segments brownish black, base of segment 1 red, segment 4 with a narrow ($\pm 1/10$) white annulus proximally. Labium reddish, segment 4 blackened distally.

Thorax. — Anterior part of pronotal collar white, posterior part blackened or red; callus red, sometimes suffused with black centrally; disc yellow with a more or less extended blackish area near yellow posterior margin, sometimes disc almost entirely black; lateral margin orange to red; edge blackened, especially anteriorly. Corium yellowish white; a patch near middle reaching costal edge, costal edge, apical corner, and membrane brownish black to black; distal margin of membrane greyish white. Ventral surface: collar, posterior pleural margins, and epicoxal lobes white; sterna, pleura, pronotal epipleuron, coxae, trochanters, and femora orange to red, the latter darkened or blackened dorsally and distally; remaining parts of legs brown to blackish. Ostiolar peritremes reddish.

Abdomen. — Sternites yellowish white, lateral parts reddish, anterior margins red or darkened to blackish, those of segments V-VII enlarged; genital segments red. — Male: genital characters closely resembling those of *D. fernaldi* Ballou and *D. immarginatus* Blöte; capsular lamella (figs.



Figs. 260-266. *Dysdercus basialbus* Schmidt. 260-263, *D. b. basialbus*, male from Honduras; 260-261, genital capsule in lateral and posterior view resp.; 262-263, right paramere in lateral and posterior view resp. 264, *D. b. basialbus*, female from Honduras, genitalia in posterior view. 265-266, *D. b. silaceus* nov. subsp., male, paratype from Colombia, right paramere in lateral and posterior view resp.

260, 261) low, trapezoidal, without lateral projecting angles. Proximal spur of paramere (figs. 262, 263) short, head more curved. — Female (fig. 264): first gonocoxa reduced, evenly rounded; sclerites of second gonocoxae fused, forming one plate-like structure.

Length of male 11.5-14.0 mm; length of female 13.4-15.2 mm.

Material (distribution: fig. 259).

Honduras. — La Ceiba, 8-10.iii.1941, H. C. Cook, 10 ♂, 4 ♀ (CAS).

Panama. — Barro Colorado I., Canal Zone, iv-v.1939, Jas Zetek, No. 4420, 1 ♂, 2 ♀, 3 nymphs (USNM).

Colombia. — Rio Magdalena, 1914, E. Pehlke, 1 ♀ (holotype), 1 ♂, 1 ♀ (*Dysdercus mimus* Say, Edm. Schmidt det., 1931) (MW).

***Dysdercus basialbus silaceus* nov. subsp.**

(figs. 259, 265, 266; pl. 16 fig. 4)

Posterior part of pronotal collar, callus, and lateral edge of pronotum without black suffusions, blackish area on disc usually restricted to a narrow fascia near posterior margin. Corium yellow, without a black patch near middle; corial costal margin without blackish suffusion. Paramere: figs. 265, 266.

Material (distribution: fig. 259).

Colombia. — Rio Magdalena, 1914, E. Pehlke, 1 ♂ (figs. 265, 266), 1 ♀ (paratypes) (MW). Puerto Berrio, Antioquia, 5.viii.1938, H. Dybas, 1 ♂ (paratype) (CNHM).

Ecuador. — Guayaquil, F. Campos, 1 ♂ (USNM); a small specimen with head and scutellum black, excluded as paratype.

Peru. — Cumbase, 1 ♀, Iguapa, 1 ♀ (Muche-Radeberg Ank., MD). Puerto Inca, Rio Pachitea, 1 ♀ (ML). (paratypes).

Bolivia. — Cristal Mayu, Chapare, Cochabamba, 800 m, F. Steinbach, 1 ♂ (holotype) (pl. 16 fig. 4), 1 ♀ (allotype) (ML). Santa Cruz, Steinbach, 1926, 1 ♀ (ZIL), 1 ♂ (BM) (paratypes).

INFRAGENERIC RELATIONSHIPS

During the present taxonomic study, originally undertaken merely to obtain a classification based on morphological characters, a number of interesting facts emerged. Although these facts justify a more detailed account of some of the problems concerning the phylogenetic relationships within the group under revision, the restrictions inherent in the present treatment of the subject make it impossible to discuss this matter thoroughly. To do so would have required consideration of several other aspects, such as internal organ systems, nymphal features, egg shell structure, etc., as well as a study of the phylogeny and geography of the food plants. Lack of time prevented such extensive studies and, moreover, little is known about the biology, ecology, physiology, and genetics of most of the species. Consequently, the conclusions drawn are necessarily rather speculative and preliminary, and are presented only as a basis for further study.

To study the interspecific relationships in a genus, we must in the first place consider which characters are most likely to supply data on such relationships. In the second place, we must try to evaluate the phylogenetic importance of these characters in order to determine whether they are to be regarded as primitive or as derived. To obtain a picture of the phylogenetic trends within the genus *Dysdercus*, representatives in both hemispheres must be taken into consideration.

The family Pyrrhocoridae consists of about thirty genera, all of which are found in the Old World; most species inhabit the tropics (Hussey, 1929: 7). If we exclude the case of *Pyrrhocoris apterus* (L.), the New World Pyrrhocoridae consists only of a single subdivision of the genus *Dysdercus* (fig. 267). The former species was apparently introduced fairly recently by human agency and has been found in two widely separated localities (Distant, 1883: 228; Pittier & Biolley, 1895: 20, Costa Rica; Barber, 1911: 111, New Jersey). It is, therefore, obvious that the origin and development of the family as a whole took place in the Old World and that the American stock must have been derived from immigrants.

The Old World *Dysdercus* species by no means constitute a homogeneous group. Freeman (1947: 380) divides this assembly of species into two sections on the absence or presence of vertical processes of the ninth segment of the male. These processes (inferior accessory process, Sharp, 1890; genital embracer, Yang, 1938) are formed by the dorsal elongation of a

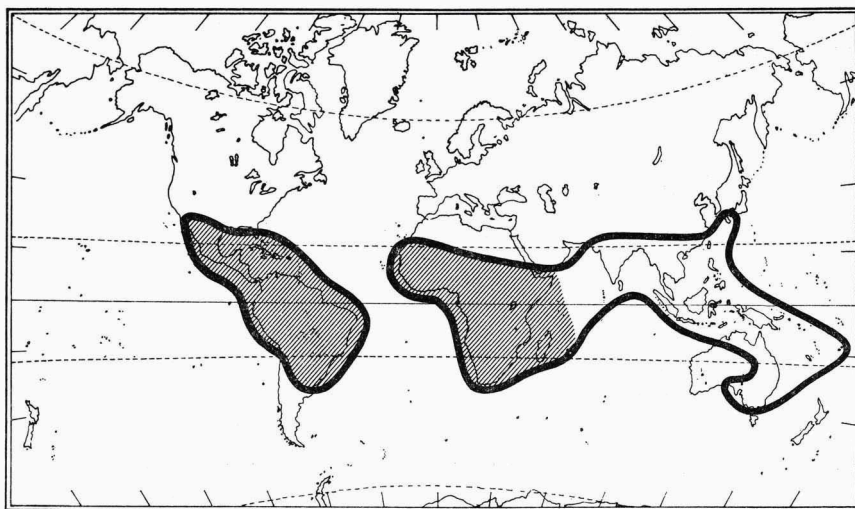


Fig. 267. Distribution of the genus *Dysdercus*, and its subgenus *Dysdercus s. str.* (shaded).

paired structure on the floor of the genital atrium. The distribution of the group with the vertical processes (Section II) is almost purely Oriental, with the exception of one very rare East African species. Section I, on the other hand, exclusively inhabits the Ethiopian Region. This section is subdivided into two groups, a and b, according to characters of the ninth segment of the male and of the spermatheca of the female. Furthermore, as can easily be seen from Freeman's figures 27-32, these groups can also be distinguished by the shape of the parameres.

The genital structures of the American species closely resemble those of group Ia of the Ethiopian Region. The American species also lack the vertical process; the posterior margin of the genital capsule is not conically produced, except to some extent in *D. andreae*; in structure and shape the parameres are all very similar, and the female genitalia also show little variation. There are further points of resemblance: the posterior lip of the genital capsule in *D. superstitiosus* (Fabricius), a wide-spread African species, has a median excavation on either side of which there stands a small tooth, the dorsal edge being bordered by an erect, transverse lamella, exactly as that found in the American species. The parameres of this African species are very similar to those of *D. maurus*, which also holds for the genital structures of the female.

Thus, it is quite probable that the American species are most closely related to those of Freeman's group Ia and that they originated from the Ethiopian Region¹). The question of when and how they reached the New World is a subject of great interest, but beyond the scope of this study.

The New World *Dysdercus* do not differ essentially from those of the Old World in external morphology. Since these characters are usually very conservative and reasonably constant within the genus, they are of little or no value for the determination of infrageneric relationships.

The colour pattern, on the other hand, is very variable within the genus, although all seemingly different designs are based on a common pattern. The basic pattern is composed of a yellow to reddish ground colour, a dark fascia posterior on the pronotum, and a black dot on each of the hemelytra which latter two spots may be absent. Blackish suffusions on various parts of the body often obscure the original pattern. The common pattern can be considered an archaic feature, still present in most species but lost or concealed in some of them. However, the fact that even within some species

1) In two recent papers on Old World Pyrrhocoridae Stehlik (1965) designates the four "groups" of Freeman as subgenera *Dysdercus* Guérin (Ia), *Neodysdercus* Stehlik (Ib), *Paradysdercus* Stehlik (IIa) and *Megadysdercus* Breddin (IIb). He considers all American species to belong to *Dysdercus* s. str.

this pattern is highly variable, as we have seen in *D. obscuratus*, *D. basialbus*, *D. ruficollis* etc., proves that it cannot be regarded as a reliable indicator of phylogenetic relationships.

The pigmentation of the basal part of antennal segment 4 may be of greater value in this respect. In sixteen species this part is white, while in the others it is blackish and concolourous with the rest of the segment. This character is very constant within the species (except in *D. peruvianus*) and, as far as I have been able to observe, in the last nymphal stages it agrees with that of the adults. (*D. basialbus*, *D. chaquensis*, *D. fernaldi*, *D. fulvoniger*, *D. maurus*, *D. ruficollis* with a white annulus; and *D. andreae*, *D. concinnus*, *D. mimulus*, *D. mimus*, *D. obscuratus*, *D. suturellus* without a white annulus).

In view of the fact that the colour pattern of the other parts of the body of the nymphs is different from that of the adults, this could suggest that the presence or absence of the antennal ring is to a considerable extent independent of the rest of the pattern. This idea is supported by the fact that in species with differently patterned subspecies, the antennal character is not affected (*D. mimus*, *D. obscuratus*, *D. basialbus*). In view of the variability of the colour pattern in general, this could suggest that the phylogenetic value of the antennal character is greater than that of the other colour characters. On the other hand, in some of the species groups which are mainly based on genital structures the presence of the antennal ring is not constant and, furthermore, there is strong evidence that this character is geographically correlated. These facts compel us not to overestimate the phylogenetic value of the character.

Since none of the Old World species possesses a white antennal annulus in the adult stage, it seems likely that the original invaders of the New World had an entirely black antenna, and that the white ring made its appearance at a later date. However, according to Pearson (communicated by Freeman, 1947: 375, 381) the antenna of the East African species *D. cardinalis* Gerstaecker (group Ia) has a white annulus in the nymphal stage. If this is indeed the case, the white ring may be a much older nymphal feature in the genus, becoming manifest in the adults in the New World.

The genital characters of the American species are very constant within the species, but vary widely within the genus. We can, however, divide the species into groups, each of which have several genital characters in common; we assume the species within such a group to be more closely related among themselves than they are to species of other groups.

In a similar way, based mainly on the male genitalia, Freeman divided the Old World species of *Dysdercus* into four groups. Since in this case the genital differences involved are of a much more profound nature than

occurs between the American species, Freeman's groups are of a higher taxonomic level (subgeneric): the groups considered in the present study are to be regarded as species groups within a subgenus. In considering the phylogenetic validity of such groups based on similarities, the possibility of convergence of course cannot be wholly excluded, but this can be reduced to a minimum by comparison of several structures.

The structure of the paramere, the most characteristic part of the male genitalia, is sufficiently complex to exhibit several features from which relationships may be deduced. The shape and the pubescence of the shaft, the "shoulders", the position of the "head" on the shaft and particularly the development of the two spurs, provide reliable characters for determining to which group a species may belong.

One interesting question is whether the double spur is a primitive or a derived feature. Most of the New World species have a double spur, like the African species to which they are thought to be related. Therefore this feature may be the original condition in the American group. In the few American species possessing only one spur on each paramere this condition is probably secondary, resulting from the reduction of the double spur. It is impossible to state here whether in the genus as a whole the double spur is primitive or derived, since that would require a study of the genitalia throughout the family.

The posterior margin of the genital capsule also provides valuable comparative characters, especially where exceptional development has taken place, such as a capsular lamella having been formed or the margin showing an unusual depression. The presence of a small tooth on both sides of such a depression is also a useful character, although this is sometimes difficult to observe.

In the female the differences are probably less characteristic than in the male, because the gonocoxae consist of rather simple valves, structures which evidently have only limited possibilities for variation. Probably, the first pair of gonocoxae have developed from rectangular valves entirely covering the genital area, a condition observed in most bugs. Where these gonocoxae become narrower and the genital area is more or less exposed, as is seen in many *Dysdercus* species, the condition is considered to be derived. The sclerites of the second pair of gonocoxae originally were entirely separate and are found as such in most species. Therefore, fusion of them is a derived condition; it is often accompanied by a reduction of the first pair of gonocoxae. Various relevant details will be discussed under the species groups.

In attempting to classify the American species we can best start with a few

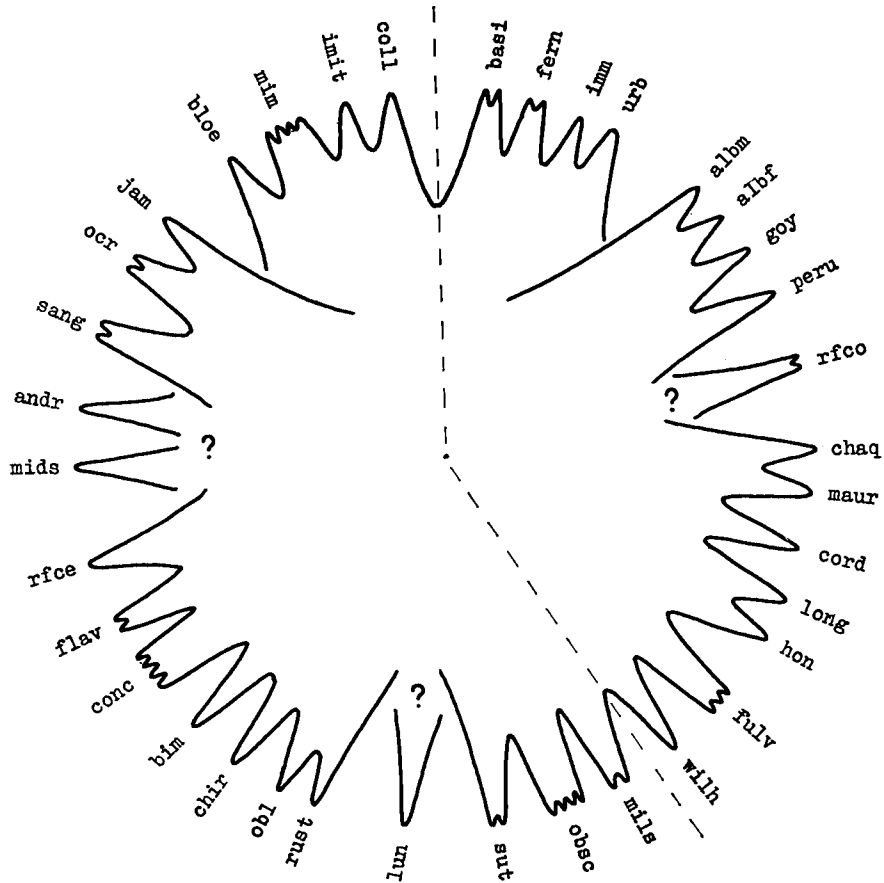


Fig. 268. Diagram ("lichenogram") showing the supposed relationships between the American species of *Dysdercus*. Centre of the circle suggests the probable monophyletic origin of the group, whilst the outermost level represents the present state of speciation. Depth of indentations correspond to supposed phylogenetic level of speciation. Smallest indentations indicate sub-specific differences (= geographic races). The broken line through the diagram roughly separates species with and without a white antennal annulus.

- | | | |
|-----------------------|----------------------|---------------------|
| albf = albofasciatus | flav = flavolimbatus | mim = mimus |
| albm = albomaculatus | fulv = fulvoniger | obl = obliquus |
| andr = andreae | goy = goyanus | obs = obscuratus |
| basi = basialbus | hon = honestus | ocr = ocreatus |
| bim = bimaculatus | imit = imitator | peru = peruvianus |
| bloe = bloetei | imm = immarginatus | rfce = ruficeps |
| chaq = chaquensis | jam = jamaicensis | rfco = ruficollis |
| chir = chiriquinus | long = longirostris | sang = sanguinariis |
| coll = collaris | lun = lunulatus | sut = suturellus |
| conc = concinnus | maur = maurus | urb = urbahni |
| cord = cordillerensis | mids = mimuloides | wilh = wilhelminae |
| fern = fernaldi | mils = mimulus | |

pairs of species whose genital structures are so similar that they can safely be assumed to be closely related. Three examples of such pairs are: *D. immarginatus* - *D. urbahni*, *D. maurus* - *D. chaquensis*, and *D. honestus* - *D. longirostris*.

When the parameres of these species pairs are compared, it is immediately evident that the second and third pairs show a closer resemblance to each other than to the first pair. The same holds true for virtually all other genital structures. An obviously much closer relationship exists between the pairs *D. maurus-chaquensis* and *D. honestus-longirostris* than between either of them and *D. immarginatus-urbahni*.

All species may be compared in this manner; most of them fall into several more or less well-defined species-groups. However, there remain a few species for which it is much more difficult to establish any similarly direct relationship. This is particularly true of species in which the parameres possess only a single spur.

The circular diagram (fig. 268) shows the probable relationships between the American species. The centre represents the origin of the entire group and the outer circle shows the present situation. The various species are arranged on this circle in such a way that the most closely related are near each other but separated by indentations whose depth indicates the degree of relationship, i.e., the deeper the indentation the less distinct the relationship. The depth of the indentations is, of course, arbitrary, but serves to indicate the successive phylogenetic levels, especially in respect of species and subspecies.

The broken line through the middle of the diagram roughly separates species with and species without a white annulus on the antenna. The distinction might indicate a primary evolutionary dichotomy around this character.

The *Dysdercus fernaldi* group. — The species *D. fernaldi* Ballou, *D. basialbus* Schmidt, *D. immarginatus* Blöte, and *D. urbahni* Schmidt constitute a well-defined and closely knit group of species; the parameres, capsular lamella and gonocoxae are strikingly similar in shape. The shaft of the paramere shows a marked mesial shoulder and is setose only on the apical half; the proximal spur is small, but the distal spur consists of a short but well-developed hook on which there is a scooped-out cavity (figs. 236, 237). A row of denticles may be present between the spurs. The posterior margin of the male genital segment shows a lamella which is marked off into three parts by two vertical pleats (fig. 235). In the female the first pair of gonocoxae show a modest amount of reduction; the second pair of gono-

coxae have become fused and the lateral folds are inclined outwards. In the male the degree of specialization can be deduced initially from the shape of the capsular lamella: a progressive increase in the height of this lamella can be traced through the series *D. basialbus* - *fernaldi* - *immarginatus* - *urbahni*. Further specializations are, in the female, an increase in size of the lateral papilla of the fused second pair of gonocoxae; in the male an extension of the head of the paramere combined with an increased curvature of the distal spur. All of the species of this group have a white annulus at the base of antennal segment 4.

The distribution of *D. immarginatus* is remarkable in that it appears to be discontinuous into two main regions: Venezuela, Trinidad and part of Colombia in the North, and southeastern Brazil and the eastern half of Paraguay in the South (fig. 242). However, the discovery of a few specimens from Peru suggests that the distributional pattern in fact is either continuous or only recently became discontinuous: there is of course the possibility that its distribution has been influenced by man. In any case, it is clear that *D. immarginatus* does not occur in the Amazon Basin, a pattern of distribution not uncommon in other insects, e.g. *D. peruvianus* and *D. ruficollis*; also in other orders, e.g. Odonata (communicated by Dr. D. C. Geijskes).

In marked contrast *D. urbahni*, another species of this same group, has a distribution apparently limited to the Amazon Basin (fig. 242). This species, which is so closely related to *D. immarginatus* that a subspecific rank for it could be argued, very probably represents a recent dichotomy from *D. immarginatus* or its ancestor.

The *Dysdercus mimus* group. — *D. collaris* Blöte, *D. imitator* Blöte, *D. mimus* (Say) and *D. bloetei* Doesburg, all without a white antennal annulus, constitute another well-defined group, clearly related to the group of *D. fernaldi*. In this group the genital opening of the male ninth segment is large, the capsular lamella hardly developed, and the proximal spur of the paramere particularly well developed and also markedly widened. In the female the first pair of gonocoxae is reduced to a varying extent and the second pair completely fused. The representatives of this group resemble each other in general facies. Their distribution appears to be restricted to the western part of South America, except for *D. mimus* which is also widely distributed in Mexico, Central America, the Guyanas, and the Amazon Basin.

The paramere of *D. collaris* seems to be the most primitive in this group, although the unusual mesial rotation of the well-developed distal spur indicates a certain specialization. This species may be seen as a transitional

form, closest to the *D. fernaldi* group. On the other hand, *D. bloetei* represents the most advanced species in this group: the proximal spur is extremely widened, the distal spur strongly reduced, and the whole head of the paramere curiously curved (figs. 40, 41). The latter species also shows a notable reduction of the hairs on the shaft of the paramere.

The *Dysdercus jamaicensis* group. — This group comprises the species *D. jamaicensis* Walker, *D. ocreatus* (Say), and *D. sanguinarius* Stål, all endemic inhabitants of the Greater Antilles. The first two species are undoubtedly closely allied to each other and cannot be assigned to one of the other groups; they show characters that point towards a relationship with the group of *D. fernaldi* and to a lesser degree also with that of *D. mimus*. In the male *D. jamaicensis* the shape and pubescence of the shaft, the well developed shoulder, and the relative dimensions of the spurs closely resemble those of the species in the group of *D. fernaldi*. The same is true of the capsular lamella, which is distinct although poorly developed. In the female the structure of the second pair of gonocoxae also closely resembles that of the same group. Probably the present group diverged from an ancestor of *D. fernaldi*. The absence of a white antennal ring in the group of *D. jamaicensis* supports the hypothesis that the divergence took place at an early stage. *D. jamaicensis* is restricted to the island of Jamaica. *D. ocreatus* very probably sprang from the *D. jamaicensis* stock on the neighbouring island Hispaniola and migrated from there to Cuba and Puerto Rico. Compared with *D. jamaicensis*, *D. ocreatus* is somewhat smaller and shows a reduction of the distal spur and capsular lamella in the male; in the female, the second gonocoxae are slightly less prominent. Another closely allied species is *D. sanguinarius*, which is distributed over more or less the same area as *D. ocreatus*. *D. sanguinarius* is probably the original endemic species of Cuba; it has become dispersed over the neighbouring islands of Hispaniola and Puerto Rico. On the latter island it has developed the subspecies *neglectus*. *D. ocreatus* may have originated from Hispaniola and has developed a subspecies on Cuba, viz., *D. ocreatus fervidus*. This type of distribution completely agrees with the data on mammals analyzed by Simpson (1956). This author suggests that: "..... the Greater Antilles are a zoogeographic dead end" with which conclusion our results for *Dysdercus* agree. It is indeed unlikely that the above-mentioned species reached the Greater Antilles via the Lesser Antilles.

The *Dysdercus flavolimbatus* group. — This group is of a somewhat more heterogeneous nature and is composed of the species: *D. ruficeps* Perty, *D. flavolimbatus* Stål, *D. concinnus* Stål, *D. bimaculatus* Stål, *D. chiriquinus*

Distant, *D. obliquus* Herrich-Schäffer, and *D. rusticus* Stål. The group is characterized by a rather large, only sparsely hirsute shaft to the paramere, which has a mesial shoulder and a head with two spurs, the distal one of which may be reduced or even entirely absent; the capsular lamella is almost completely lacking. The female has slightly reduced first gonocoxae and well-separated second gonocoxal sclerites. *D. flavolimbatus* and *D. concinnus* both have a rather aberrant genital capsule (figs. 83, 89) and a paramere with a characteristic mesial shoulder curving anteriorly (figs. 85, 91); these characters are the main reason for keeping the two species close together. In *D. concinnus* the distal spur has been reduced to a short hook, which is in accordance with a more mesial implantation of the second gonocoxal sclerites in the female. In *D. bimaculatus* the distal spur is markedly reduced and is present only as a rudiment on the apical margin of the remaining proximal spur. In *D. chiriquinus* the paramere has only one hook-like spur and it seems to be the distal spur that has disappeared entirely, but in this respect the placement of this species within the *D. flavolimbatus* group is rather speculative. With respect to its habitus, *D. chiriquinus* resembles *D. rusticus*, with which it shares a prolonged rostrum. The rostrum of the former, however, is much more prolonged than that of the latter, thus suggesting a higher degree of specialization in its food habits. In their distribution these species do not overlap, which may be an indication of a recent evolutionary divergence. Judged from their genital characters, *D. rusticus* is more closely related to *D. obliquus* and externally they are also fairly similar except for the normal length of the rostrum of the latter; they are both virtually allopatric. It is noteworthy that externally *D. obliquus* shows a more detailed similarity to *D. bimaculatus* than to *D. rusticus*, but on genital characters the closer relationship is between *D. obliquus* and *D. rusticus*.

The *Dysdercus maurus* group. — It is proposed to call the following assemblage of species the group of *D. maurus*. The following species are considered to belong to this group: *D. suturellus* Herrich-Schäffer, *D. obscuratus* Distant, *D. mimulus* Hussey, *D. wilhelminae* Doesburg, *D. fulvoniger* (De Geer), *D. honestus* Blöte, *D. longirostris* Stål, *D. cordillerensis* Doesburg, *D. maurus* Distant, and *D. chaquensis* Freiberg. The representatives of this group show the following characters: (male) shaft of paramere with a lateral shoulder, strongly hirsute; head of paramere with two spurs, proximal spur recurved, large, shaped like the thorn of a rose; capsular lamella usually well developed; (female) first pair of gonocoxae usually well developed, second pair of gonocoxae as a rule not fused. All species except *D. mimulus*, *D. obscuratus*, *D. suturellus*, and *D. cordillerensis*, have a white

ring at the base of antennal segment 4. *D. maurus* and *D. chaquensis* are closely allied species, as can be immediately seen upon examination of the genitalia. These species are allopatric, at least according to present data; the border line between these two species runs approximately along 46° W across the Brazilian states Minas Gerais and São Paulo (fig. 196). With respect to the understanding of the true relationship between the two forms, this area is of special interest. If they occur here together without interbreeding, this would be strong evidence that they are both well established species. It is clear, however, that if there is an interbreeding zone, it cannot be very broad. I have not yet seen specimens from this area. *D. honestus* and *D. longirostris* are also closely allied species, as shown by their genitalia; however, they differ in length of the rostrum, which is particularly produced in the latter species. *D. longirostris*, unlike *D. honestus*, occupies only a very restricted area (fig. 174) and its long rostrum suggests adaptation to some special host plant (?*Sterculia excelsa*; Dr. P. Silva, in litt.). Regarding their distribution, it is clear that *D. honestus* is a species inhabiting inland regions and *D. longirostris* is restricted to the coastal area. This restriction is also explicable in terms of specialization to different food plants. They may be partly sympatric, but there is no evidence that they interbreed.

Judged from the male and female genitalia, *D. cordillerensis* may be placed between the above two pairs of species; the male structures agree fairly with those of *D. maurus*, whereas the female structures more closely resemble those of *D. honestus*. It is highly probable that in *D. cordillerensis* the white annulus of the fourth antennal segment is lost secondarily; in some of the specimens this segment is proximally somewhat paler in colour. Of the remaining species, *D. wilhelminae* seems to be most closely allied to *D. honestus* particularly with regard to the male and female genital structures; here the parameres have a slightly reduced apical spur, and there is a general similarity in the posterior margin of the genital capsule where only the capsular lamella is strongly enlarged. In this species the white antennal annulus is still fairly well-developed although obviously reduced. In the females of *D. wilhelminae* and *honestus*, most structures are also closely comparable. *D. fulvoniger* stands apart from the other species of the group. In the female the second pair of gonocoxae are displaced laterally and its members are widely separated by a membrane, while the first pair are somewhat reduced. In the male genitalia the lamella is normally developed and the apical spur of the paramere strongly produced. It is likely that at an early stage this species diverged from the ancestors of the *D. maurus* group. The same may also apply to *D. mimulus*, which has fairly simple genitalia closely resembling those of *D. honestus* and *D. maurus*. In the

writer's opinion, *D. mimulus* should be included in this group; although the white antennal annulus is completely absent; the parameres, the simple capsular lamella, and the structure of the female gonocoxae fully agree with those of other members of the group. It is possible that in this species the antennal annulus has been secondarily obscured by the generally strong development of dark pigmentation apparent in most parts of the body cuticle.

Superficially, *D. obscuratus* stands apart from all other species because of its unusually shaped pronotum and its markedly shiny head and callus. However, the genitalia closely resemble those of *D. mimulus*. Consequently, we have to consider the possibility that *D. obscuratus* diverged at an early stage. This view is supported by the presence of an unusual secondary denticle on the base of the apical spur of the paramere, and the wide distribution involving geographical subspecies. On the evidence of male genitalia it seems likely that *D. suturellus* belongs to the same category. It should be noted that the distribution of the latter three species is partially sympatric.

The *Dysdercus albofasciatus* group. — The species of this small group, *D. peruvianus* Guérin Méneville, *D. goyanus* Doesburg, *D. albofasciatus* Berg, and *D. albomaculatus* Doesburg, have genitalia of a less specialized pattern but otherwise show some affinity with the group of *D. fernaldi*. They may be considered the progeny of less specialized ancestors of this group, which probably resembled *D. collaris*. Structural specialization in the male genitalia has led to the production of secondary spurs on the parameres; the female system, however, shows only a modest reduction of the first pair of gonocoxae and a similarly small amount of fusion in the second pair. Of this group, *D. albofasciatus* and *D. albomaculatus* are closely allied; both have an aberrant colour pattern, viz., black with white spots on the corium. These species probably occupy an unusual niche for which the pattern may have survival value; they are allopatric, but the niches they occupy could be very similar. *D. goyanus* is quite normal as far as pattern and colour are concerned; the genitalia (known only from the male) do not show any appreciable degree of specialization. Attention is drawn to the remarkably long white annulus, which occupies about one third of antennal segment 4. Unfortunately the only known specimen of this species has lost one of its antennae, so that there is a possibility that the exceptional antennal ring is merely an individual aberration. *D. peruvianus* has parameres closely resembling those of *D. albomaculatus*; however, the posterior margin of the male genital segment is markedly different, which makes one hesitate to classify *D. peruvianus* in the present group on other than a tentative basis. In the female the second gonocoxae are separate and resemble those of *D. ruficollis*

to some extent; the same applies to the afore-mentioned posterior margin of the male genital capsule.

Species not referable to any group. — *D. andreae* (L.), *D. mimuloides* Blöte, *D. lunulatus* Uhler, and *D. ruficollis* (L.) now remain for consideration; on the characters utilized, these four species do not fit satisfactorily into any of the groups discussed above. The parameres of *D. ruficollis*, *D. lunulatus*, and *D. mimuloides* have become reduced to such a degree that only one spur remains. It is impossible to state with certainty which spur has disappeared, although an apical knob in *D. mimuloides* suggests that here it is the distal spur that has been thus reduced. Other genital characters such as the shape and pubescence of the shaft, the capsular lamella, and, in the female, the scarcely reduced first gonocoxa, resemble characters of the group of *D. maurus*; on the other hand, the fused second gonocoxae could suggest a relationship with the group of *D. fernaldi* or that of *D. mimus*. We must conclude that *D. mimuloides* diverged at such an early stage that it has now become difficult to discover any direct relationships. The species does, however, share a few characters with *D. andreae*. The females of both these species have scarcely reduced first gonocoxae and the second gonocoxae are fused. The male genitalia of *D. andreae* somewhat resemble those of *D. mimuloides* in the shape of the paramere shaft, in that both possess a well developed lamella sited deep inside the genital capsule and also in having two denticles on the posterior margin of this capsule. In the former species these teeth are situated near the very edge of the strongly extended posterior margin. *D. mimuloides* occurs on the Pacific coast near the border between Central and South America; *D. andreae* has a Caribbean distribution. Because of their respective distributions the author placed these species next to those of the Caribbean area and the species of the group of *D. flavo-limbatus* from Central America.

The other two difficult species, *D. ruficollis* and *D. lunulatus*, similarly possess reduced parameres: not only the shaft but also the head, which bears only one hook (figs. 124, 205), is reduced in size; both have a simple posterior margin to the genital capsule. In the female the first gonocoxae have become slightly reduced and the second gonocoxae are contiguous but not fused. Differences are found in the shape of the hook, in particular of the posterior margin of the genital capsule, and also in the presence (*D. ruficollis*) or absence (*D. lunulatus*) of a white annulus to antennal segment 4. *D. ruficollis* bears a remarkable chitinous process on the inside of the posterior edge of the genital capsule. Since this structure is slightly forked distally, one might feel tempted to interpret it as an incomplete fusion of the two denticles found on the posterior margin in *D. lunulatus*. Both species

undoubtedly diverged from the main stock at an early stage of evolution in the genus.

HOST PLANTS

The plants important for both the nutrition and reproduction of the various *Dysdercus* species belong almost without exception to the families Malvaceae, Sterculiaceae, Bombacaceae and Tiliaceae, forming the distinctly natural order Columniferae (Strasburger et al., 1962). Virtually the only parts of these plants used for food are the ripe or ripening seeds (Sands, 1917; Withycombe, 1924; Williams, 1934). The bugs are rarely observed on these plants when no fruits are present, but as soon as the first fruits open (Withycombe, 1924) or even shortly before (Sands, 1917; personal observations) they appear, often in large numbers. Apparently they are attracted by some volatile substance produced by the seeds (Withycombe, 1924; personal observations).

Copulation takes place on the same plants, often lasting several days and continuing through oviposition. The abdomen of the female often swells markedly. Copulation is interrupted to permit the laying of eggs. These eggs are laid in sand or leaf litter under the plants or sometimes in open fruits. With intervals of 3 to 7 (usually 4 to 5) days the eggs are laid in several batches (up to seven: Sands, 1917). These insects usually re-copulate after each batch of eggs has been laid. The larvae develop on or under the plants and are gregarious. Consequently, all stages can be found together. Often the colony may contain more than one species.

Most, if not all, *Dysdercus* species are (phyto-)polyphagous. This is associated with the fact that many of the above-mentioned plants form seeds only periodically, the seeds of certain species therefore being available only during part of the year. An uninterrupted supply of seeds thus necessitates migration between various plants. For the species of the Lesser Antilles this situation has been investigated in detail by Sands (1916, 1917) and Squire (1939), for some African species by Whitfield (1933). Migration has also been observed in Peru (Berry, 1951: 333), and very probably occurs throughout the genus.

A number of plants of the above-mentioned families appear to be specially attractive to these bugs, since many species congregate on them. *Ceiba pentandra*, *Sterculia* species, *Hibiscus abelmoschus*, etc. are well known stainer hosts. The cotton plant (*Gossypium* spp.) also features among these and most *Dysdercus* species may be found on cotton at some time or other (see list provided by Hargreaves, 1948: 29-31). In all likelihood, however,

besides the "common hosts", each species has other more or less specific food plants in its cycle. In Surinam the writer observed that *D. mimus* (Say) shows a distinct preference for *Sida* species, whereas *D. fernaldi fuscofasciatus* is more often found on *Hibiscus bifurcatus* in swampy areas.

The food provided by the seeds is rich in proteins and fats and is apparently indispensable for the development of eggs and of larvae. Other sources of protein may be utilized however, since occasional predation (even cannibalism) has been observed (Myers, 1927). Creighton (1936a: 94; 1936b: 282) even found *D. suturellus* (Herrich-Schäffer) in Florida to be a predator attacking the cotton leaf-worm *Alabama argillacea* (Huebner) (Lepidoptera, Noctuidae, Catocalinae), and also "very efficient" in preying upon the larvae and pupae of *Anomis erosa* Huebner (Lepidoptera, Noctuidae, Erebiniae), another insect pest of cotton.

In addition to these staple food plants, the flowers or fruits of other plant families are visited for the collecting of nectar. This is done only by adults, probably in the migratory phase. As a rule, no copulation takes place here, even though both sexes are often present together (Myers, 1927; Sands, 1917: 245; personal observations on *Asclepias curassavica* in Surinam). As a source of carbohydrates use is also made of honey dew (excretions of Homoptera) (Sands; cf. also the capture of *D. andreae* (L.) by Mac Gillavry in Cuba "on sooty *Agras sapota* leaves" where the presence of black mould evidently did not discourage the visits of the stainers). In Florida *D. suturellus* is known as a pest of oranges, since they attack the fruits upon the trees.

Interesting data on bionomics, pest status, etc. can be found in: Ballou, 1906; Berry, 1951; Callan, 1943, 1947; Geering, 1965; Hargreaves, 1948; Mac Gill, 1935, 1941, 1945, 1947; Mendes, 1936; Riley & Howard, 1889; Sands, 1917; Squire, 1939; Wille, 1951; Withycombe, 1924; Freiberg, 1943, 1945; Barber, 1925.

The food plants of the various *Dysdercus* species, as far as they are known, are listed below. Cotton is usually mentioned first because of its great economic importance. The names of various species of *Gossypium* are quoted from the literature or from labels of preserved specimens. In these cases it is often not possible to know whether a wild cotton species or a commercially-grown variety is meant. It should be kept in mind here that in some cases the identification of the insect species is not reliable.

D. albofasciatus Berg

Cotton: Brazil (Hargreaves, 1948: 29; Mendes, 1938: 205), Argentina (Ruffinelli & Pirán, 1959: 32). — *Pavonia* sp.: Uruguay (Pando) (Berry, 1951: 330), Uruguay (Ruffinelli & Pirán, 1959: 32). — *Sida* sp.: Uruguay (Montevideo) (Lima et al., 1962: 30).

D. andreae (L.)

Cotton: British Honduras, Jamaica, Cuba, Haïti, Puerto Rico, British West Indies, Guadeloupe, Martinique (Hargreaves, 1948: 29), Puerto Rico (Barret, 1905: 396, "*D. suturellus*"; Graywood, 1920: 123; Leonard, 1931: 120; Fife, 1939: 7; Bartlett, 1943: 15), Florida, West Indies (Torre-Bueno, 1941: 117), Cuba (Howard, 1900: 100), Haïti (Wolcott, 1927: 180; Wolcott, 1931: 134), West Indies, Lesser Antilles, Northern Islands (Ballou, 1906a: 54; Ballou, 1906b: 74, 76), St. Croix (Wilson, 1923: 15). — *Thespesia populnea*, *Abutilon hirtum* and *Sida* sp.: Puerto Rico (Fife, 1939: 7). — *Sterculia carthaginensis*, *Abutilon* sp., *Thespesia populnea*, *Hibiscus elatus*, *Sida* sp., *Bidens* sp., *Vernonia menthaefolia*, *Casearia decandra*, *Parthenium hysteromorphus*: Florida, West Indies (Torre-Bueno, 1941: 117). — Flowers of *Bidens* sp., of *Vernonia menthaefolia* (Poepp.) Less., of *Casearia decandra* (Jacq.) and of *Parthenium hysteromorphus* L., on *Thespesia populnea* Cav., *Sterculia carthaginensis*, *Abutilon* sp., and *Sida* sp.: Cuba (Myers, 1927: 286). — "Adults and nymphs on crushed maga pods and seeds [*Montesuma speciosissima* Sessé & Moc.] on ground, "on ground feeding on seeds from ceiba tree" [*Ceiba pentandra* (L.) Gaertn.]: Puerto Rico (Wolcott, 1936: 164). — "On *Achras sapota* trees with sooty webs on leaves" [honey dew?], sugar cane, *Sida urens*: Cuba; *Hibiscus tiliaceus*: Guadeloupe (Grande Terre) (this paper).

D. bimaculatus (Stål)

Cotton: Guatemala (Secanguin, Trece Aguas) (Sailer, 1947: 17), San Salvador (Yzalco, La Concordia, La Unión), Colombia (Atlantico) (Sailer, 1947: 17), Mexico, El Salvador, Nicaragua (this paper). — Cacao: Guatemala (Alta Vera Paz) (Sailer, 1947: 17). — *Gardemia jasminoides* Ellis and *Gossypium hirsutum*: Venezuela (Vivas-Berthier, 1941: 117, "*D. obliquus*"). — *Asclepias*: Mexico; *Sterculia apetala* (Jacq.), *S. carthaginensis*: Venezuela (this paper).

D. chaquensis Freiberg

Cotton: Brazil (Rio de Janeiro) (Lima et al., 1962: 35, "*D. discolor*"), Argentina (Freiberg, 1943: 2-13, "*Dysdercus* sp."; Freiberg, 1945: 362-372, *D. pallidus*"; Freiberg, 1948: 121). — Cotton, "malvisco" (*Sphaeralcea* sp.): Argentina (Tucumán) (Hayward, 1942: 35, "*D. pallidus* Blöte").

D. collaris Blöte

Cotton, maize, "cayena", *Sida* spp., *Malvastrum coromandelianum*: Venezuela (this paper).

D. concinnus Stål

Cotton: Mexico, Ecuador (Hargreaves, 1948: 30, identification of species unreliable).

D. cordillerensis Doesburg Jr

Urocarpidium mathewsii: Peru (this paper).

D. f. fernaldi Ballou

Cotton: Grenada (Hargreaves, 1948: 30).

D. fernaldi fuscofasciatus Blöte

Cotton: Venezuela (Hargreaves, 1948: 30). — *Gossypium hirsutum* L.: Venezuela, El Valle, D.F., *Sida* sp.: Venezuela, Miranda (Vivas-Berthier, 1941: 117). — Kena f

(*Hibiscus cannabinus* L.): Suriname (Vreden, 1964: 70). — *Gossypium peruvianum* Cav., *Hibiscus bifurcatus*, *H. abelmoschus* L., *H. tiliaceus* L., *Bombax globosum* Aubl., *Ceiba pentandra* Gaertn.: Suriname (Doesburg Jr, 1966). — *Hibiscus esculentus*: Venezuela (Aragua) (this paper).

D. flavolimbatus Stål

Cotton: Salvador (Hargreaves, 1948: 30, identification of species unreliable).

D. fulvoniger (De Geer)

Cotton: British Guiana ("*D. ruficollis* (L.)"), Trinidad ("*D. howardi* Ballou") (Hargreaves, 1948: 30), Trinidad (Urich, 1916; Ballou, 1906; Withycombe, 1924). — *Malachra capitata*, *Sida glomerata*, *Eriodendron anfractuosum*: Trinidad (Urich, 1916). — *Hibiscus cannabinus* L.: Suriname (Doesburg Jr, 1960; Vreden, 1964). — *Gossypium barbadense*, *Hibiscus abelmoschus*, *H. cannabinus*, *Thespesia populnea*, *Bombax globosum*, *Ceiba pentandra* Gaertn., *Sterculia carthagenensis* Cav.: Suriname (Doesburg Jr, 1966). — *Gossypium hirsutum*: Venezuela (Apure) (this paper).

D. fulvoniger discolor Walker

Cotton: British West Indies, Guadeloupe, Martinique (Hargreaves, 1948: 30), St. Vincent (Sands, 1917), Lesser Antilles, southern islands excluding Barbados (Ballou, 1906: 54). — *Sterculia caribaea*, *Eriodendron anfractuosum*, *Thespesia populnea*, *Hibiscus esculentus* (to a lesser extent), *Ochroma lagopus* (occasionally), *Malachra capitata*, *Pachira aquatica*, *Bombax malabaricum*; the species does not breed, but may feed on flowers of: *Magnifera indica*, *Eupatorium odoratum*, *Cordia cylindrostachys*, *Moringa pterygosperma*, fruits of *Momordica charantia* and secretions of scale insects: St. Vincent (Sands, 1917: 245, 248). — Seeds of silk cotton (*Eriodendron anfractuosum*): St. Vincent (Ballou, 1906: 74). — *Hibiscus tiliaceus*: Guadeloupe (this paper). — Cotton, *Thurberia*, *Thespesia populnea*, *Ceiba pentandra*, *Sterculia* trees: St. Vincent (Myers, 1935: 143).

D. fulvoniger modestus Doesburg Jr

Cotton, *Thespesia*, *Abutilon*, *Ceiba*, *Bastardia viscosa*, *Hibiscus rosasinensis*: Curaçao (this paper).

D. honestus Blöte

Cotton: Brazil (Minas Gerais, São Paulo) (Mendes, 1938: 205; Mendes, 1956: x, xi), Brazil (Hargreaves, 1948: 30). — Cotton (*Gossypium hirsutum*): Venezuela (Apure, Cojedes, Carabobo, Aragua), Brazil (Minas Gerais); *Sterculia apetala*: Venezuela (Portuguesa); sugar cane: Venezuela (Lara, Yaracuy); *Hibiscus esculentus*, *Sterculia carthagenensis*: Venezuela (Aragua) (this paper).

D. imitator Blöte

"en Bidens", sugar cane, "follage maiz": Venezuela (this paper).

D. immarginatus Blöte

Cotton: Trinidad (this paper). — *Chorisia insignis* Kth.: Argentina (Tucumán) (Hayward, 1942: 34).

D. jamaicensis Walker

Cotton: Jamaica (Hargreaves, 1948: 30, "*D. sanguinarius*"). — *Urena lobata*: Jamaica (this paper).

D. longirostris Stål

Piercing fruits of *Citrus* sp.: Brazil (Distrito Federal) (Gomes, 1938: 58-60; Lima et al., 1962: 40). — On seeds of *Chorisa* sp.: Brazil (Piracicaba) (Mendes, 1938: 205).

D. maurus Distant

Cotton: Brazil (Hambleton & Sauer, 1938: 328), Brazil, Trinidad (Hargreaves, 1948: 30), Brazil (Minas Gerais) (Mendes, 1938: 205), Brazil (Pernambuco) (this paper), Trinidad (Urich, 1916: 18, "*D. howardi* var. *minor* Ballou"). — kenaf (*Hibiscus cannabinus* L.): Suriname (Doesburg Jr, 1960: 88, "*D. pallidus* Blöte"). — *Malachra capitata*: British Guiana (Proctor, 1958: 107); *Gossypium peruvianum* Cav., *Thespesia populnea* L., *Hibiscus cannabinus* L., *H. abelmoschus* L., *Sida* sp., *Ceiba pentandra* Gaertn., *Bombax globosum* Aubl., *Sterculia carthaginensis* Cav.: Suriname (Doesburg Jr, 1966: 52; this paper). — Sugar cane: Venezuela (Lara); *Gossypium hirsutum*: Venezuela (Jaracuy); "wild mallow": Trinidad (this paper).

D. mimulus Hussey

Cotton: Jamaica, Salvador, U.S.A. (Hargreaves, 1948: 30), U.S.A. (Arizona) (Cassidy & Barber, 1939: 100), U.S.A. (Texas), Mexico (Sonora) (this paper). — Cotton, *Sida carpinifolia* L., *Ambrosia artemisiaefolia*, *A. elator* L., *Verbesina eucelioides* (Cav.) B. & H.: U.S.A. (Texas) (Barber, 1925: 1137, "*D. obscuratus* Distant"). — Late instar nymphs and adults on flowers of *Neurolaena lobata* (L.) R. Br., adults alone on flowers of *Casearia aculeata* and of *Parthenium hysterophorus* L., *Sida* sp. near *cardifolia*, *Abutilon* sp.: Cuba (Myers, 1927: 286, "*D. mimus* (Say)"). — *Iresine paniculata*: U.S.A. (Torre-Bueno, 1941: 117). — Orange sunflower, bean: U.S.A. (Texas); alfalfa: Mexico (Puebla); "broom weed": Cuba (this paper). — Data given by Torre-Bueno (1941: 118) apparently refer to Myers' 1927 study.

D. mimus (Say)

Cotton: U.S.A., El Salvador, Ecuador, Peru, Venezuela, Trinidad, Jamaica (Hargreaves, 1948: 30, not wholly reliable due to some confusion with *D. mimulus* Hussey; ibid.: 31, "*D. urichi*"), Brazil (Hambleton & Sauer, 1938: 328), Guatemala, Venezuela (Carabobo, Aragua) (this paper). — *Gossypium hirsutum*: Venezuela (Vivas-Berthier, 1941: 118). — *Malachra capitata*: British Guiana (Proctor, 1958: 107). — kenaf (*Hibiscus cannabinus* L.): Suriname (Doesburg Jr, 1960: 88; Vreden, 1964: 70). — "Em semente de Samauma caída no solo": Brazil (Belém) (Lima et al., 1962: 44). — *Sida rhombifolia* L., *Sida* spp., *Hibiscus abelmoschus* L., *H. cannabinus* L., *Ceiba pentandra* Gaertn., *Sterculia carthaginensis* Cav., *Asclepias curassavica* L., native cotton: Suriname (Doesburg Jr, 1966: 55). — *Sida* sp.: Venezuela (Tachira, Yaracuy), Trinidad; sugar cane: Venezuela (Lara); "en gamelote": Venezuela (Mérida); maize, "en frijoli" [*Vigna sinensis*], flowers of *Mimosa*: Venezuela (Aragua); *Cordia* sp.: Venezuela (Carabobo); *Cucurbita moschata*: Mexico (Tabasco) (this paper). — *Iresine paniculata* (L.): Gualan, Guatemala (Cockerell, 1912: 327).

D. obliquus (Herrich-Schäffer) (Probably most — if no all — data refer to *D. bimaculatus*)

Cotton: New Mexico (Morril, 1927: 80), Guatemala (Sailer, 1947: 17), Mexico, El Salvador, Venezuela (Hargreaves, 1948: 30).

D. obscuratus Distant (most earlier identifications unreliable)

Cotton: Mexico, U.S.A., Peru ("*D. incertus* Distant") (Hargreaves, 1948: 30). — On seeds of *Sida* sp.: Texas (Torre-Bueno, 1941: 118).

D. ocreatus (Say) (= *fervens* Walker)

Cotton: Haïti (Hargreaves, 1948: 30).

D. ocreatus fervidus Bergroth

Cotton: Cuba (Hargreaves, 1948: 30).

D. peruvianus Guérin Méneville

Cotton: Colombia, Venezuela, Brazil (Hargreaves, 1948: 30, including *D. columbicus* Blöte and *D. mendesi* Blöte), Peru, Brazil (Minas Gerais, São Paulo) (Mendes, 1938a: 205; Mendes, 1938b: 133; Mendes, 1956: x, xi, "*D. mendesi* Blöte"), Peru (Herrera, 1962: 30; Wille, 1951: 16, "*D. ruficollis* (L.)"; Wille, 1959: 7, 24), Venezuela (Carabobo, Aragua), Brazil (Minas Gerais), Argentina (Misiones) (this paper). — *Gossypium hirsutum*, *Punica granatum* L.: Venezuela (Vivas-Berthier, 1941: 117). — *Gossypium hirsutum*: Venezuela (Distrito Federal); *Sida* sp.: Venezuela (Tachira) (this paper). — *Punica granatum* L. and in maize plantations: Venezuela (Aragua) (Martorell, 1939: 188). — "On the foothills of the western slope of the Andes in northern Peru occur extensive forests of silk-cotton and other trees, which are acceptable alternate hosts to the stainers" (Wolcott, 1929: 227, "*D. ruficollis* (L.)" — most likely this refers to the extremely common *D. peruvianus*; in most of the older Peruvian literature this insect is called *D. ruficollis*).

D. ruficollis (L.)

Cotton: Argentina, Brazil, Colombia, Ecuador, British Guiana, Mexico, Peru, Salvador (Hargreaves, 1948: 30, only in part: as this species does not occur in Colombia, Ecuador, Peru, Salvador and Mexico, these records must be misidentifications of other species), Argentina (Hayward, 1942: 35), Brazil (Mendes, 1938b: 133), Argentina and Brazil (Ruffinelli & Pirán, 1959: 32), Brazil (São Paulo, Minas Gerais) (Mendes, 1938a: 205; Mendes, 1956: x, xi; Fonseca, 1934: 284). — *Pachira aquatica* Aubl., *Bombax ventricosa* Arr. Cam., *Chlorospermum insigne* St. Hil.: Brazil (Monte, 1936: 452-454). — Adults and nymphs on *Pavonia sessiliflora* H.B.K.: Suriname, Sipaliwini savanna (Doesburg Jr, 1966: 58).

D. rusticus Stål

Cotton: Peru (Hargreaves, 1948: 30).

D. sanguinarius Stål (including ssp. *neglectus* Doesburg Jr, in Puerto Rico)

Cotton: Cuba, Haïti, Puerto Rico (Hargreaves, 1948: 30), Puerto Rico (Leonard, 1931: 120; Wolcott, 1924b: 64, 1924c: 56, 1936: 164). — Cotton, *Montezuma specio-*

sisima, and to a lesser extent on *Thespesia populnea*: Puerto Rico (Fife, 1939: 7). — Cotton, *Thespesia populnea* (L.) Soland: Puerto Rico (Bartlett, 1943: 15). — *Montezuma speciosissima* (= *Thespesia grandiflora*): Puerto Rico (Squire, 1937: 291, "D. neglectus Uhl.").

D. suturellus (Herrich-Schäffer)

Cotton: United States of America (Hargreaves, 1948: 31, Argentina, Colombia and Jamaica are also listed, but this must be incorrect: the species is restricted to Florida, Bahamas, Isla de Pinos and perhaps also Cuba), Bahamas (Riley, 1885; Schwartz, 1879), Florida (Pfadt, 1962), Florida, West Indies (Saunders, 1883: 387). — Cotton, Rose Mallow (*Hibiscus* sp.), *Hibiscus fulgidus*, orange fruits, on mealy bugs on the leaves of guava: Florida (Comstock, 1879). — Seed pods of *Hibiscus sabdariffa*, *H. fulgidus*, *Urena lobata*, *Solanum nigrum*, *S. melongena*, *Carica papaya*, Oleander, roses, "injurious to oranges" (fruits), "very injurious to cotton", "notorious as the cotton stainer of the north": Florida (Torre-Bueno, 1941: 118). — Orange fruits, egg plant, guava, *Hibiscus* sp., *Urena lobata*, *Solanum nigrum*: Florida, Georgia, Alabama, S Carolina, Bahamas (Hunter, 1912, incorrectly including Cuba and Puerto Rico). — *Solanum melongena*: Florida (Quaintance, 1896). — Oranges (fruits): Florida (Comstock, 1879; Hubbard, 1885; Riley & Howard, 1889). — Tangerine orange tree, rose buds and blossoms, seed pods of *Hibiscus sabdariffa*, pods and blossoms of Oleander, ripe fruits of *Carica papaya*: Florida (Howard, 1897).

Dysdercus spp.

Gossypium spp., *Urena* sp., *Sida* sp., *Hibiscus esculentus* L., *Chorisa* sp.: Brazil (São Paulo) (Mendes, 1937: 4). — Cotton (cultivated varieties of Sea Island, Marie Galante and two wild species: *Gossypium purpurascens* and *G. religiosum*), *Thespesia populnea*, *Hibiscus tiliaceus*, *Sida cordifolia*, *S. rhombifolia*, *Malvastrum spicatum*, *Malachra capitata*, *Sterculia caribaea*, *S. foetida*, *Cola* sp., probably *acuminata*, *Ochroma lagopus*, *Ceiba pentandra* (= *Eriodendron anfractuosum*), *Pachira aquatica*: West Indies (Lesser Antilles) (Squire, 1939: 290, 291). — Cotton, *Ceiba* sp., *Bombax discolor*, *Cochleospermum* sp., *Palaua malvifolia*, *Malvastrum peruvianum*, *Nicotiana paniculata*, *Solanum* sp., *Urena* sp., *Ismene amancaes*, *Sida paniculata*, *Malachra* sp., *Hibiscus* sp., *Gossypium raimondii*, *G. peruvianum*: Peru (Wille, 1951). — *Asclepias curassavica* L. "sirve à menudo de refugio à varias especies de *Dysdercus*": Costa Rica (Pittier & Biolley, 1895). — *Ceiba pentandra* and *Malachra capitata*: British Guiana (Proctor, 1958: 107).

NATURAL ENEMIES

Vertebrates

Most of the information in the literature derives from more or less incidental observations made in connection with the control of the cotton stainers. Guppy (1914) considered that, with few exceptions, birds play an insignificant part in the control of insect pests in Trinidad. He lists *D. howardi* among the insects abundant in localities where birds are plentiful. Sands (1917) mentioned *Tyrannus rostratus* (Tyrannidae) as an enemy of *D. delauneyi* on St. Vincent Island. Stomachs of these birds have been found to contain a large number of cotton stainers. Other birds reported to prey on the bug to a limited extent are: *Crotophaga ani* (Cuculidae) and

"domestic fowls". *Quiscalis fortirostris* (Icteridae) has also been reported to prey on this stainer (Anon., 1919). On the other hand, Ballou (1918) asserted that the cotton stainers on St. Vincent have almost no natural enemies. Myers (1927) studied *D. andreae* in Cuba and never observed any of the common insectivorous birds feeding upon these insects. He noted that lizards (*Anolis sagrae*) may eat an occasional nymph but for the most part ignore them.

Myers (1927: 292-293) also made some observations on specimens of *Gambusia punctata* Poey (Pisces, Cyprinodontes). In their natural environment they were fed with various stages of *D. andreae* and *D. mimulus* Hussey ["*D. mimus*"] from *Sida* almost overhanging the water. "All were seized and eaten with avidity". A large Cuban tree frog, *Hyla septentrionalis* Boulenger, in captivity ate numbers of *D. andreae* at night.

Arthropoda

Important natural enemies are found among the Tachinidae (Diptera). These flies insert their egg into the body of a second-stage larva (Wille, 1951: 26), but development of the maggot is completed only in the adult stage of the host. The full-grown maggot then leaves the emaciated victim and pupates in the soil.

The following species were bred from (1) *D. honestus* Blöte, (2) *D. mendesi* Blöte and (3) *D. ruficollis* (L.): *Acaulona brasiliiana* Townsend (1, 2, 3; the most important in Brazil), *Euomogenia dysderci* Townsend (2, 3), *Eutrichopoda abdominalis* Townsend (3), *Alophoropsis brasiliensis* Townsend (2, 3), *Euphorantha dysderci* Townsend (2, 3), *Paraphorantha brasiliiana* Townsend (1, 2, 3), *P. dimidiata* Townsend (1, 2, 3), *P. politana* Townsend (2), *Phoranthella mendesi* Townsend (2), *Hyalomyodes brasiliensis* Townsend (2) and *Paraphasiana dysderci* Townsend (2, 3) (Townsend, 1937, 1938a, 1938b, 1940; Mendes, 1938c).

Acaulona peruviana Townsend and *Paraphorantha peruviana* Townsend were found on *Dysdercus* spp. [mainly *D. peruvianus*] in Peru (Townsend, 1913b; Wille, 1951: 26, fig. 10).

Hyalomya chilensis Macquart and *Acaulona peruviana* Townsend from Peru have been introduced into Puerto Rico on *D. andreae* (L.) and *D. sanguinarius* Stål (Bartlett, 1943: 15) and on *D. andreae* (L.) and *D. neglectus* Uhler (Bartlett, 1944: 24).

D. howardi Ballou and *D. howardi* var. *minor* Ballou are occasionally parasitized by a species of *Trichopoda* (Urich, 1916: 18).

Megilla maculata, var. (Coleoptera), has been observed eating a young larva of *D. andreae* (L.) (Ballou, 1906b: 78).

A small mite, externally parasitic on the stainers, is repeatedly noted.

A "small arachnid parasite" (Anon., 1914; Myers, 1927: 292). "Una especie de acaro que se localiza en numerosas colonias debajo del "corium", de las alas y en la incisión de éstas con el tórax" (Wille, 1951: 27).

Ectoparasitic Acari from *D. mendesi* Blöte and *D. ruficollis* (L.) have been found at Campinas, Brazil (Mendes, 1938c). In the wild state these appear to be of little importance; in breeding cages, however, they frequently caused the death of the insects on St. Vincent (Sands, 1917: 252) and in Suriname (own observation, unpublished).

Recently a parasitic mite, *Treatia dysderci* Evans, was described from *Dysdercus howardi* Ballou [= *D. fulvoniger* (De Geer)] from Trinidad (Evans, 1963: 609-611, figs. 1-5). Parasites collected from this host in Suriname by the present author belong to the same mite species (det. Dr. G. O. Evans, communicated by Dr. G. L. van Eynhoven, in litt.). A closely related species, *T. phytoseioides* (Baker & Johnston) was found on "Hemiptera", Oakland, Florida, Sept. 8, 1958, by R. J. Griffith (Baker & Johnston, 1959).

A remarkable observation made by Myers (1927: 291) records a pseudoscorpion preying on *D. andreae* in Cuba. This cotton stainer, occurring on fissured bark of *Thespesia*, was attacked by *Chelanops oblongus* (Say), which was extremely numerous beneath the bark flakes. The bugs are seized at the tip of an extremity and held tightly. Such a victim is unvariably sucked-out by cannibalistic members of its own species. Beneath the bark with the chelifers were numerous fragments of the Pyrrhocorids, presumably dragged there by the predators.

In spite of many efforts, true egg parasites have never been found (Ballou, 1906b: 78; Sands, 1917: 239; Mendes and Wille do not mention such parasites either, although it is obvious that they searched for them). The only record, made by Howard (1889: 242), is very doubtful: *Hadronotus rugosus* Howard, "Described from 3 ♀ specimens (♂ unknown) dissected from eggs of Heteropteron, found on Orange by H. S. Williams, Rock Ledge, Fla., in April, 1880, and supposed by Professor Comstock to be those of *Dysdercus suturellus*".

Ballou (1916) notes that eggs of *D. delauneyi* may be attacked by a thrips species.

Sands (1917: 239) observed some ant species on St. Vincent: "The small red stinging ant (undetermined) frequently attempted to carry off the eggs [of *D. delauneyi*] but did not succeed. The crazy ant or "Wild Irishman" (*Prenolepis longicornis*) was strongly repelled by the eggs. . . The common small black stinging ant (*Solenopsis geminata*) readily carried off the eggs, as also did the hunting "tac tac" (*Odontomachus haematodes*)".

COLOUR PATTERNS AND MIMICRY

One striking aspect of *Dysdercus* is the variety in colour patterns found in this genus while different species occurring in the same region often resemble each other. This phenomenon can be observed in almost all areas in which more than one species is found. Although these regions sometimes overlap and the similarities in colour pattern are not always equally strong, they are nevertheless unmistakable.

The following colour patterns and regions can be distinguished, only the colours of the upper surface being taken into consideration (fig. 269).

(1) Mainly yellow without black markings on corium. The species which belong to this group are chiefly found in three regions: (a) *D. obscuratus flavipennis*, *D. mimus distanti*, *D. fulvoniger*, *D. collaris*, *D. honestus*, *D. peruvianus*, *D. maurus*, *D. fernaldi fuscofasciatus*, *D. immarginatus*: Vene-

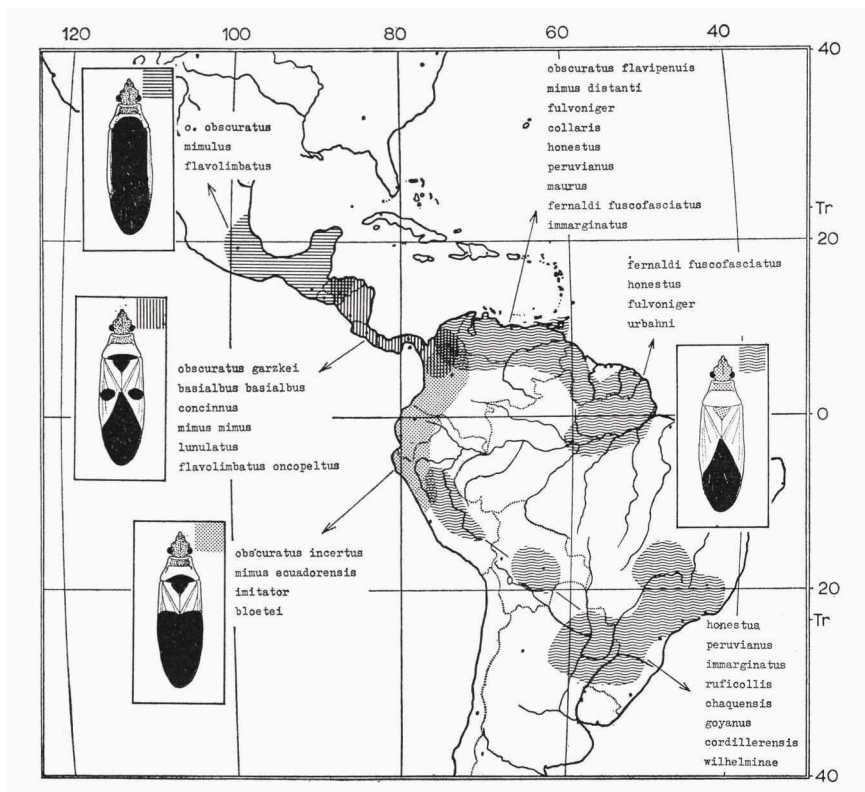


Fig. 269. Some of the most important colour pattern regions of *Dysdercus* in the new world.

zuela; (b) *D. fernaldi fuscofasciatus*, *D. honestus*, *D. fulvoniger*, *D. urbahni*: Amazon Basin; (c) *D. honestus*, *D. peruvianus*, *D. immarginatus*, *D. ruficollis*, *D. chaquensis*, *D. goyanus*, *D. cordillerensis*, *D. wilhelminae*: southern Brazil, Argentina, Bolivia, Peru.

(2) Yellow with a black small spot or transverse fascia on corium and a pale membrane: *D. obliquus*, *D. bimaculatus*, *D. chiriquinus*: Mexico, Central America.

(3) Yellow with a large black spot on corium: *D. obscuratus garzkei*, *D. b. basialbus*, *D. concinnus*, *D. m. mimus*, *D. lunulatus*, *D. flavolimbatus oncopeltus*: Mexico, Central America, Andes region.

(4) Yellow with posterior half of corium black: *D. obscuratus incertus*, *D. mimus ecuadorensis*, *D. imitator*, *D. bloetei*: Colombia, Ecuador, Peru.

(5) Black with yellow lateral margins: *D. o. obscuratus*, *D. f. flavolimbatus*, *D. mimulus*: Mexico, Central America.

(6) Red with a black marking on corium: *D. jamaicensis*, *D. sanguinarius*, *D. ocreatus*, *D. andreae*: Greater Antilles. Worth mentioning is that *D. fulvoniger*, which is mainly yellow on the continent, has a subspecies on the Lesser Antilles, *discolor*, which is red with blackish suffusions.

(7) The yellow part of the pattern deeply coloured: *D. concinnus mundus*, *D. m. mimus*, *D. mimulus luteus*: Atlantic coast of Mexico:

(8) Entirely darkly pigmented: *D. maurus*, *D. mimus infuscatus*: Suriname; *D. maurus*, *D. ruficollis*: northeastern Brazil.

A few *Dysdercus* species have an entirely different colouring showing no obvious relationship to the basic generic pattern. One of these is *D. ruficeps*, which is entirely black with a red head and a yellowish white pronotum. The colour pattern of *D. albofasciatus* is also atypical: mainly black with a white patch on the hemelytra. It resembles that of the closely related and allopatric *D. albomaculatus*.

In some cases species have subspecies with different colour patterns, falling in different colour groups according to the region inhabited. Thus, the five geographic races of *D. obscuratus* Distant have different colour patterns, four of which correspond to those of other *Dysdercus* species inhabiting the respective areas (fig. 145). *D. basialbus* Schmidt, closely related to the three other yellow species of the *D. fernaldi* group, has a yellow subspecies (*silaceus*) on the South American continent (fig. 259). The nominate form inhabiting Central America has a black dot on the hemelytra; here, several other, less closely related species have a similar pattern. In Mexico, none of the *Dysdercus* species has the corium entirely yellow, and *D. mimus* is provided with a black spot on this part; but in

Venezuela, where practically all other species of this genus are yellow, the corium of this species too is unicolorous.

The correspondence in colour pattern is apparently not restricted to the genus *Dysdercus*; other bugs have been found to show patterns with a striking resemblance to species of this genus. Among the Lygaeidae, the *Oncopeltus* species occurring in the same regions show patterns and colours like those of group 3 (Central America) and group 6 (Antilles). Various species of the Coreidae, Lygaeidae, and Miridae show the same colour pattern and also occur in the same region as *D. o. obscuratus*: see on this point the plates of Distant's *Biologia Centrali-Americana*. The colour pattern of *D. albofasciatus* Berg resembles strongly that of a *Hypselonotus* species (Coreidae) which occurs in the same region.

These examples show that the resemblance between the different species, which is called mimicry, is apparently correlated with the region of occurrence and does not necessarily indicate close affinities, since the mimetic resemblance cuts, so to speak, right across the phylogenetic relationships. Similar correlations have also been demonstrated for numerous other insects (Bates, 1862; Shelford, 1901, 1917; Marshall & Poulton, 1902; Gahan, 1913; Dixey, 1919; Carpenter, 1921; Arrow, 1928; etc.).

It is generally accepted at present that mimicry is the result of a selection determined by the interaction between the animals and the exigencies of their environment, the main role here being played by certain predators. In this situation the colour patterns fall into two functional groups: cryptic patterns, which make the animal less noticeable, and aposematic patterns, which make it more conspicuous. The latter development can be explained by assuming that certain predators, after a learning process (Lloyd Morgan, 1896, and many later authors: see Cott, 1957: 276), avoid eating prey with a certain colour pattern that is associated with one or other disagreeable attribute (warning coloration). Observations have shown that many aposematic animals are unpalatable, whereas the others, particularly the cryptically patterned, are usually highly palatable (Cott, 1957: 251).

It is also generally accepted that birds and other vertebrates are among the most important selective predators. Various experiments with birds have demonstrated that they indeed learn to avoid certain patterns after becoming acquainted with an unpalatable species bearing such a pattern. It is therefore probable that these predators, assuming that they (learn to) discriminate equally well under natural conditions, have thus exerted a selective influence on the colour patterns of their prey.

Two forms of mimicry are known, the Batesian and the Müllerian. The former concerns palatable species with such a strong resemblance in

appearance and behaviour to a more common species avoided by certain predators because of some unpleasant attribute, that the mimic enjoys a certain amount of protection (false warning coloration). For this type of mimicry, which seems to occur especially frequently in the tropics of the New World, the mimics of a given model are often found in many very distantly related groups, in other families or even other orders.

In the Müllerian mimicry (Müller, 1879), to the contrary, the similarity in warning coloration is accompanied by a corresponding unpalatability (common warning coloration). Here, therefore, a number of often more closely related animals, members of the same order, family, etc., form a complex which contributes to reinforcing the learning process of the predators.

In addition to the members of a Müllerian group, Batesian mimics can form part of the complex. For example, Linsley et al. (1961) found in Arizona two mimetic complexes (a so-called *Lycus fernandezi* complex and a *L. loripes* complex), both of which contained Müllerian and Batesian elements.

The question is now, how should we interpret the colour patterns of *Dysdercus* from this point of view? All *Dysdercus* species are not equally aposematic. Some are predominantly blackish, and these are in all probability cryptic. Among such species are *D. mimus infuscatus* and *D. maurus* in Suriname, which have very dark colours and lead at least partially hidden lives. The former spends most of its time among low herbs (*Sida* spp.), and the latter is found on the fruits of *Thespesia*, which are usually thickly covered with leaves. Both species migrate, however, and are also found (in a different biotope) among the other yellow species *D. fulvoniger* and *D. fernaldi fuscofasciatus* on other plants, where they are much more conspicuous. *D. obscuratus lugubris* and perhaps some of the representatives of group 5 are also cryptic.

The other species, especially the yellow ones with the striking red markings and black spots, are in all likelihood aposematic. This immediately raises the question of whether their mimicry is Müllerian or Batesian. The animals involved are related forms with virtually the same behaviour, living on the same or very closely related plants. The mimetic agreement is in many cases not extremely close, and there are usually no wide differences in abundance. All these facts seem to suggest a Müllerian mimicry. Such relationships are usually accompanied by a much lower degree of palatability. Unfortunately, we know hardly anything about this point of the Pyrrhocoridae. These bugs are generally odourless and, as far as we can observe, do not produce any of the disagreeable aromatic scents characteristic of many other bugs, even

though they possess a well-developed metasternal scent apparatus (Brindley, 1930: 202, pl. 10 fig. 5), and the dorsal glands of the larvae appear normal. Darlington (1938) reported for *D. andreae* (L.) in Cuba that "This bug has a characteristic stink..." and Parsons (1940: 3): "Both the *Dysdercus* [*andreae* (L.)] and the *Oncopeltis* [sic] exude a pink body fluid when handled; and *Dysdercus* has a characteristic odor", but Myers (1927: 297) stated that in Cuba, "Adults of *Dysdercus andreae* have no perceptible odour when handled. Moreover, the roughest shaking fails to cause any exudation from the dorsal glands of the nymphs... Similarly, no smell was ever perceived from nymphs or adults of *D. mimus* [= *D. mimulus*]. On the other hand, my only example of *D. sanguinarius* Stål, taken near Guines, emitted a distinct but not strong "buggy" odour". It is nevertheless possible that these bugs has a bad taste or possess some other unpleasant attribute. Only such an attribute would make it understandable that they are avoided by the majority of predators (see chapter on 'Natural Enemies'). A few species have been reported to eat them (Sands, 1917; Anon., 1919), but it is possible that the birds mentioned by these authors consume such bugs only when driven to by necessity, and thus may learn that they are acceptable. It may also be that *Tyrannus* has specialized feeding habits, and that it consumes insects normally avoided by other birds, as is known for the cuckoo (White, 1935; Cott, 1957; Sheppard, 1958). Lizards also do not eat them willingly (Myers, 1927; Parsons, 1940). But it is just the potential predators, which do not readily eat these insects and have to learn to discriminate between the various patterns, that have the greatest selective effect, and thereby promote the development of defence mechanisms in their prey.

These selective predators must in all likelihood be sought among the birds and perhaps also the lizards, but we have no exact data on this point. Only properly conducted experiments and more precise field observations can provide the necessary information.

According to Myers' observations, lizards are the main predators of insects in Cuba. Darlington (1938) came to the same conclusion, but this does not settle the problem of whether any selection is involved.

Another question relevant to *Dysdercus* is whether selection affects the colour pattern when the animals collect in large numbers or during the migratory phase. In the former case, i.e. during the breeding phase, they are found on a particular plant and the population is exposed to a certain (limited) number of predators. The specific predators, if such indeed exist, would, after finding the population, eat of them indiscriminately and therefore would not be selective with respect to the pattern. The potential predators, for which the bugs are unacceptable, would begin by tasting the

prey but soon come to know the population and then avoid it. This population would then go on to produce a number of individuals — often varying from hundreds to thousands — on which virtually no further selection on its pattern would be operative.

When this population departs for new feeding grounds, it disperses as a large number of separate individuals, each of which must travel through a large number of biotopes. As a result, the members of this population not only become individually far more conspicuous but also each one encounters many more and many new potential predators. The meetings between 'the pattern' and the potential predators will therefore, as compared to those of the population, greatly increase in number and occur in many different kinds of situations. At this time, each individual is entirely dependent on the aposematic value of its own pattern, the direct protectional influence of the population being absent or greatly reduced. It is then to be expected that specimens with deviating colour pattern would have a greater chance of being molested. It seems to the author, therefore, that the selective influence from potential predators on the colour pattern must be most pronounced during the periods of migration.

All this will hold true when the colour pattern is a simple primary warning pattern in relation to a disagreeable attribute of the prey. But if *Dysdercus* is part of a more complicated mimetic complex, as some of the data suggest, the effect of selection on the pattern would be strongest in biotopes in which they are present as a complex or even observed together with the other members of this complex. Although, as far as we know, such complex (including others than *Dysdercus*) is not found on the food plants, it could be present in one of the biotopes visited only during migration, for instance on *Asclepias* and other flowers on which *Dysdercus* is often seen in the migratory period, and on which *Oncopeltus* and Lycidae species also occur. Perhaps these insects could be supposed to be members of a mimetic assemblage in which *Dysdercus* species are involved. The Lycidae are known to be extremely unpalatable for vertebrate predators (Marshall & Poulton, 1902; Carpenter, 1921; Jones, 1932; Carpenter & Ford, 1933; Darlington, 1938; Parsons, 1940; etc.), and for some invertebrate predators (Linsley et al., 1961). According to Jones, this might be due to poisonous or bitter-tasting substances present in their food plants.

Another indication that the colour pattern of the adult *Dysdercus* may have something to do with migration is the fact that the larvae, which do not migrate and which usually occur together in great numbers, possess a quite different and much less complicated aposematic colour pattern than the adults, which do migrate. The pattern of the larvae of *Dysdercus* have

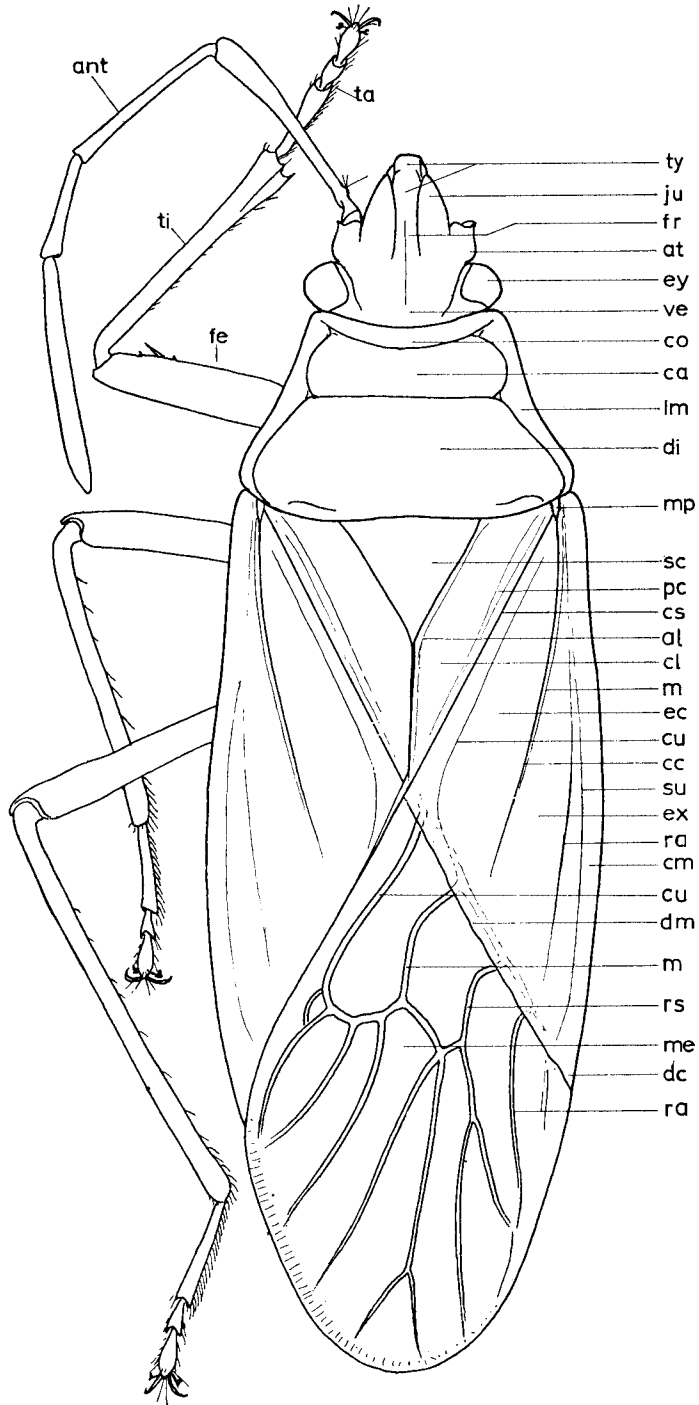
apparently evolved in different direction. They are always red and shiny, and because their habitus is different from that of the adults they are even more aposematic. They look very much like red berries, and in congregations even resemble flowers (Myers, 1927). The behaviour of these larvae does not suggest any attempt at concealment; on the contrary, apart from their colour, they are often very conspicuous because of their large numbers and because they are active during the daylight hours. According to Cott (1957: 191), these are "the methods by which conspicuousness is attained". Even "the sluggish behaviour, combined with apparent indifference to enemies" contributes to this effect, although author's experiences in the field taught him that the latter holds only to a certain extent. The larvae are not easily alarmed, as those who have observed them in the field can testify, but when they are mechanically disturbed they make an attempt to escape by allowing themselves to fall from the plant or by running away. In any case it is obvious that these animals advertise their presence, and we can only conclude that this provides them with a certain amount of protection. For the present, we can only guess at how the mechanism operates. In all probability these insects are not palatable, and as a rule this is accompanied by a corresponding warning coloration. It is not impossible, however, that their colour, which is unusual for an insect, serves only to deter or at least inhibit some insect-eating predators. This fear or distrust of unusual or new objects, which seems to be innate in many if not all of the higher vertebrates, is called "misoneismus" by Piepers (1903: 291) (see also Heikertinger, 1929: 75). In this connection the observations of Pickens (1930) and Gilbert White (in: Cott: 192) are also interesting. The former found that humming-birds are markedly attracted by red and that the so-called "humming-bird flowers" are almost exclusively red or orange. White also found birds to be strongly influenced by colour and in his opinion it is not at all a matter of chance that the fruits and berries eaten by birds are nearly all red. But red rarely occurs in the available food of the insect-eating birds, which are practiced in finding concealed and well-camouflaged prey; the red colour does not fit into their feeding pattern and probably lies entirely outside their sphere of interest. Whether this special interest in red among the fruit-eating birds and the tendency to seeking behaviour found among the insect-eating birds are inborn or only acquired by experience does not greatly affect the final result: probably a hereditary tendency of the young animal in a particular direction becomes further developed through learning during life. Blest (1963: 1046) states: "There is also a suggestion in recent work that some potential predators may be equipped with built-in responses to aposematic patterns".

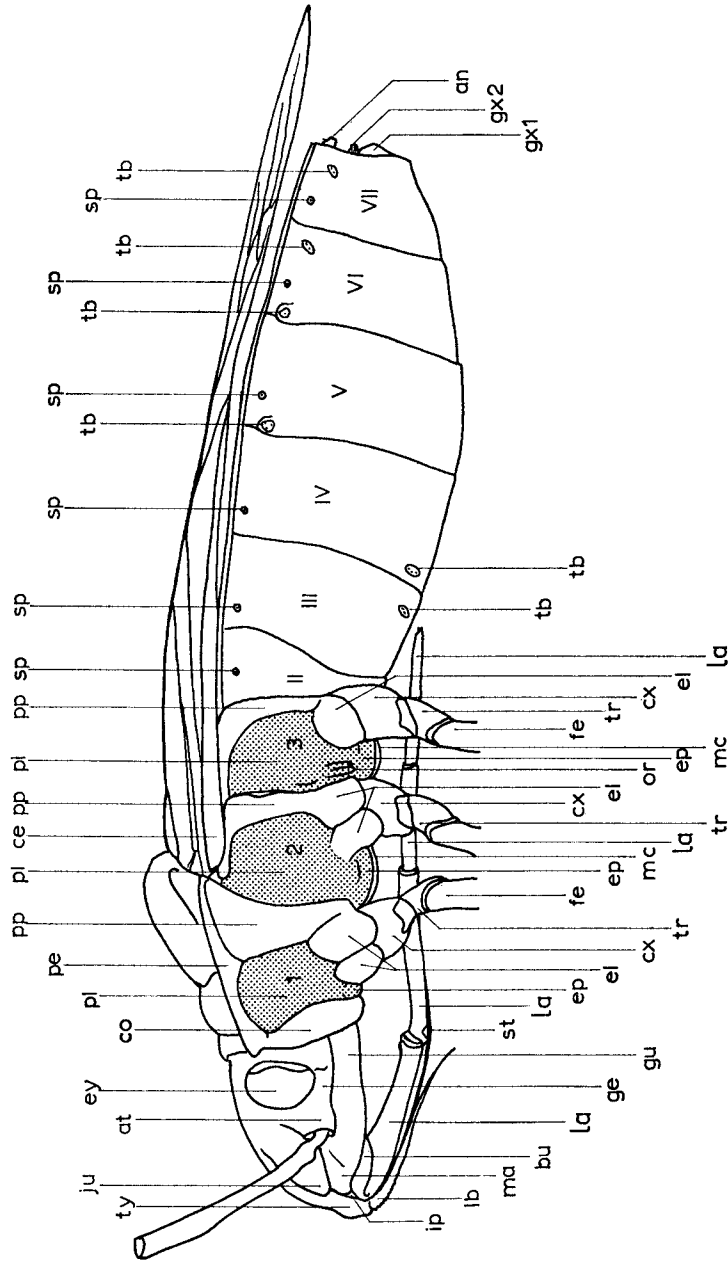
To summarize, it may be said that the colours and colour patterns of the *Dysdercus* species and their larvae in all probability have a mimetic significance. Since, however, we know very little about their predators and nothing about their palatability, it is difficult to determine the mechanism on which this mimicry is based. Because the same patterns are found in different species of the same genus and in the same region of distribution, a Müllerian mimicry in the adults seems the most likely. For the larvae it is more probable that the defence mechanism operates via a general warning coloration, which may indicate that they are also unpalatable; such a mechanism is likely to depend also on confusion and the misoneism of the predators.

APPENDIX

Figs. 270 and 271 (p. 200, 201). Dorsal and lateral aspects of *Dysdercus*.

al = anal vein	ju = jugum
an = anal tube	la = labium
ant = antenna	lb = labrum
at = antenniferous tubercle	lm = lateral margin of pronotum
bu = buccula	m = medius
ca = callus	ma = maxillary plate
cc = corial cleft	mc = median carina
ce = corial epipleuron	me = membrane
cl = clavus	mp = median plate
cm = costal margin	or = ostiole of scent gland
co = collar	pc = postcubitus
cs = claval suture	pe = pronotal epipleuron
cu = cubitus	pl = pleuron
cx = coxa	pp = posterior pleural flange
dc = distal corner of corium	ra = radius
di = disc of pronotum	rs = radius-sector
dm = distal margin of corium	sc = scutellum
ec = endocorium	sp = spiraculum
el = epicoxal lobe(s)	st = stylettes (mandibulae + maxillae)
ep = episternum	su = subcosta
ex = exocorium	ta = tarsus
ey = eye	tb = trichobothria
fe = femur	ti = tibia
fr = frons	tr = trochanter
ge = gena	ty = tylus
gu = gula	ve = vertex
gx1 = first gonocoxa	I-3 = thoracic segments one to three
gx2 = second gonocoxa	II-VII = abdominal segments two to seven
ip = intercalary plate	





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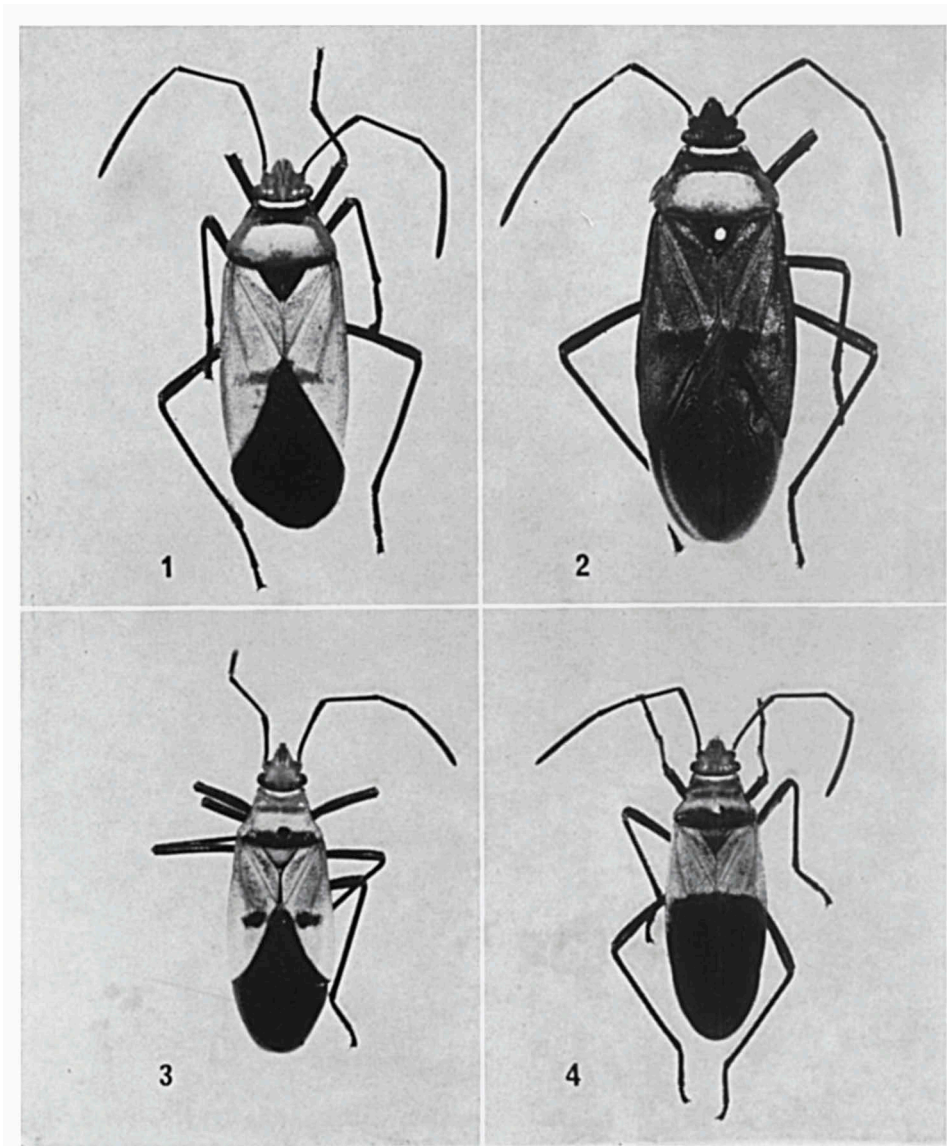
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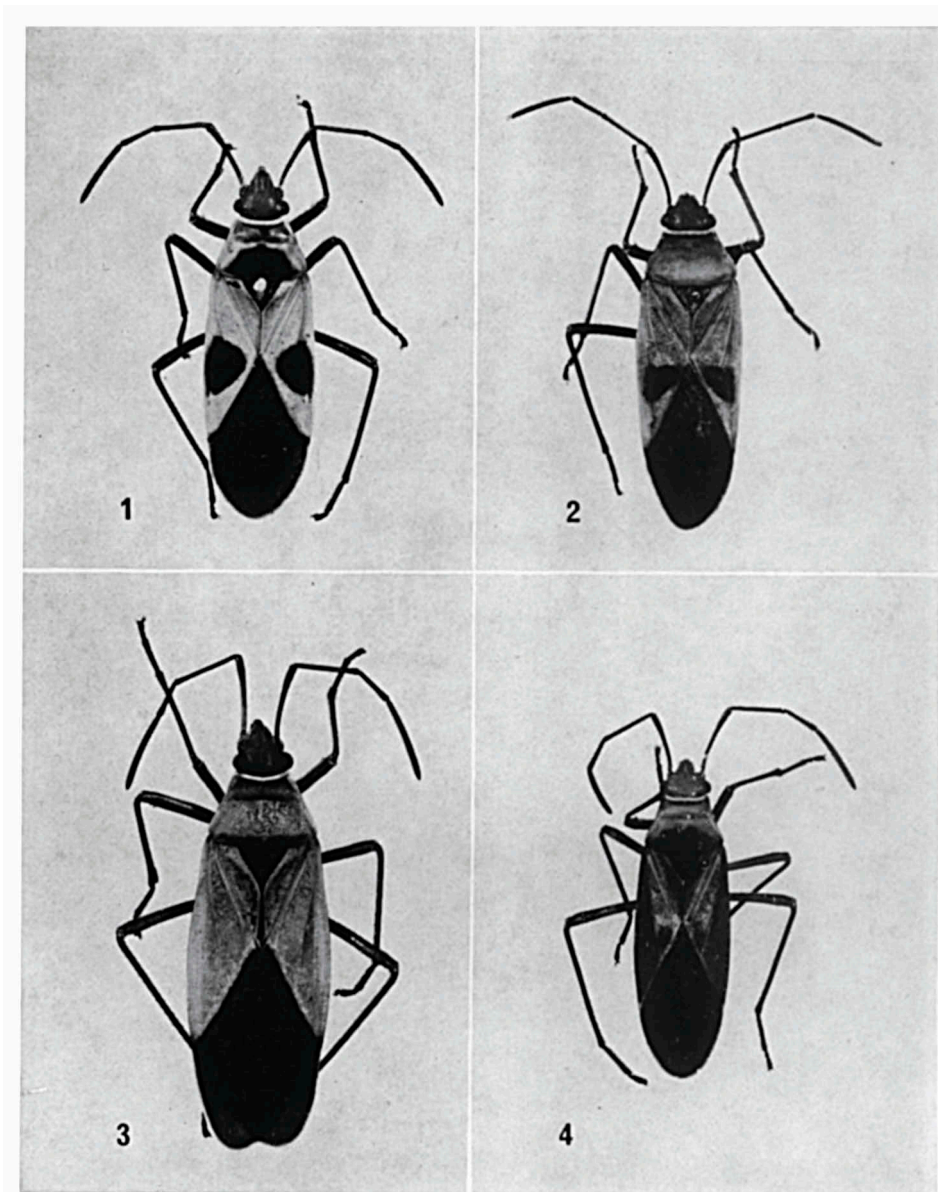
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Figs. 1, 2. *Dysdercus collaris* Blöte. 1, ♀ from Mérida, Venezuela; 2, ♀ from Paolia, Colombia. Figs. 3, 4. *Dysdercus imitator* Blöte, 2 ♂ from Buena Vista, Bolivia.



Figs. 1-4. *Dysdercus mimus* (Say). 1, *D. m. mimus* (Say), ♀ from Alta Vera Paz, Guatemala; 2, *D. m. ecuadorensis*, paratype ♀ from Parroquia, Ecuador; 3, *D. m. distanti* Blöte, ♀ from Cojedes, Venezuela; 4, *D. m. infuscatus* Blöte, from Suriname.

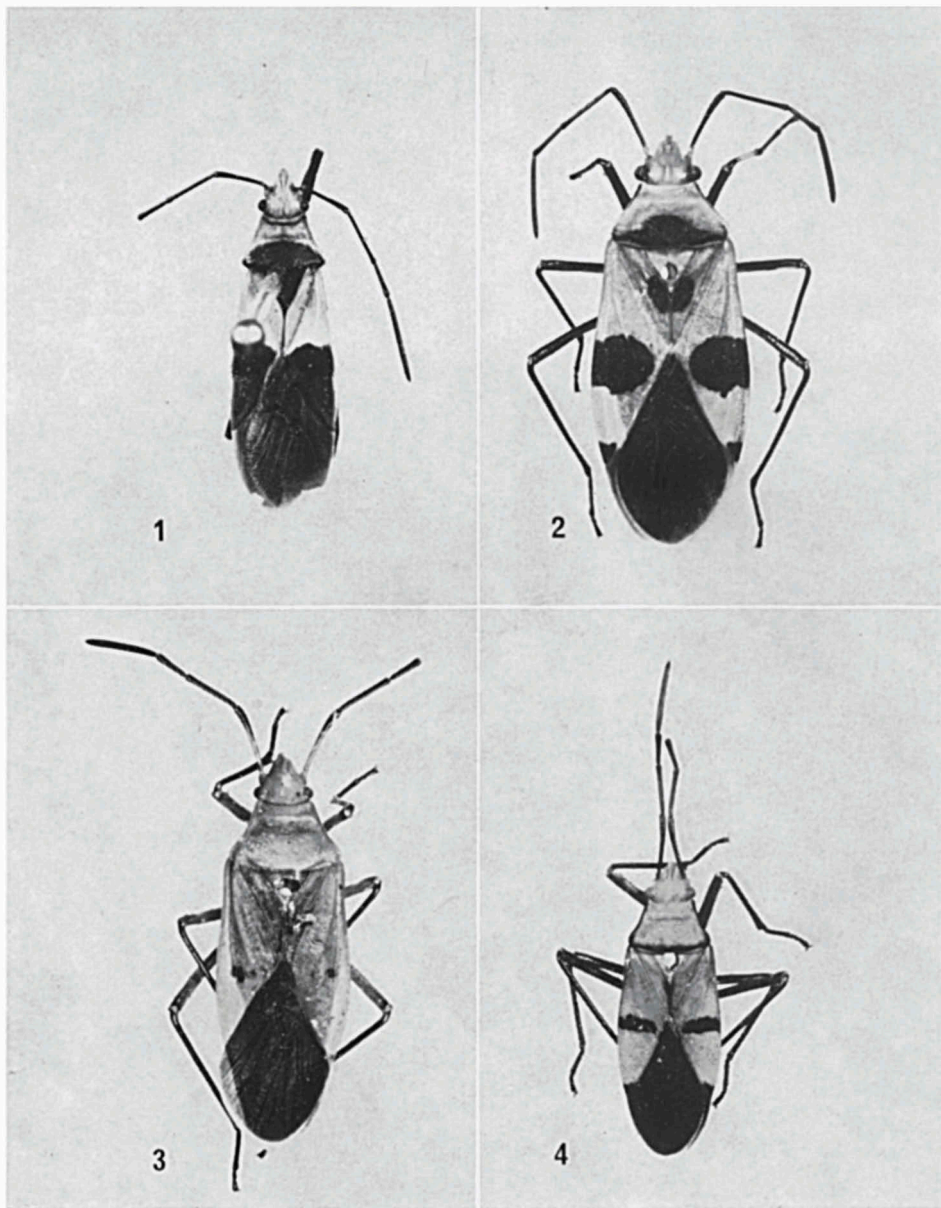
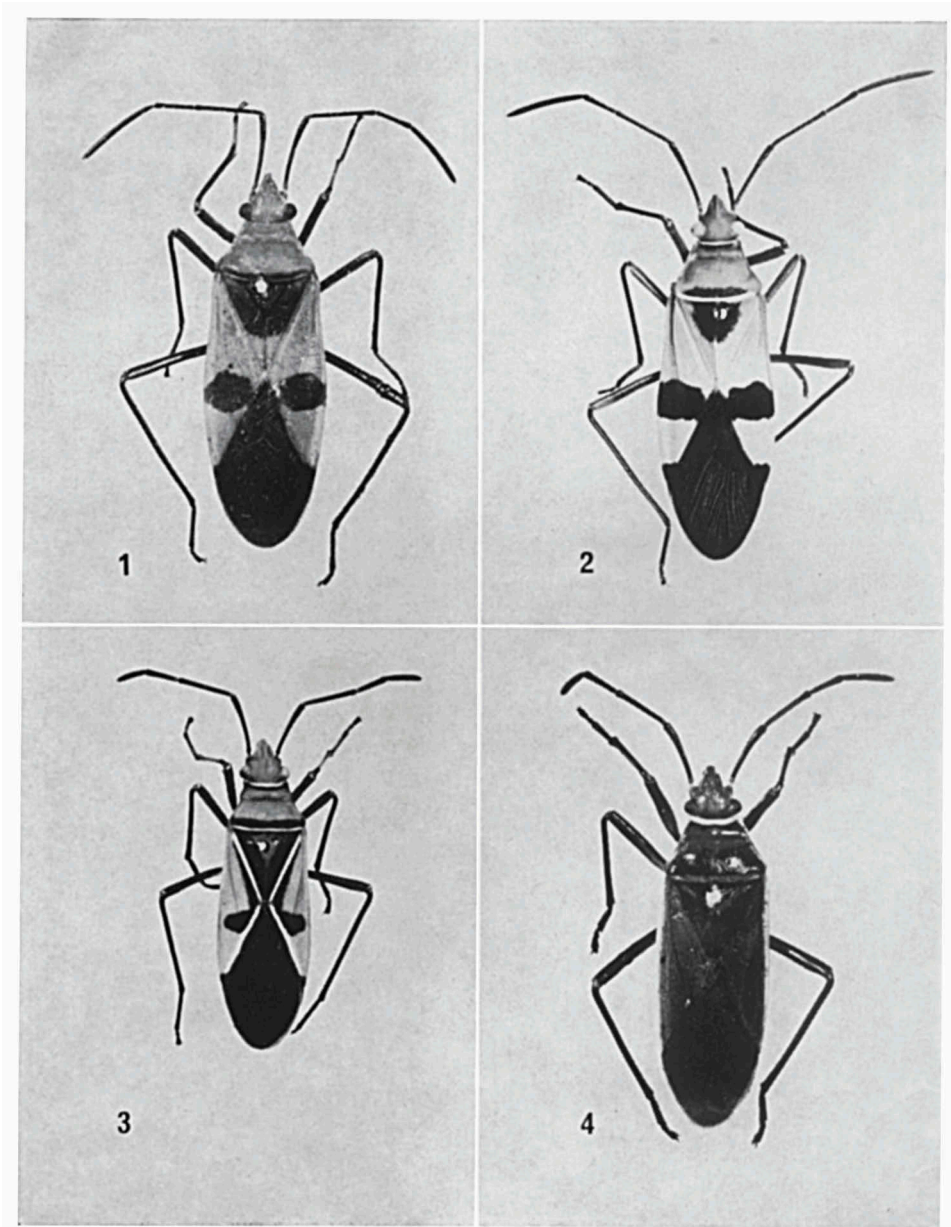
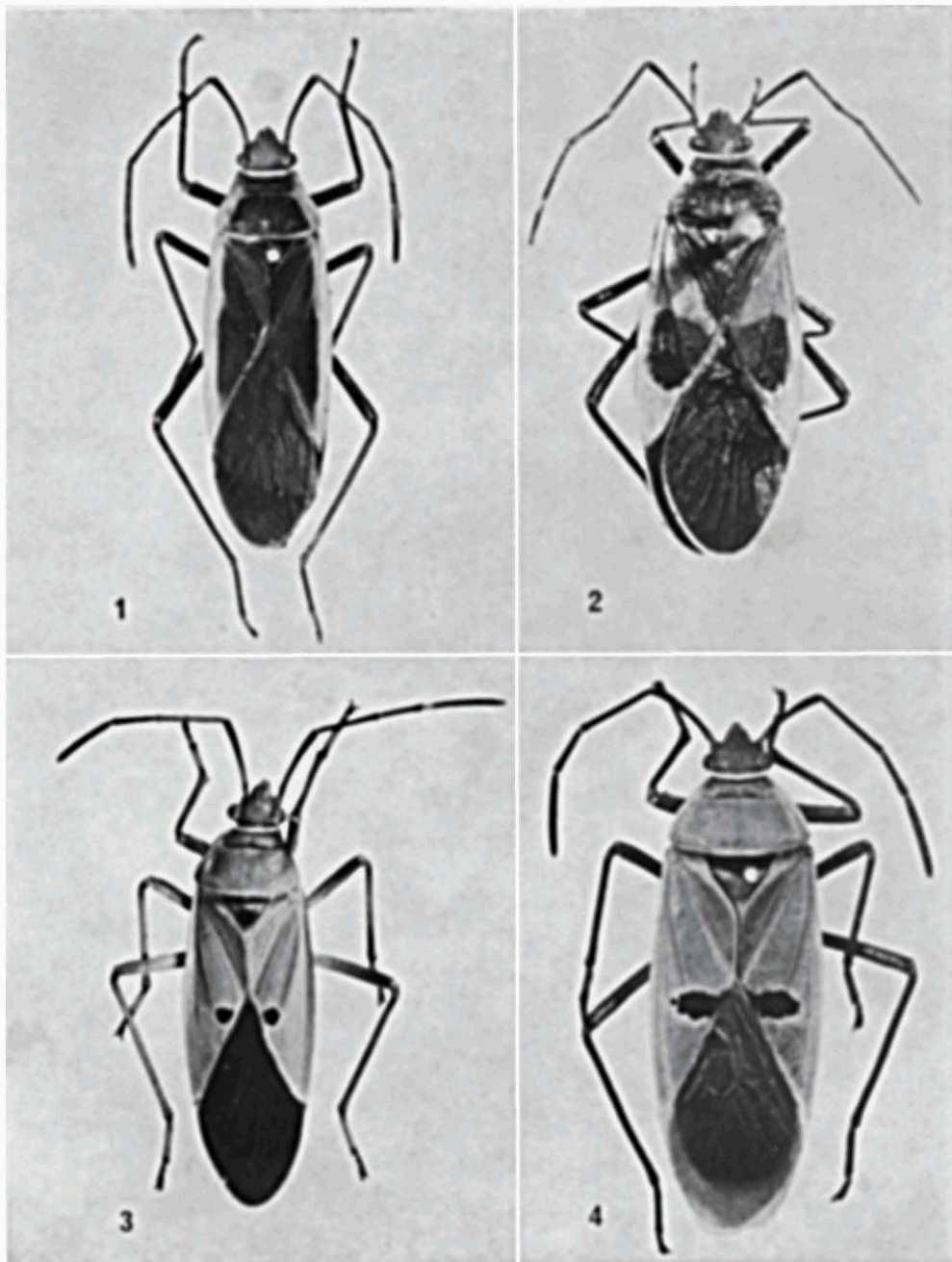


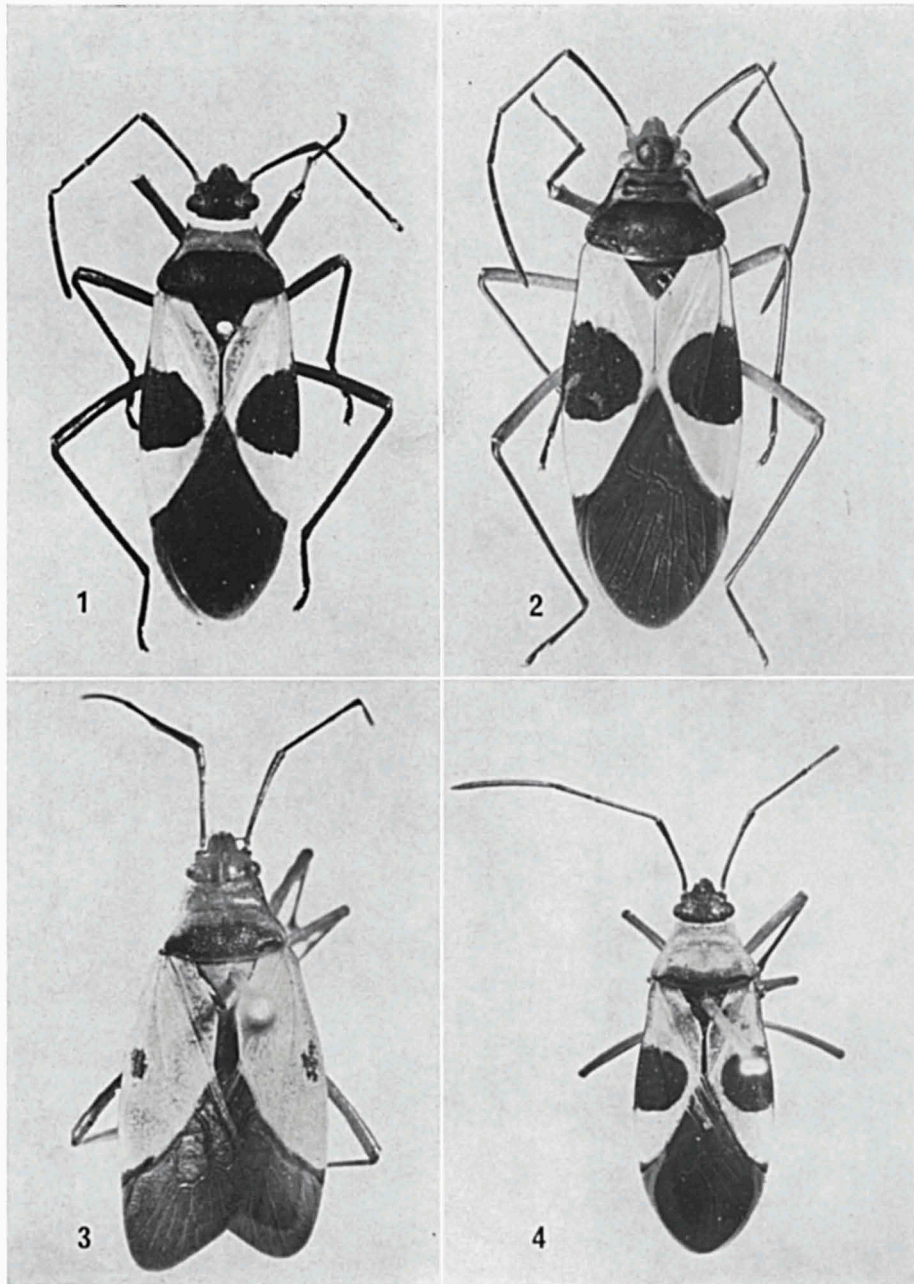
Fig. 1. *Dysdercus bloetei* nov. sp., holotype ♂ from Cachabé, Ecuador.
 Fig. 2. *Dysdercus jamaicensis* Walker, ♀ from Jamaica. Figs. 3, 4. *Dysdercus ocreatus* (Say). 3, *D. o. ocreatus* (Say), ♀ from Haïti; 4, *D. o. fervidus* Bergroth, ♂ from Cuba.



Figs. 1, 2. *Dysdercus sanguinarius* Stål. 1, *D. s. sanguinarius*, ♂ from Cuba; 2, *D. s. neglectus* nov. subsp., holotype ♂ from Mayagüez, Puerto Rico. Fig. 3. *Dysdercus andreae* (Linnaeus), ♀ from Key West, Florida. Fig. 4. *Dysdercus mimuloides* Blöte, ♂ from Isla del Rey, Gulf of Panama.



Figs. 1, 2. *Dysdercus flavolimbatus* Stål. 1, *D. f. flavolimbatus* Stål, ♂ from Córdoba, Vera Cruz, Mexico; 2, *D. f. oncopeltus* Distant, syntype ♀ from Volcano de Chiriqui, Panama. Figs. 3, 4. *Dysdercus bimaculatus* (Stål). 3, ♂ from Panama; 4 ♀ from Oaxaca, Mexico.



Figs. 1-4. *Dysdercus concinnus* Stål. 1, *D. c. concinnus*, ♀ from La Calera, Nicaragua; 2, *D. c. pohlkei* Schmidt, ♀ from La Chorrera, Panama; 3, *D. c. rufipes* Stål, allolectotype ♀ from Bogotá, Colombia; 4, *D. c. maritimus* nov. subsp., holotype ♂ from Porto Cabello, Venezuela.

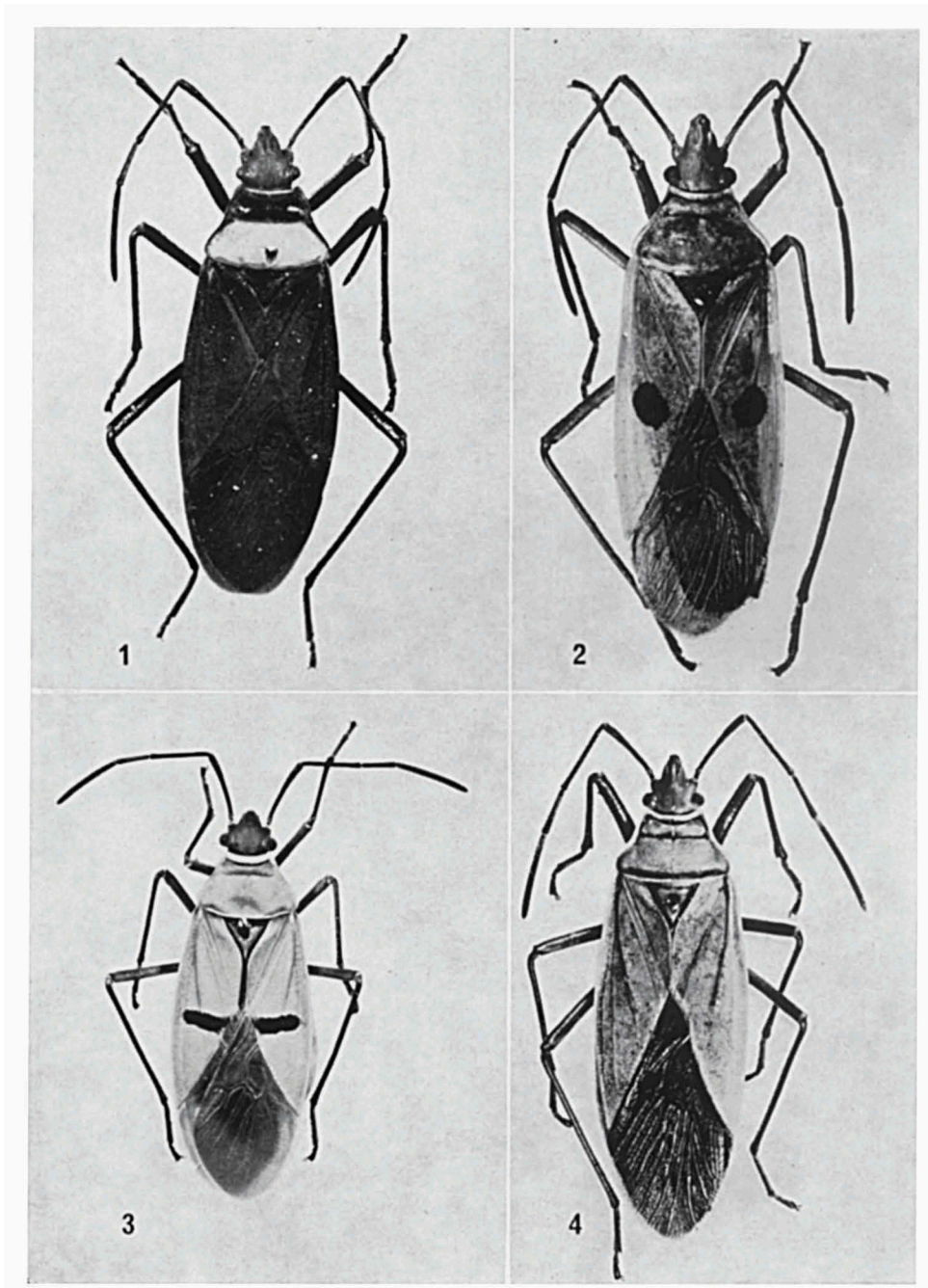


Fig. 1. *Dysdercus ruficeps* (Perty), ♀ from Cochabamba, Bolivia.
 Fig. 2. *Dysdercus chiriquinus* Distant, ♀ from Córdoba, Vera Cruz, Mexico.
 Fig. 3. *Dysdercus obliquus* (Herrich-Schäffer), ♀ from San Luis Potosi,
 Mexico. Fig. 4. *Dysdercus rusticus*, ♀ from Monson Valley, Peru.

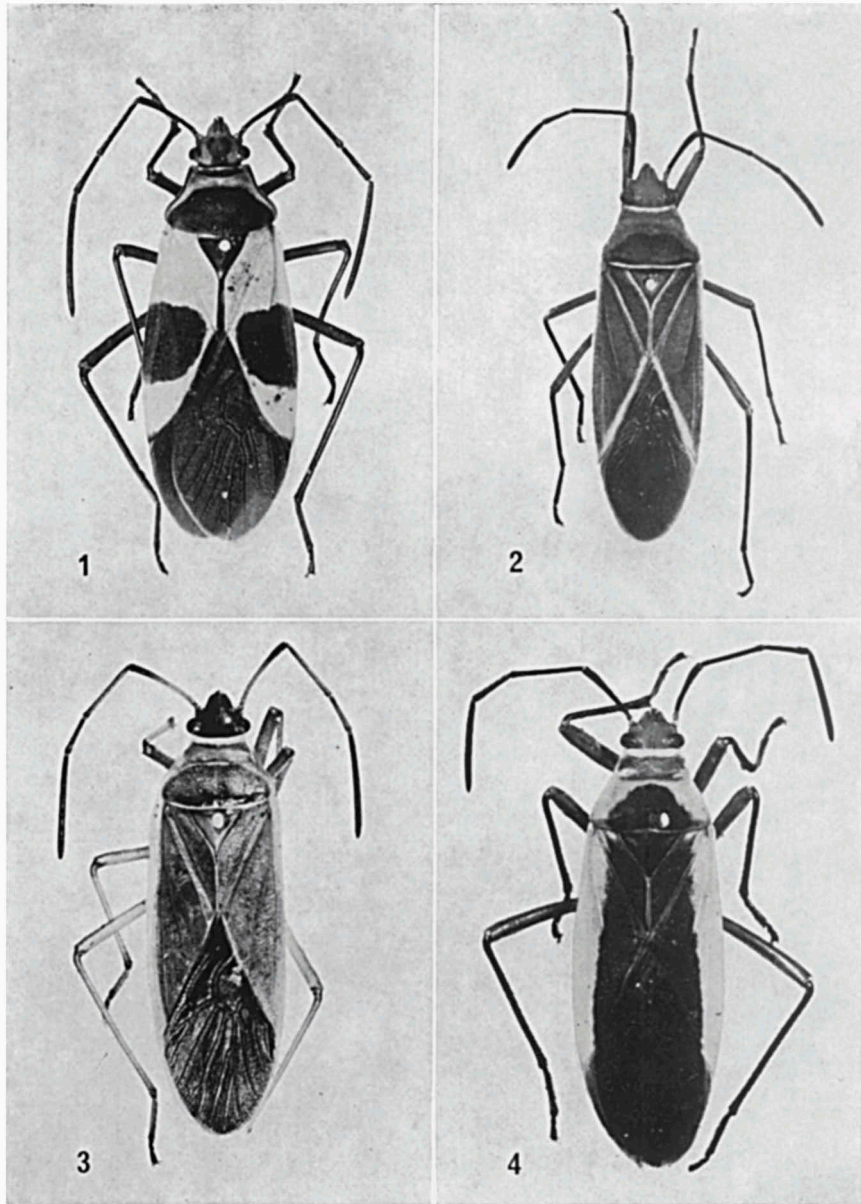
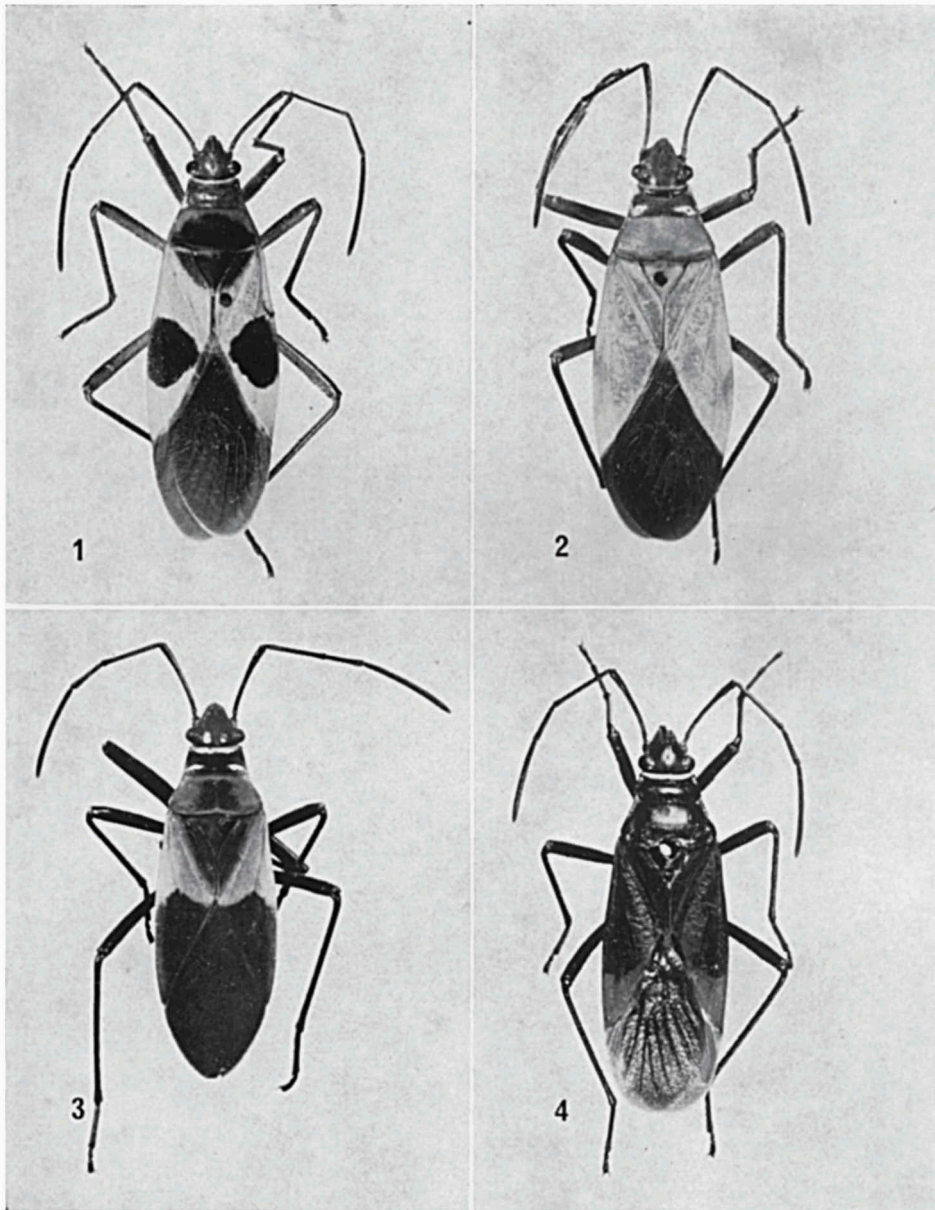
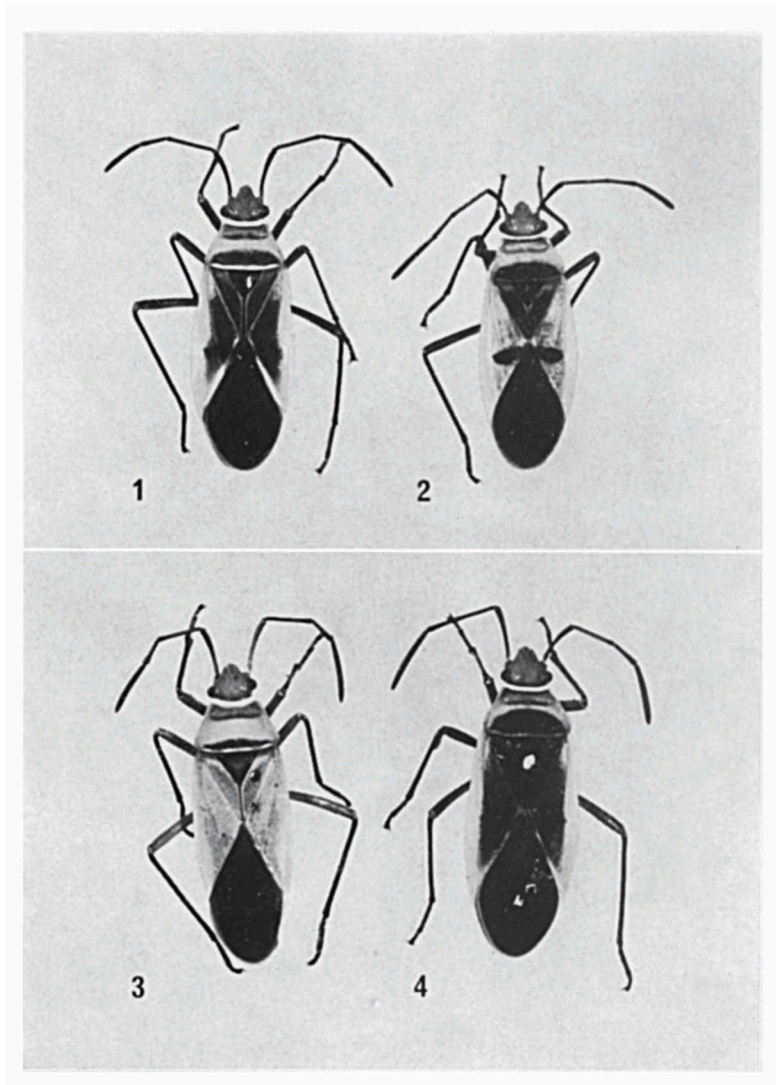


Fig. 1. *Dysdercus lunulatus* Uhler, ♀ from Gamboa, Panama. Figs. 2, 3. *Dysdercus suturellus* (Herrich-Schäffer). 2, *D. s. suturellus* (Herrich-Schäffer), ♂ from Key West, Florida; 3, *D. s. capitatus* Distant, ♀ from Petén, Guatemala. Fig. 4. *Dysdercus o. obscuratus* Distant, ♀ from Ahuacatlán, Nayarit, Mexico.



Figs. 1-4. *Dysdercus obscuratus* Distant. 1, *D. o. garzkei* Schmidt, ♂ from Sto Pablo, Colombia; 2, *D. o. flavipennis* Blöte, ♀ from Villavicencio, Colombia; 3, *D. o. incertus* Distant, ♀ from Turrialba, Costa Rica; 4, *D. o. lugubris* Schmidt, ♀ from Balsapamba, Ecuador.



Figs. 1-4. *Dysdercus mimulus* Hussey, 1, 2, 4, *D. m. mimulus* Hussey. 1, ♂ from Brownsville, Texas; 2, ♂ from Monterrey, Mexico; 4, ♀ from Vera Cruz, Mexico. 3, *D. m. luteus* nov. subsp., paratype ♂ from Tempe, Arizona, U.S.A.

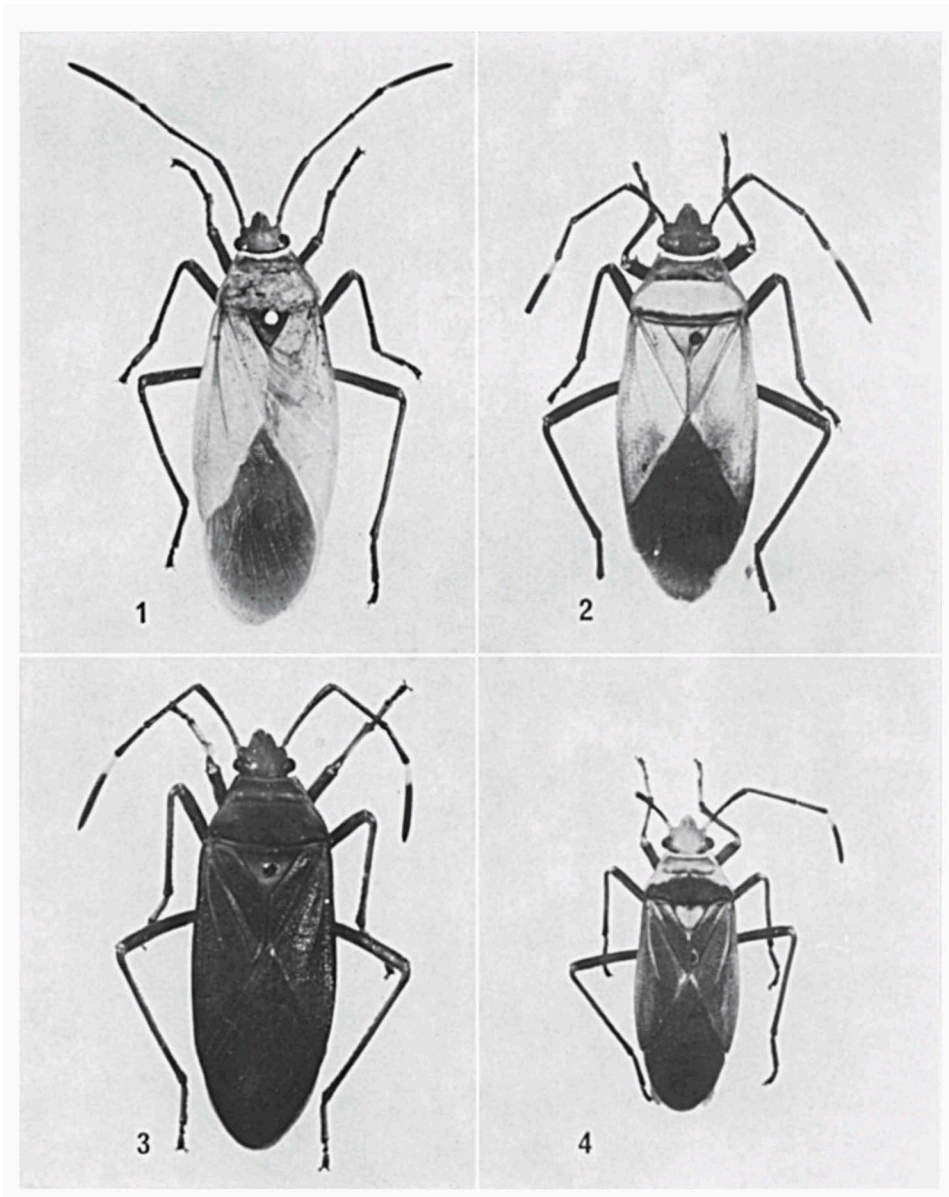


Fig. 1. *Dysdercus wilhelminae* nov. sp., holotype ♂ from La Rioja, Argentine. Figs. 2-4. *Dysdercus fulvoniger* (De Geer). 2, *D. f. fulvoniger* (De Geer), ♀ from Matapica, Suriname; 3, *D. f. discolor* Walker, ♀ from St. Vincent; 4, *D. f. modestus* nov. subsp., holotype ♂ from Curaçao.

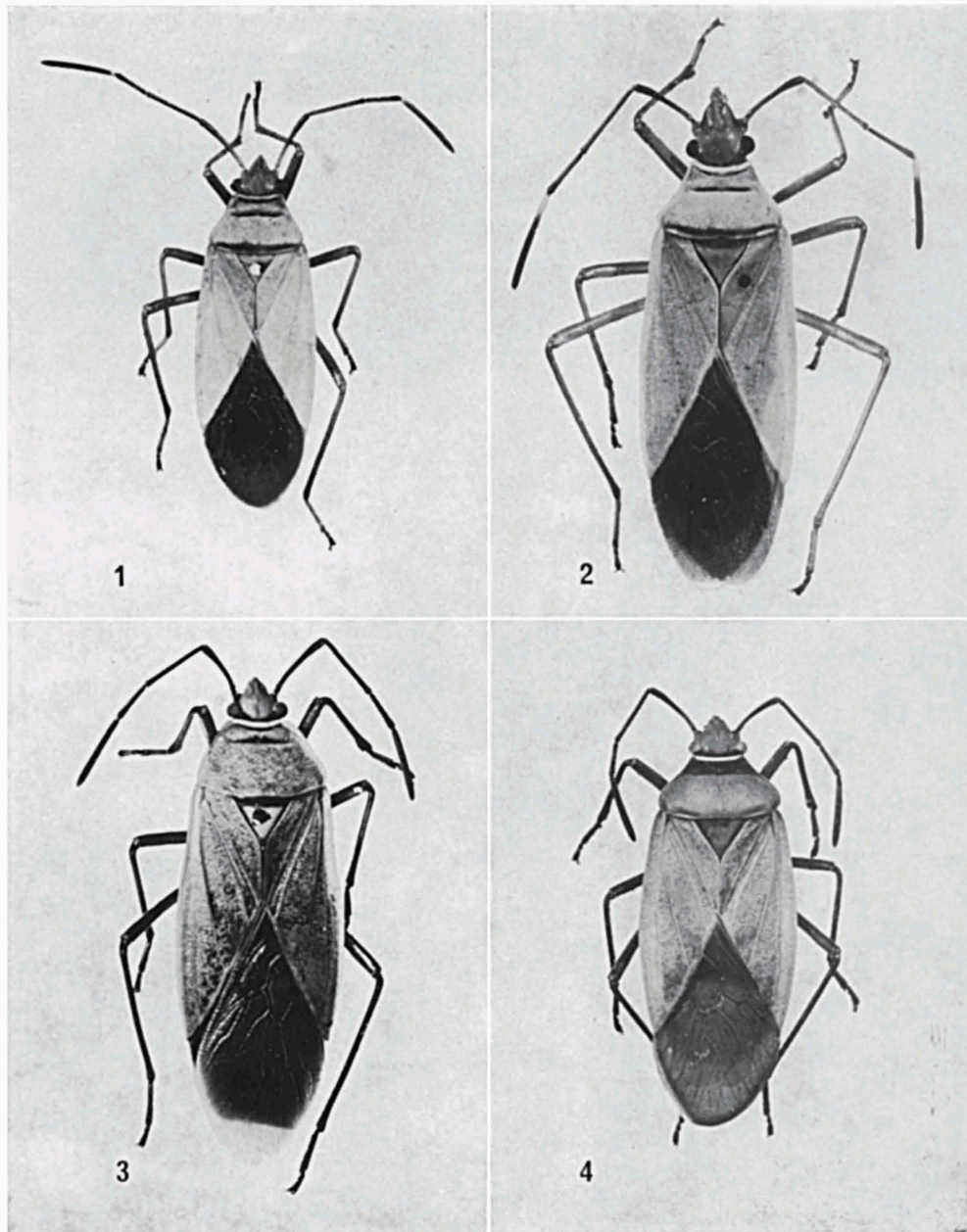
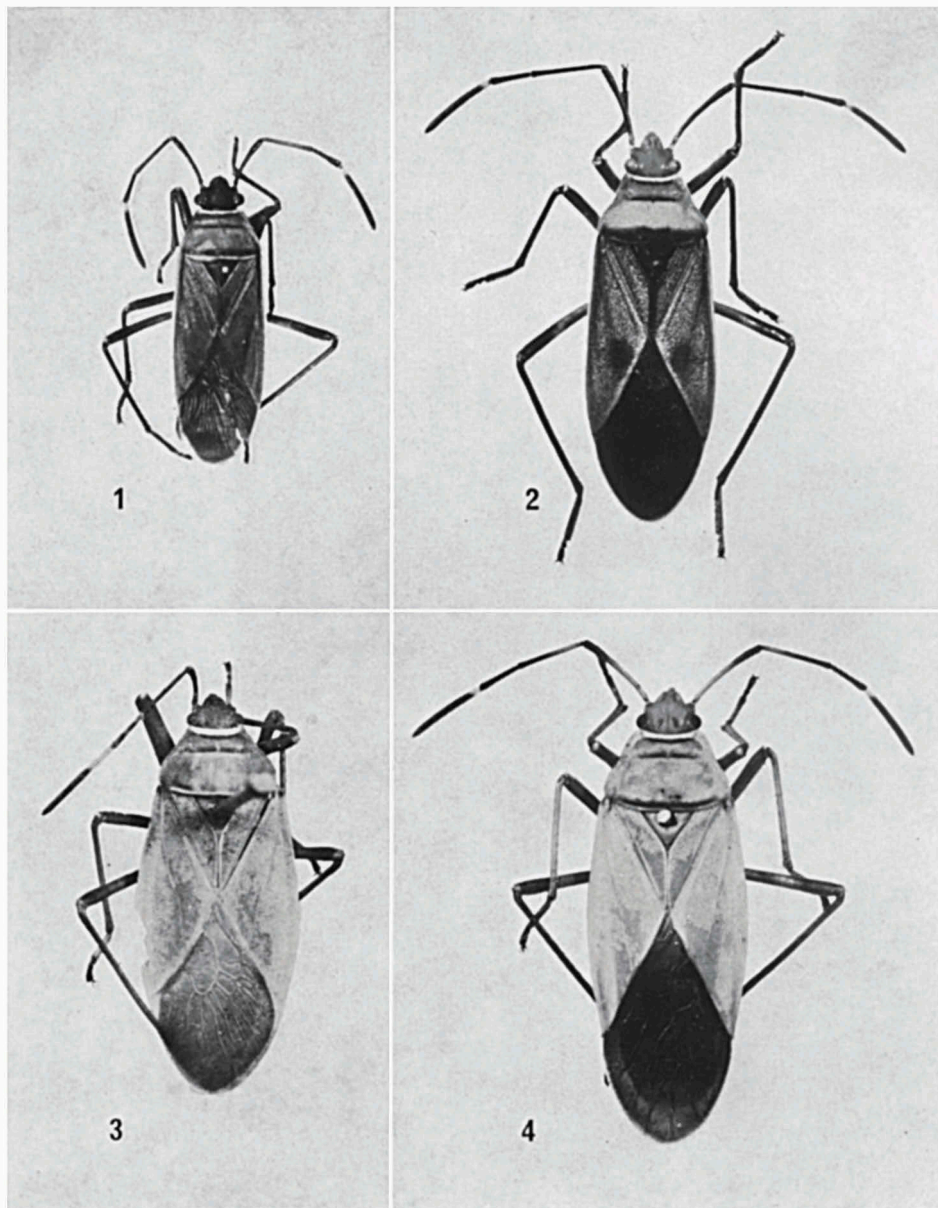
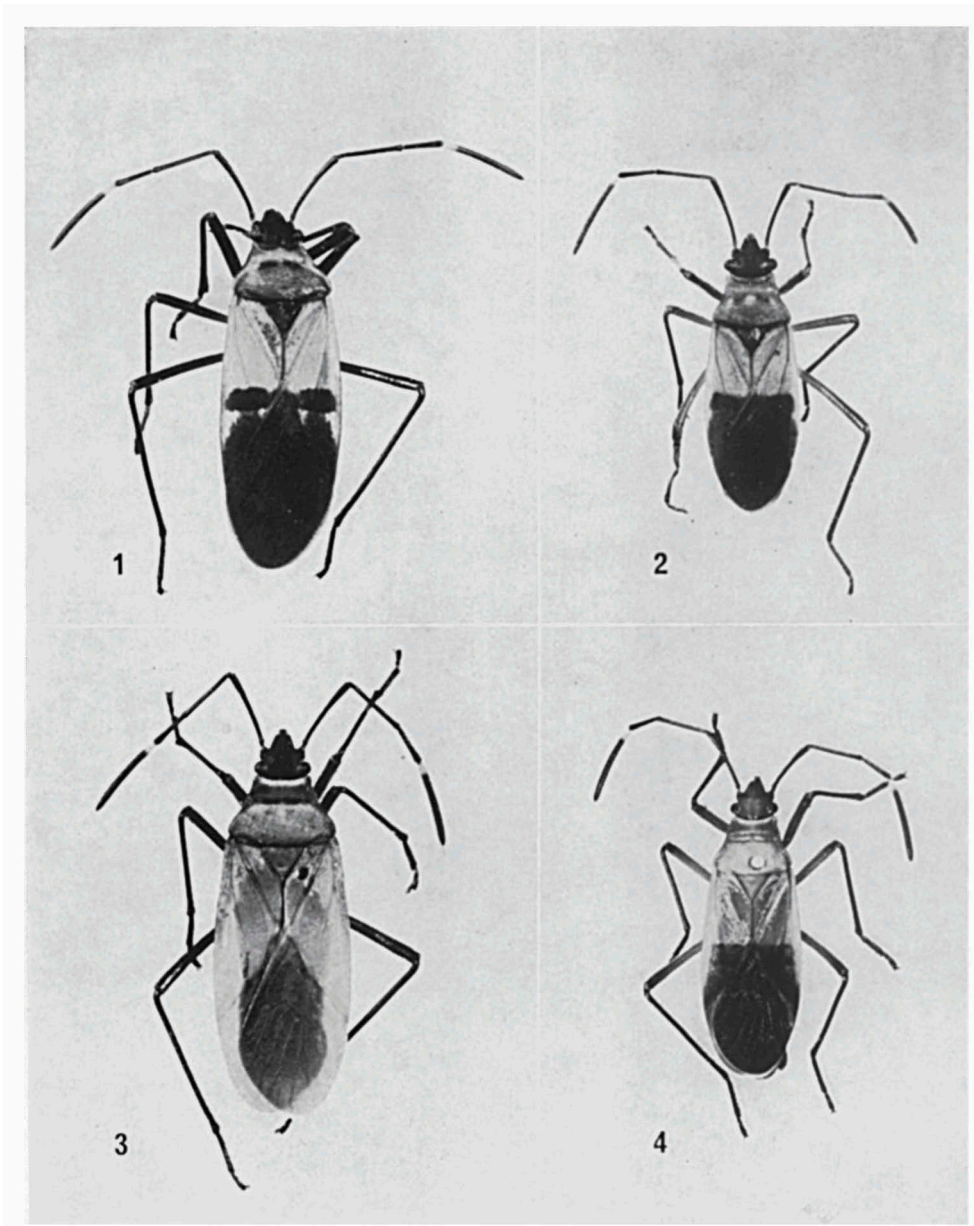


Fig. 1. *Dysdercus honestus* Blöte, ♂ from Mérida, Venezuela. Fig. 2. *Dysdercus longirostris* Stål, ♀ from Corcovado, Brazil. Fig. 3. *Dysdercus cordillerensis* nov. spec., ♂ from Rio Pampas, Peru. Fig. 4. *Dysdercus peruvianus* Guérin Méneville, ♀ from Bucay, Ecuador.



Figs. 1, 2. *Dysdercus maurus* Distant. 1, ♂ from Minas Gerais, Brazil; 2, ♂ from Paramaribo, Suriname. Fig. 3. *Dysdercus goyanus* nov. spec., holotype ♂ from Goyas, Brazil. Fig. 4. *Dysdercus chaquensis* Freiberg, ♀ from Pronunciamente, Argentine.



Figs. 1-4. *Dysdercus ruficollis* (Linnaeus). 1, ♂ from Rio de Janeiro, Brazil; 2, ♂ from Corcovado, Brazil; 3, ♀ from Nova Teutonia, Brazil; 4, ♂ from Sipaliwini, Suriname.

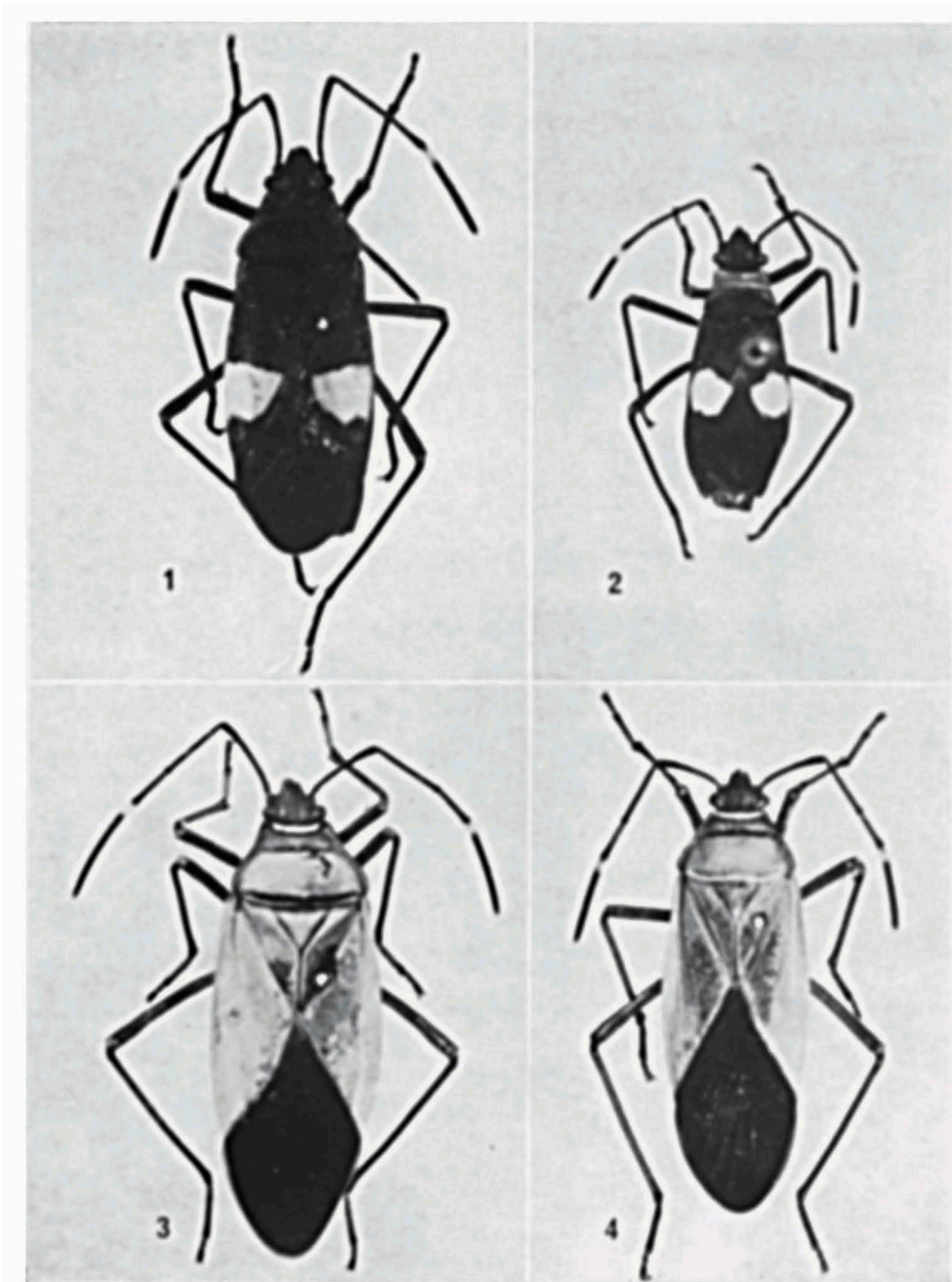
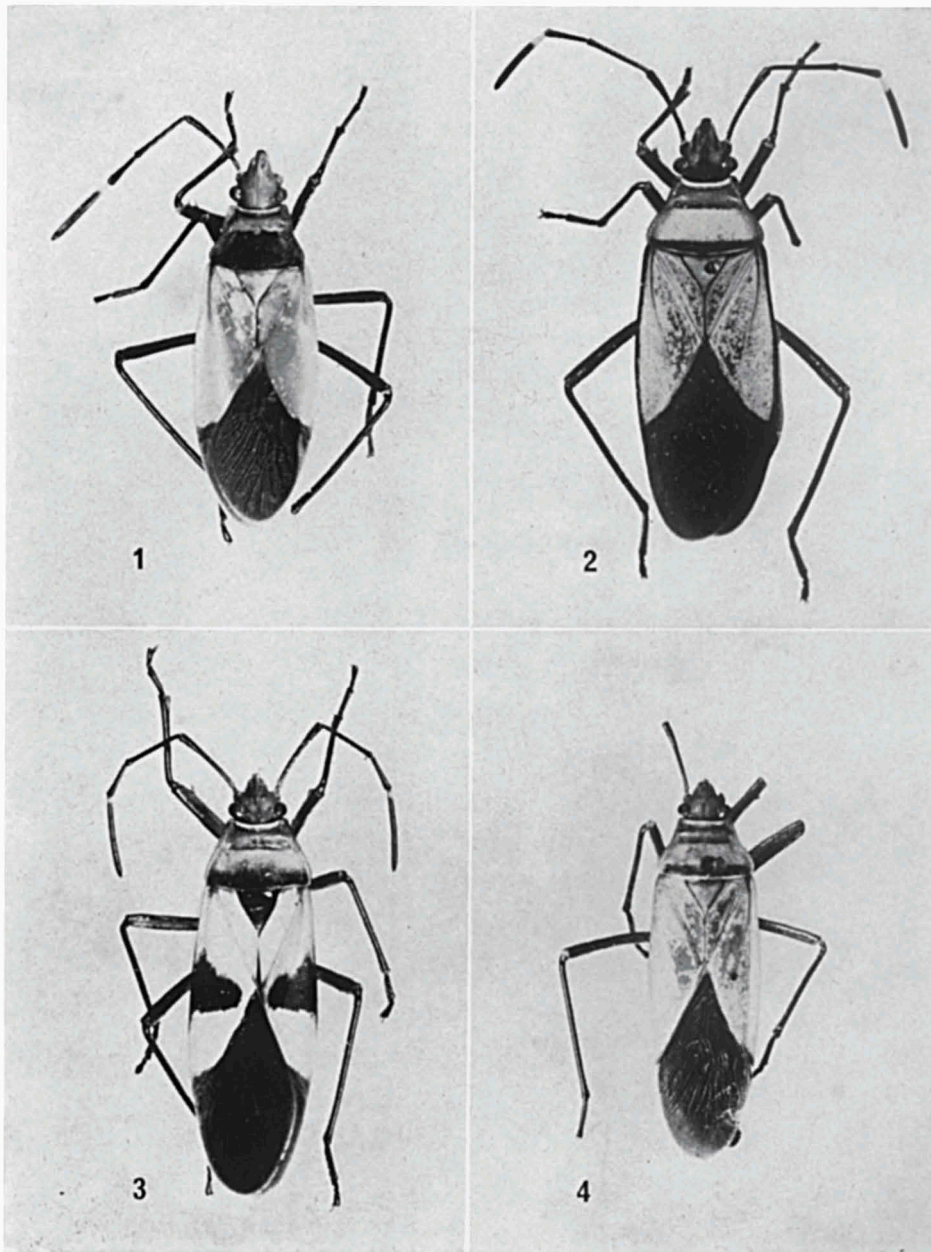


Fig. 1. *Dysdercus albofasciatus* Berg, ♀ from Nova Teutonia, Brazil.
Fig. 2. *Dysdercus albomaculatus* nov. sp., holotype ♂ from Santa Cruz, Bolivia.
Fig. 3. *Dysdercus immarginatus* Blöte, ♀ from Corcovado, Brazil.
Fig. 4. *Dysdercus urbahni* Schmidt, ♀ from Manaus, Brazil.



Figs. 1, 2. *Dysdercus fernaldi* Ballou. 1, *D. f. fernaldi* Ballou, ♀ from Grenada, West Indies; 2, *D. f. fuscofasciatus* Blöte, ♀ from Coronie, Suriname. Figs. 3, 4. *Dysdercus basialbus* Schmidt. 3, *D. b. basialbus*, ♂ from La Ceiba, Honduras; 4, *D. b. silaceus* nov. subsp., holotype ♂ from Cochabamba, Bolivia.