

**MALE GENITALIA OF THE PARASARCOPHAGA DUX  
(THOMSON)-GROUP OF THE SUBGENUS LIOSARCOPHAGA  
ENDERLEIN, 1928 (DIPTERA, SARCOPHAGIDAE)**

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There exist only few examples of such a partly incredible taxonomical confusion in such a comparatively easily definable group of flies as within the family Sarcophagidae. The reasons seem to be obvious. Most of the species of this family are habitually rather uniform so that only supraspecific taxa (genera, species groups) can be recognized by their habitual characters in most cases, individually also a habitual identification of species is possible. This contrasts with the fact that especially the male genitalia offer mostly unambiguous specific characters, making a correct identification of nearly each individual quite easy. The importance of male genitalia for the identification of species in Sarcophagidae was early recognized but it was mainly Böttcher (1912—1913) who established the first comprehensive classification of Sarcophagidae according to male genitalia. Irrespective of this important fact, his figures of male genitalia were problematic, first of all because of their too simple outline and, second, their magnification was unsatisfactory so that important details were omitted, as seen also in the case of the *dux*-group where Böttcher's paper caused some unnecessary mistakes. It was Rodendorf (1937) who definitely recognized the necessity of devoting greater care to the details of male genitalia in this family and to their drawings as he presented them after years of busy efforts in his yet classical book mentioned above.

An example of this general development of taxonomy in Sarcophagidae is the co-called „*misera—dux*“ group of the genus *Parasarcophaga* Johnston & Tiegs, 1921, one of the most voluminous genera comprising rather advanced and progressive forms of this family, in which a recent speciation should be presumed from a common ancestor (monophyly), so that Rodendorf (1937) calls it a „central genus“ of Sarcophagidae. The confusion started, typically, by a misidentification of specimens (belonging to *Sarcophaga dux* Thoms.) sent by Johnston & Tiegs to E. E. Austen, as *Sarcophaga misera* Walker, 1949, by Austen. *Parasarcophaga* [s. str.] *misera* (Walker, 1849) was described after a female (see Lopes & Kano, 1979) from Australia. This species is widely distributed in the Australian and Oriental Region, New Guinea,

Formosa, Philippine Islands, China, Japan, India and Ceylon, reaching its northern limit probably in the Ussuri territory of Far East. The species, which has nothing in common with *P. (L.) dux* (Thoms.), is a typical representative of the genus *Parasarcophaga* (s. str.), as evidenced by its genitalia (fig. 1). It also represents ecologically a schizophagous form, feeding on various decaying organic substrates. This error caused that for nearly sixty years Walker's name was erroneously applied to a sanitarily important species of nearly cosmo-subtropical to tropical distribution.

The next circumstance responsible for this confusion was the current misidentification of related but distinctly different species, as typically reflected — irrespective of numerous less important papers — mainly in the monograph of the West European Sarcophagidae by Séguy (1941). It is difficult to see, why Séguy, having at his disposal several related species of this group, recognized yet by his countryman Pandellé (1896) [e. g. *harpax*, *tuberosa*], considered specific and rather constant structures of male genitalia as variation classes and attributed to these excellent specific taxa at most a subspecific status. This confusion increased essentially also in numerous other cases of misidentified species of this group, including their frequent mistakings, often by prominent dipterists. In such cases it is even difficult to decide whether purely nomenclatorial or factual errors or whatever kind of misunderstandings were concerned. In several instances even such species as *Parasarcophaga ruficornis* (Fabr.), a widely distributed tropical synanthrope, were involved (figs. 22, 23). And — last not least — the typical species of the subgenus *Liosarcophaga* remained practically uncleared, because its most decisive character, viz., the genitalia were not properly studied by a specialist, and consequently its taxonomical validity and value was an open question.

This unnecessary confusion was gradually removed by both European [Gregor & Povolný (1959, 1960, a, b, 1961)] and by other authors [e. g. Kano, Field, Shinonaga (1967)] who based their identifications more or less on Rodendorf's papers especially on his monograph [Rodendorf (1937)]. Rodendorf identified, during the thirties of this century and after World War II, extensive series of specific taxa of this group recognizing in them members of a special subgenus (*Liosarcophaga*) described accidentally by Enderlein (1928). It is known to me, from my long-lasting personal communication with Rodendorf, that he intended to work out a monograph of this group up to his last days. I therefore tried to contribute to this endeavour after his death. This paper is based on my identification of materials of the „*dux-misera*“ group in the collections of the Department of Entomology, British Museum (Natural History — BMNH), London, and completed by series of Central European species of my own and of some other species presented by Dr. Jurij Verves, Kiev. Most of the specimens in the BMNH had been determined by Rodendorf himself, which fact facilitated my task irrespective of some existing nomenclatorial errors for which Rodendorf was not res-

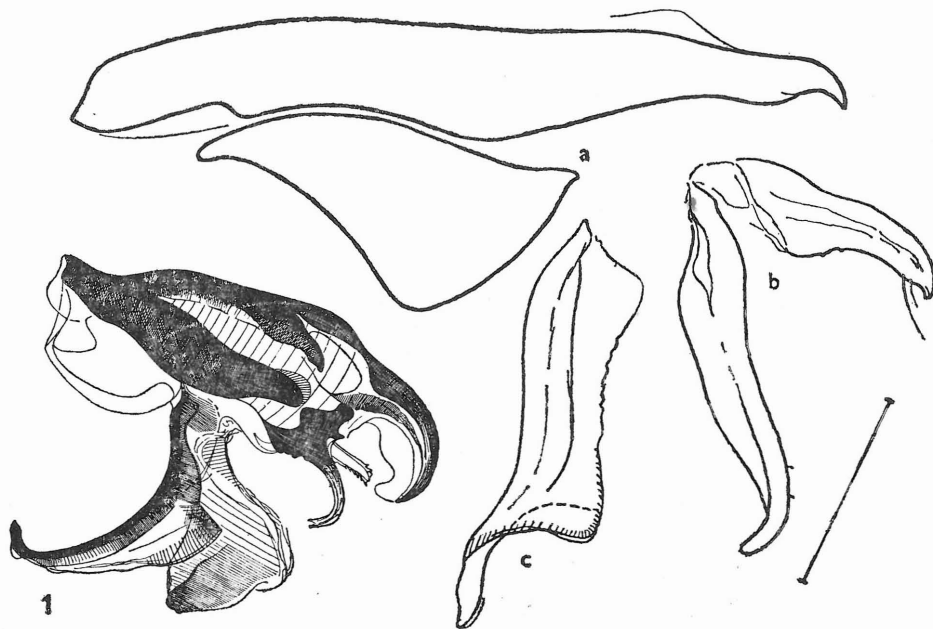


Fig. 1: *Parasarcophaga (Parasarcophaga) misera* (Walker, 1849), paraphallus, cercus with coxite (a), gonites (b) and membranal tube (c), (Burpengary, Queensland). The abscissa corresponds 0.25 mm.

possible. Another important contribution to this paper was the fact that, finally, I could study one of the decisive syntypes of *Cynomyia madeirensis* Schiner preserved in the collections of the Entomologische Abteilung, Naturhistorischen Museum, Vienna. I was obliged to abandon the revision of the entire subgenus *Liosarcophaga* End. due to difficulties in providing some additional and important type specimens, which are either not accessible or probably lost so that no definite conclusions could be done on the taxonomic status and nomenclatorial validity of certain remaining taxa and the work would extend over additional years. I therefore decided to publish the results of my study of this species group which represents no doubt the most difficult and a numerous complex of this subgenus to create in such a way a necessary base for a future revision of this subgenus which should offer only organisatory problems to be easily enclosed by a museum taxonomist. My own possibilities are rather limited in this respect.

The „*dux-misera*“ group of the subgenus *Liosarcophaga* End. is characterized by striking paired, mostly well sclerotized terminal ledges hanging deeply from the upper lateral sclerite of the paraphallus (phallosome) tip. These species, generally known as „*misera*“ group [see e. g. Séguy (1941)], are no doubt strictly monophyletic, possessing

essentially identical structural elements of the phallosome which appear to be characteristic only by their qualitative differentiation, offering absolutely constant specific criteria recognized first by Pandellé (1896). Thus, a close relationship of the individual species of the „miserä“ — group makes it therefore difficult to judge on their concrete relations which remain, but for a few cases, still a question of more or less subjective considerations. Their inaccurate interpretation, started by Böttcher (1912/1913) and continued mainly by Séguy (1941), caused numerous confusions of distinct specific taxa which were rehabilitated mainly by Rodendorf (1937).

Ecologically all these species are either true scavengers or parasitoids to pseudoparasitoids. The adults of both sexes are frequent visitors of such substrates as decaying meat and feces [see Povolný in Greenberg et al. (1971)]. Their maggots can develop in various kinds of invertebrate and vertebrate carcasses including necrotic tissues of living animals and some of the body cavities (producing myiases). When describing „*Sarcophaga tuberosa* var. *sarracenoides*“, Aldrich (1916) gives a detailed and exemplary information on such relations in maggots of this form reared from grasshoppers (obviously locusts),

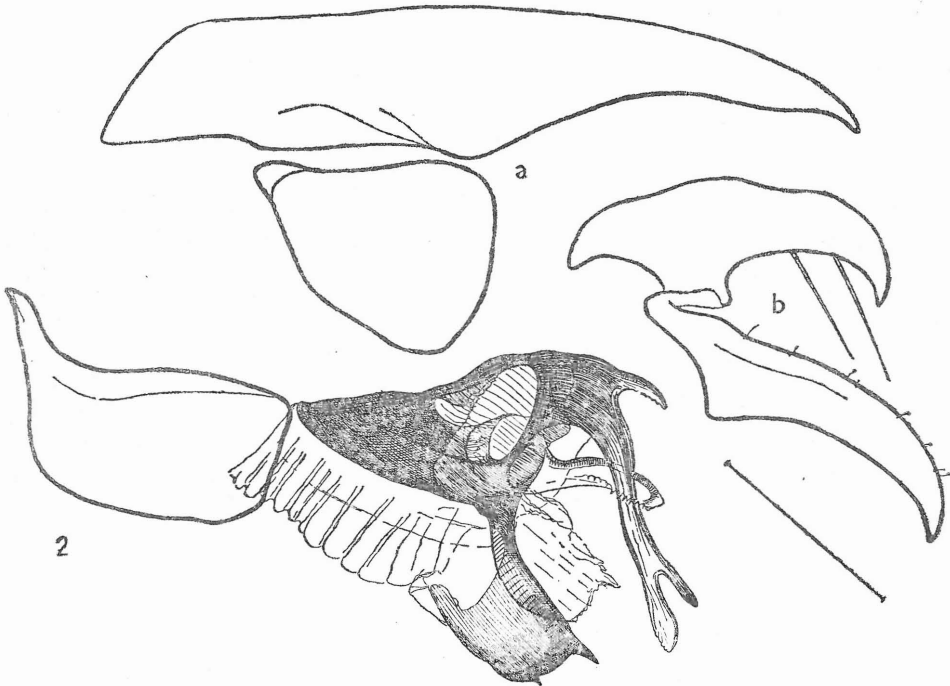


Fig. 2: *Parasarcophaga* (*Liosarcophaga*) *dux* (Thomson, 1868), paraphallus, cercus with coxite (a), and gonites (b), [Dalmatia, Korčula]. Abscissa equals 0.25 mm.

noctuid and other moth caterpillars, larvae and pupae of various beetles (Coleoptera) and unspecified vertebrate carcasses („decaying meat“). Numerous data on the ecology of these species are presented also by Kano, Field, Shinonaga (1967) in their monograph of Japanese Sarcophagidae. They characterize most of these species as visitors of various animal carcasses and of privies, especially of fish along rivers and seashores. Rodendorf (1937) gives numerous observations of successful rearings of *Liosarcophaga* spp. (and other *Parasarcophaga* species generally) from dead locusts based mainly on observations by Olsufjev. Numerous cases of myiasis caused by the members of the „*miser*“ group are mentioned in literature [Rodendorf (1937), James (1947), Zumpt (1965), Kano, Field, Shinonaga (1967), Smith et al. (1973)]. There is no doubt that *Liosarcophaga* spp. are not specific parasites or parasitoids but that they represent rather generalized copronecrophagous forms which are able to develop in a wide scale and range of organic substrates and that their importance in medicine and hygiene increases in subtropical and tropical latitudes.

#### On the subgenus

#### *Liosarcophaga* Enderlein, 1928

This subgenus was constituted (as a genus) by Enderlein (1928) as follows (p. 18): „Scutellum mit 1 Lateralborste,  $r_1$  unbehaart. Hinterrandmitte des 3. Abdominaltergites mit 2 Macrochaeten. 6. Abdominaltergit des ♂ ohne Borstenreihe. Hinterschiene des ♂ auf der Innenseite mit auffällig langen Pelzhaaren. Mittelschenkel-Ctenidium des ♂ fehlt“.

On the basis of the purely habitual characters Enderlein (1928) included, besides the typical *madeirensis* Schiner, two species in this supraspecific taxon constituted as a genus, viz. *Thyrsocnema corsicana* (Villeneuve, 1911) and *Pandelleana protuberans* (Pandellé, 1896) which are neither congeneric nor consubgeneric. The other species described as new by Enderlein, viz. *Liosarcophaga nigricaudata* (South Europe), *L. bismarckburgensis* (Aethiopian — Togo) and *L. westermanni* (Java) must be considered nomina nuda [see also Verves (1980)]. Moreover, the characters of chaetotaxy mentioned by Enderlein (1928) are rather specific of *Liosarcophaga madeirensis*, which is a habitually striking species among the other specific taxa of this subgenus. This confusion and unsatisfactory definition caused that the genus *Liosarcophaga* Enderlein was not generally recognized. The only author recognizing this supraspecific taxon was Rodendorf (1937) who included *Liosarcophaga* Enderlein as a subgenus in his genus *Parasarcophaga* Johnston & Tiegs, 1921. Rodendorf's interpretation of *Liosarcophaga* is based, however, primarily on male genitalia, as seen from my English translation of his original Russian diagnosis: „Apical part of paraphallus moderately sclerotized, provided with paired, rather thin, long processes bifurcated or dilated apically; membranous processes forming paired, very subtle and

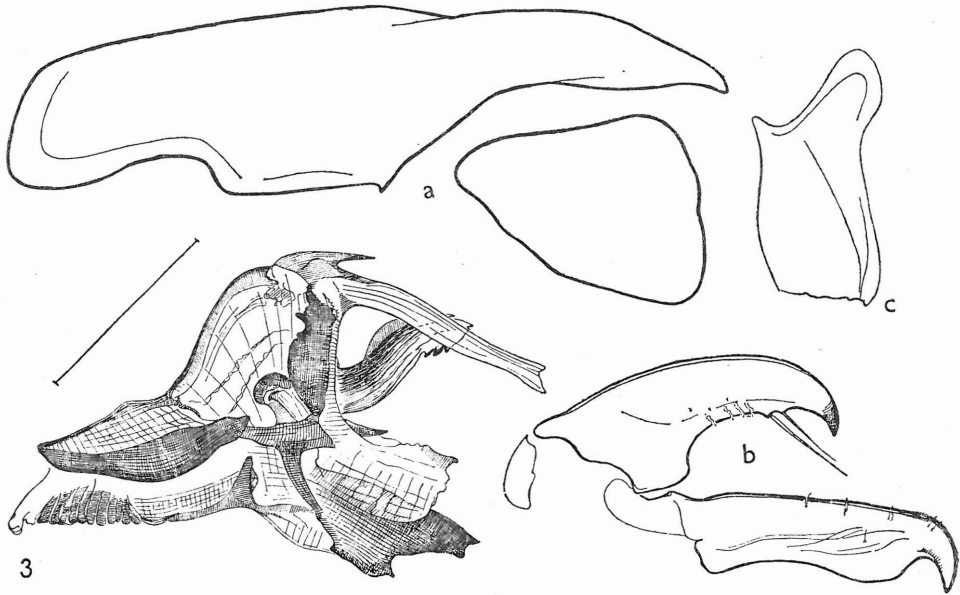


Fig. 3: *Parasarcophaga (Liosarcophaga) dux* (Thomson 1868), paraphallus, cercus with coxite (a), gronites (b), and membranous tube (c), (Egypt).

flat structures, either two or rarely one pair. Stilets long and thin, rarely thick. Genital tergite marginally without bristles. Genae and facies moderately wide“.

In his more recent paper and key to the supraspecific taxa of the tribe Sarcophagini, Rodendorf (1965) defines (in Russian) the subgenus *Liosarcophaga* Enderlein as follows (the English translation is mine): „Membranous processes forming a pair of flat flaps. Ventral processes of paraphallus base flat, similar to the membranous processes, only more sclerotized; central part of the apical portion (of paraphallus) usually short, essentially shorter than lateral processes; if it is big, then it is usually divided by a longitudinal groove into two parts; anal tergite often red.“

As evidenced by Rodendorf (1937, 1965), the subgenus *Liosarcophaga* comprises some 25 species many of which were originally described as mere varieties of „*Sarcophaga misera*“ auct. (nec Walker, 1849) or of some other specific taxa of this group [see, e. g., Séguy, 1941]. In his classical book Rodendorf (1937) not only proved that very good specific taxa were concerned but he also described further species of this group.

There might arise probably just one critical comment concerning this Rodendorf's interpretation of *Liosarcophaga*. This concerns the subgenus

*Pandelleisca* Rodendorf, 1937 [type species *Parasarcophaga similis* (Pandellé, 1896) — see fig. 17] which is so closely related to *Liosarcophaga* Enderlein that there are no reliable differences between the two subgenera. Rodendorf (1937) was partly aware of this fact since he writes (p. 238, the English translation is mine): „The peculiar structure of the penis... indicates its close relation to the subgenus *Liosarcophaga*“. — In his compilation of the tribe Sarcophagini, Rodendorf (1965) also gives no reliable criteria separating these two subgenera because the apparent discriminating characters are of purely quantitative character. Moreover, *Parasarcophaga similis* (Pand.) [fig. 17] offers no distributional or ecological circumstances separating it from the other species of the subgenus *Liosarcophaga*. It is a common transpalaeartic species distributed from Europe across temperate Asia to Japan, accompanying its deciduous and mixed forests and forest zone being a common parasitoid [see also Kano, Field, Shinonaga (1967)].

Irrespective of these and possibly other minor corrections, Rodendorf's (1937 and later) work is no doubt a milestone in the study of this (and other) group, proving, at the same time, the decisive importance and usefulness of male genitalia for the correct identification of species of this group, including its hierarchic classification.

#### ***Parasarcophaga (Liosarcophaga) madeirensis* (Schiner, 1868)**

Schiner, 1868, Nearctic Diptera Catalogue, 1442 (*Cynomyia*)

During my long-lasting study of various species of the subgenus *Liosarcophaga* End., I never detected any specimen identified as *madeirensis* Schin. (type species of *Liasarcophaga*). After a complicated exchange of ideas with Dr. Verves, Kiev, Dr. Pont, London, and Dr. Contre-ras-Lichtenberg, Vienna, it started to be increasingly clear that this important taxon was not revised by any modern specialist. Concerning the authentic specimens of *Cynomyia madeirensis* Schiner, Dr. Contre-ras-Lichtenberg stated the following (the series of syntypic species is deposited in the Naturhistorisches Museum, Vienna): „*Sarcophaga madeirensis* (Schiner): In unserer Sammlung stehen 4 Exemplare von der Novara-Reise. Ihre Bezettlung ist bei 3 Exemplaren: 1 Etikett: Novara-Reise Madera (mzw. Madeira), 1 Etikett: *maderensis* det. B. B. Das 4. Exemplar trägt ein weiteres Etikett (möglicherweise in Schiners Handschrift): *Cynomyia madeirensis* Schin.“.

Obviously this last specimen was sent to Dr. A. C. Pont, London, who kindly sent me the drawing of the male genitalia (fig. 36) of this male (preserved in a vial of glycerine). I hesitated, at first, to identify the species according to this drawing in view of the obviously damaged (broken) membranous processes, and according to what seemed to me to be a slightly turned tip of the processes of the paraphallus base (which happens by fixation in glycerine). It was also impossible to verify such statements as if the paraphallus of *madeirensis* were similar when compared with that one of *P. tuberosa* (Pand.) and partly also with „*P. exu-*

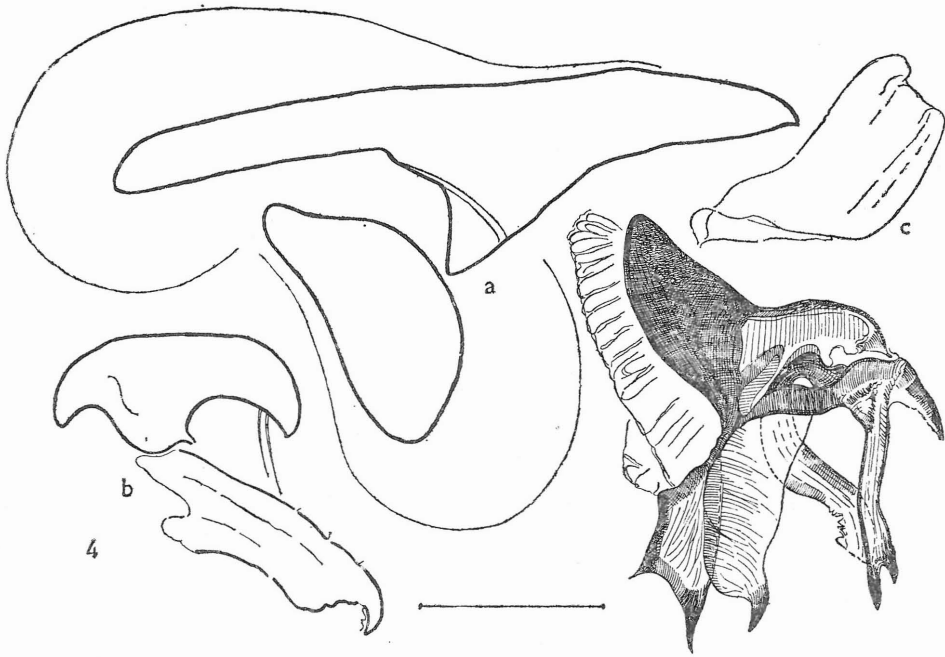


Fig. 4: *Parasarcophaga (Liosarcophaga) dux* (Thomson, 1868), paraphallus cercus with coxite (a), gronites (b) and membranal tube (c), [Johannesburg, Transvaal].

*berans* (Pand.)" (see Rodendorf, 1937 after Böttcher and Schiner). It could not be excluded, due to the numerous mistakes and misidentifications I found so currently, that possibly another form of the „*dux-miserä*“ — group was concerned which would greatly simplify the nomenclatorial part of this confused group, because *madeirensis* Schiner would have a clear priority. The explicit reference Rodendorf's to the fact that „a characteristic species, remarkably different habitually from all other species of this group“ (my English translation from Russian) is concerned as well as the description of Enderlein forced me to study personally an authentic specimen of this taxon before making any decision. I obtained, finally, a perfectly preserved male (obviously an authentic syntype of *madeirensis* Schiner) provided with two labels, viz.: „Novara-R. Madera“ and „*maderensis* det. B. B.“ This specimen was obviously authenticated by Brauer and v. Bergenstamm [1889—1894] (see: Die Zweiflügler des Kaiserlichen Museums zu Wien). Its genitalia (fig. 25) leave no doubt that a very characteristic species is concerned, one of those few specific taxa of *Liosarcophaga*, which can be obviously identified after their habitus. At the same time the species seems to be restricted to the isle of Madeira representing probably its endemic taxon.



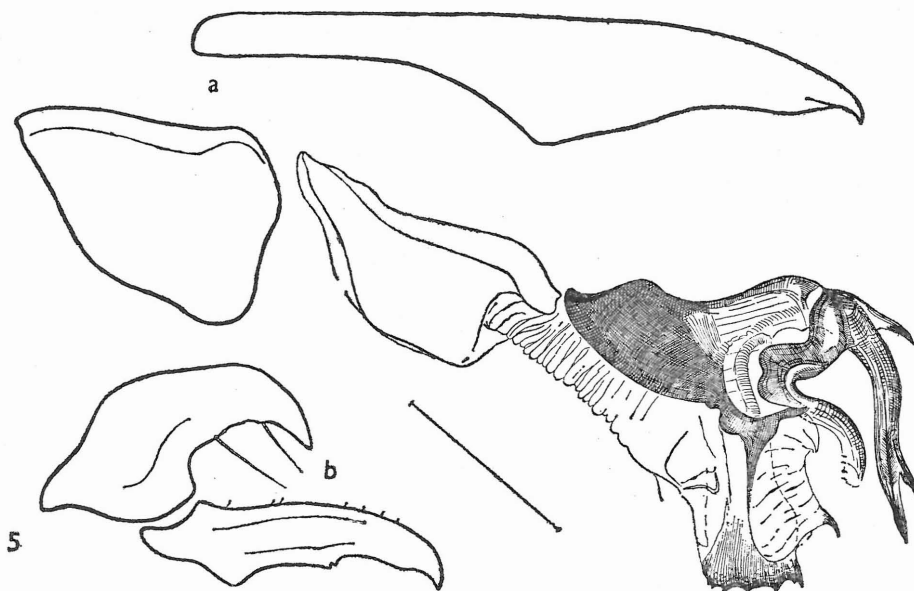


Fig. 5: *Parasarcophaga (Liosarcophaga) dux* (Thomson, 1868) paraphallus, cercus with coxite [a] and gonites [b], Peiping.

Purely habitually the species is striking by its size, general heaviness and a bluish lustre (for which it was probably described originally as *Cynomyia*), which together with its chaetotaxy (characterized above) makes it really unique among the other forms of the subgenus *Liosarcophaga*. The male genitalia (fig. 25, compare also with fig. 36) are correspondingly strong and heavy. Cercus (fig. 30) is rather thick, its upper (dorsal) edge is visibly convex in the nearly two thirds of its length proximally. The distal third is thinner and rather short. The coxite is distinctly longer than broad, its proximal part being rather narrow. The tip of phallosome is shortly spinose. The deeply hanging lateral ledge has a distinct bifurcation its upper process being heavier (thicker) than the ventral one. The membranous ventral process is entirely transparent without any sclerotization and/or pigmentation, consequently membranous s. str., and with an obtuse tip. The process of the paraphallus base is of nearly same length but distinctly sclerotized and pigmented. Its obtuse tip is cut and provided with some short obtuse serration. Both gonites are rather heavy and broad, pregonite being only moderately shorter than postgonite, the ventral ledge of which has several slight concavities. In view of the fact that the phallosome of *P. (L.) madeirensis* was frequently compared with that one of *P. (L.) tuberosa*, it is worth mentioning that this was obviously due to an inadequate magni-

fication so that especially the two paired ventral processes of the phallosome were compared and appeared to be somewhat similar. Their detailed figure together with the other genitalia characters (cercus, coxite, gonites, lateral ledges) evidence only a superficial resemblance. In all these details *P. (L.) madeirensis* remains quite characteristic and, in view of a general similarity of all members of this monophyletic genus, any comments on the purely typological or phylogenetical distance between the individual species appear to be quite irrelevant on the basis of genitalia morphology itself, the primary importance of which appears to be diagnostic.

Material studied: 1 ♂, Novara-R., Madera; *maderensis* B. B. — This is obviously an authentic specimen belonging to the series of syntypes on the basis of which the species was described.



Fig. 6: *Parasarcophaga (Liosarcophaga) dux* (Thomson, 1868), paraphallus, cercus with coxite (a) and gonites (b), [Canberra].

***Parasarcophaga (Liosarcophaga) dux* (Thomson, 1868)**

Thomson, 1868 [published early 1869], Kongl. Sven. Freg. Eugenies Resa Omkr. Jordan, 534 [*Sarcophaga*]

syn.: *Sarcophaga exuberans* Pandellé, 1896, Rev. d'Ent., 15: 186 [teste Rohdendorf 1937, 1970]

*Sarcophaga subtuberosa* Parker, 1917, Proc. U. S. Nat. Mus., 54: 89 [teste Kano, Field, Shinonaga (1967)]

*Sarcophaga ceylonensis* Parker, 1923, Ann. Mag. Nat. Hist. London, (9) 11: 125—125, **syn. n.**

*Sarcophaga craggi* Parker, 1923, Ann. Mag. Nat. London, (9)11: 126, **syn. n.**

*Parasarcophaga (Liosarcophaga) dux sarracenooides* (Aldrich, 1916), Thomas Say Found., 227—232, **comb. n. (subsp. bona)**

I had the opportunity to study extensive series of *Parasarcophaga (Liosarcophaga) dux* (Thoms.) from nearly the entire vast area of its range from its southern margin in the Palaearctic Region, from the Ethiopian, Oriental, Australian (Notogean) and the Pacific Regions respectively, and I figure here male genitalia of representative specimens from Dalmatia (fig. 2), Egypt (fig. 3) Johannesburg (fig. 4), Peking (fig. 5) and Canberra (fig. 6). It results from this study of mine, as partly evidenced by the above figures, that *Parasarcophaga (Liosarcophaga) dux* (Thoms.) is purely morphologically a rather variable and obviously polytypical species in this respect but that it offers, at the same time, a complex of quite clean-cut characters making its unambiguous identification as easy as in all other related species of this subgenus. Irrespective of the fact that practically each of the individual structures of the male genitalia (e.g. cercus, coxite, gonites and mainly paraphallus proper and its processes) may vary the general impression of the male genitalia of this species remains quite characteristic: The paired apical ledges of paraphallus tend to a terminal bifurcation which may vary from being rather inapparent (fig. 3) to very deep (fig. 7), with obtuse (fig. 8) to sharp tips (fig. 6), these variations being developed also in all possible intermediate degrees. The membranous processes are heavily sclerotized and apically pigmented. Their ventral margin protrudes into numerous thorn-like tips (two to five and even more — figs. 2—8) and it is either concave (figs. 3, 4, 8) or convex (figs. 2, 5, 6). The ventral processes of the paraphallus base are still membranous and transparent, their dorsal edge protruding into a sharp, more or less strongly sclerotized tip. The general form of this process is rather variable. The form of the pregonite and postgonite can be generally variable, too, but essentially postgonite is rather short, the heavy and shortly curved pregonite being more elongate and slender, with a tendency to form a sickle-formed tip (fig. 2, 3), less apparent in other specimens (fig. 5, 8). Similar relations are found in the form of cercus and coxite (figs. 4, 6, 7). It is necessary, however, to mention that an identical orientation of each structure is very important, because little changes may cause apparent differences of shape or form (see also Povolný, 1977). The colour of the genital (anal) segment varies from reddish to dark. Whereas in the Ethiopian Region populations having reddish

abdominal segments seem to prevail, there seems to be a colour polymorphism of the genital segment in Ceylon, China, Sumatra, Australia, where specimens with both reddish and dark abdominal segments may occur.

The above statements are especially important in relation to the validity of the next two taxa belonging to this group, viz. *Parasarcophaga (Liosarcophaga) ceylonensis* (Parker, 1923) and *Parasarcophaga (Liosarcophaga) craggi* (Parker, 1923). As seen from the genitalia figures of the paratypes of these two forms (figs. 7, 8), these two taxa fall not only within the variation range of *P. (L.) dux* (Thoms.) [compare the form of paraphallus in figs. 2,7 with figs. 4,8 and fig. 3 with figs. 5,6] but they even increase its width. Consequently both *P. (L.) ceylonensis* (Park.) and *P. (L.) craggi* (Park.) are clear synonyms of *P. (L.) dux* (Thoms.).

I also had the opportunity of examining three males of „*Sarcophaga tuberosa* var. *sarracenoides* Aldrich, 1916“ [see material studied], of which the male from „S. Jouaquin R., Newman Ca.“ [etc.] is figured (fig. 9). Generally even this form fits well into the general variation range of *Parasarcophaga (Liosarcophaga) dux* (Thoms.) but in all the three males studied there exists a constancy in the form of the apical ledge of paraphallus which is never bifurcate. There is, too, a constancy

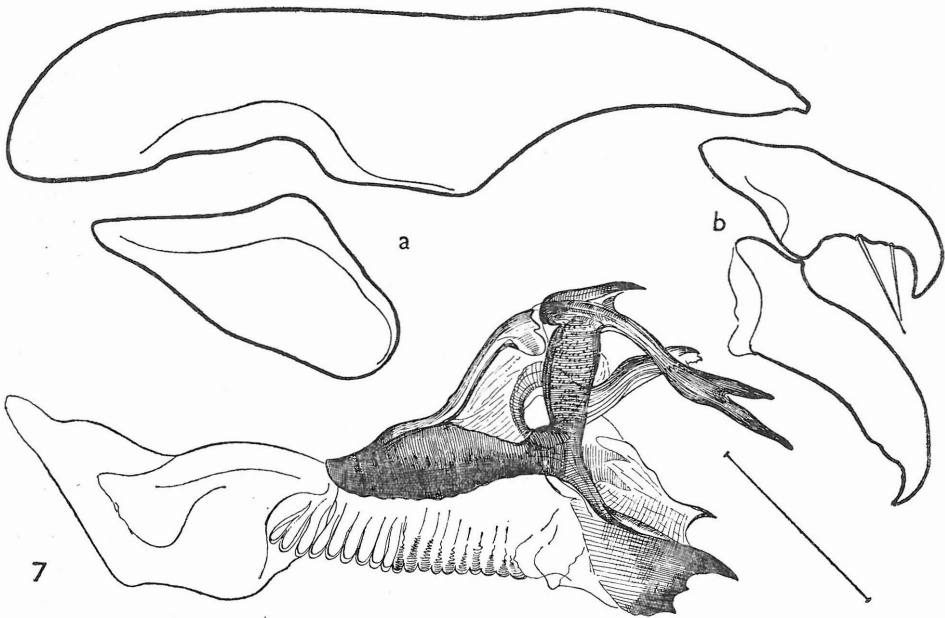


Fig. 7: Paratype of *Sarcophaga ceylonensis* Parker (a synonym of *P. (L.) dux* (Thoms.), paraphallus, cercus with coxite [a] and gonites [b], (Coimbatore, South India).

of the membranous process of the paraphallus which is narrow and, having only one protruding tip, it accords well also with the original description and figure [plate 12, fig. 108] [Aldrich (1916)]. In view of this constancy in characters which are so variable in the populations of this species in the Eastern Hemisphere, I am inclined to ascribe a subspecific status to the North American populations of this species as *Parasarcophaga (Liosarcophaga) dux sarracenoides* [Aldrich, 1916] comb. n. The subspeciation of *P. (L.) dux* [Thoms.] in the Eastern Hemisphere should be specially studied because the fact that the Ethiopian populations have mostly reddish genital segment and that in the Oriental and Australian Region numerous individuals with dark genital segment occur seems to indicate that irrespective of the pantropical distribution of this species certain geographical isolation mechanisms may be involved.

**Distribution:** Essentially paneremic and pantropical to pansubtropical. In Europe the species seems to occur in the Mediterranean including the Black Sea coasts [Rodendorf (1937)] but in view of the taxonomical confusion detailed information is still lacking.

**Ecology:** The species seems to be necrophagous, feeding preferably on animal carcasses. Of insects it prefers dead or dying locusts. It may

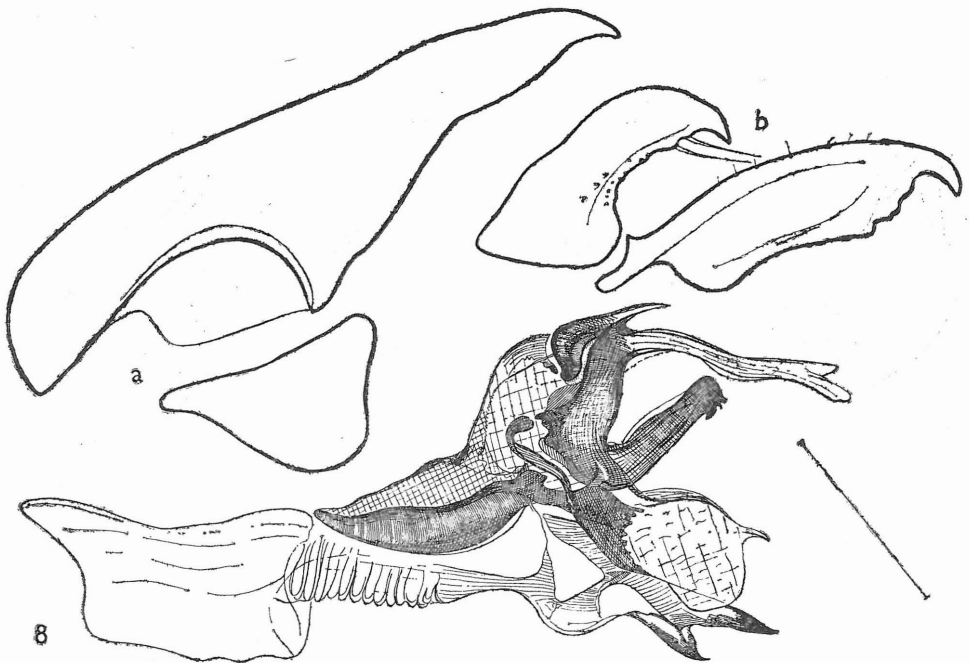


Fig. 8: Paratype of *Sarcophaga craggi* Parker (a synonym of *P. (L.) dux* [Thoms.], paraphallus, cercus with coxite (a) and gonites (b), (Nyassaland, Blantyre, India).

successfully develop in human feces. The species is highly synanthropic (which obviously prohibits its distincter subspeciation) and of indubitable sanitary importance.

Material studied: 3 ♂♂, Dalmatia [Jugoslavia], Korčula, East End., 22.—27. 5., R. L. Coe [prep. BM-101]; 3 ♂♂, Gradac, Dalmácie, 3. 8. 64, on dead crabs (leg. Povolný); 1 ♂, Jerusalem-Palestine, 20. 5. 29, U. Tarikin; 1 ♂, Hammam R'irra, 24. May—1. June 1913 (W. R. & F. H.); 1 ♂, Egypt Min. Agr., 28. 5. 1913, paras. on locust, coll. Stoney; 2 ♂♂, Egypt, Dr. I. G. Wakeling, 1910. 99 [prep. BM-117]; Amara, R. Tigris, P. Burton; 2 ♂♂, Khartoum, H. W. Bedford, 17. 2. 27, bred from human excreta, Sudat Govt.; 1 ♂, dtto, G. C., R. C. M. Darling, 24. 9. 30, feeding on dead hoppers, Sudat Govt.; 1 ♂, dtto, H. W. Bedford, 23. 11. 31, attracted to decaying fish; 1 ♂, dtto, Sudan Govt., 18. 1. 32, sought in fly trap; 1 ♂, Takar, A. H. Hussein, Dec. 1931, larvae found in the intestines of dead locust, Sudat Govt.; 1 ♂, dtto, W. Rutledge, Dec. 1931, larvae emerged in the field locusts *Schistocerca* & *Locusta*. Sudat. Govt.; 1 ♂, Belgian Kongo, Deti, December 1931; 1 ♂, Kenya Colony, Nairobi, Dec.

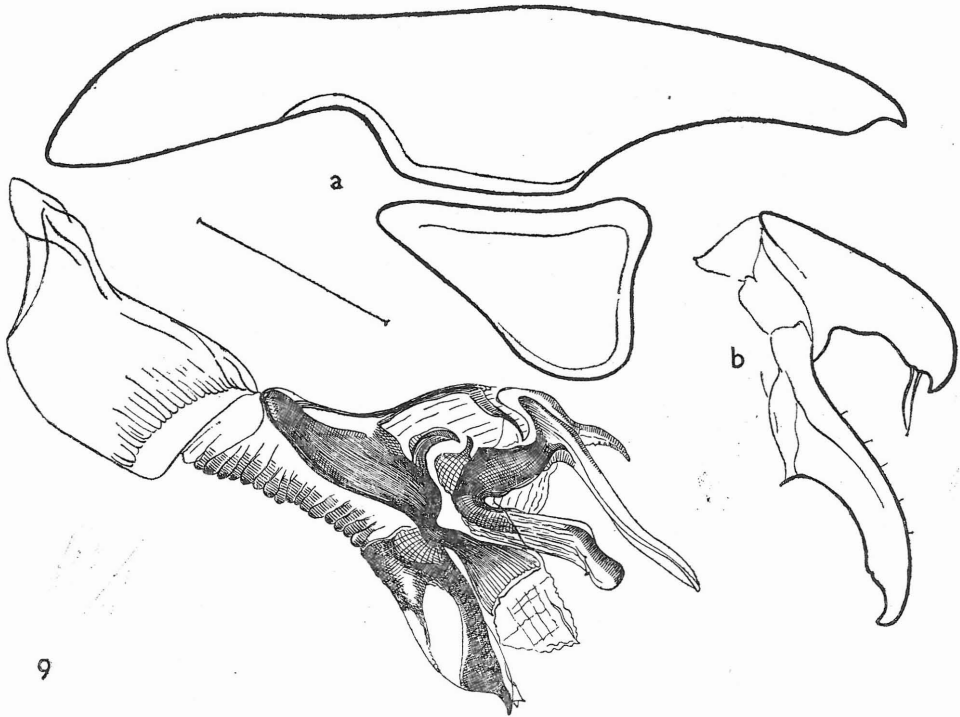


Fig. 9: Paratypoid of *Parasarcophaga (Liosarcophaga) dux sarracenoides* (Aldrich, 1916), paraphallus, cercus with cocite (a) and gonites (b), (S. Joaquin, Newman Cal.).

1927, C. B. Symes; 1 ♂, Nairobi, van Someren, July, 1930; 1 ♂, Uganda, Sesse Isles, 3. 4. 25, G. D. H. Carpenter; 1 ♂, Entebbe, Uganda, Dr. C. A. Wiggins, 21. 8. 1912; 1 ♂ Eritrea, Ailet, from Eggpod of *Sch. gregaria*, 26. 1. 1956, D. J. Greathead; 1 ♂, Johannesburg, Transvaal, leg. Zumpt (prep. BM-105); 1 ♂, Johannesburg, Transvaal, on meat, leg. Zumpt, 11. 10. 49; 1 ♂, S. Rhodesia, Feb. 1933, Dept. Agric., ex dead larvae; 1 ♂, S. Africa, Durban, The Bluff, 15. 10. 31, Miss Mackie; 1 ♂, Pretoria, 3. 3. 15; 1 ♂, S. Africa, Cape Province, Outds Hoorn, 31. 10.—2. 11. 31; 1 ♂, S. Africa, Cape Province, Van Rhyns Pass, 11. 1931, J. Toosle; 1 ♂, Graaf Reivel, Cape Prov., II. 1960; 2 ♂♂, Matala (Matabe?) Ceylon, 7. 8., 17. 8. 24, at snail, Dr. Smart; 2 ♂♂ Dengala (Dengola?), 25. II. 53, Y. A. Ahmed; 1 ♂, India: Arisa, Dongvaposi, 3. 11. 25; 1 ♂, Phrapatoon, Siam, Dr. P. G. Wolley; 5 ♂♂, Peiping, 18. III., July 15, Aug. 25, ex coll Chi-Ho (prep. BM-111); 3 ♂♂, S. China, Yung Chun, Amoy region, Fukien, 8.—29. 7. 1916, Dr. J. P. Maxwell; 5 ♂♂, Hainan Exp., 30. 3. 34, III-1. 1934, IV-22 1934, 2. 11. 34, ex coll. Chi-Ho; 1 ♂, Gogoshima, Fanme, 8. Aug. 1961; 1 ♂, Sata, peninsular Kagoshima pref., 19. Oct. 1963, K. Kameko, S. Shinonaga; 2 ♂♂, Kajoe-Tanan, Sumatra, June 1907, Dr. Hagen 1908 301 (identified as „*ceylonensis*“); 1 ♂, New Guinea, Lae. 2. 57, larvae in dead *Sexana*; 4 ♂♂, Brisbane, Nov. 1928—March 1933; 1 ♂, Canberra, A. C. T., Jan.—Feb. 1962, Ex *Helix adspersa*, K. R. Norris (prep. BM-103); 1 ♂, Honolulu, April 11, 1899, reared on dead gulls; 1 ♂, Solomon Islands, Guadalcanal, Kukum 12. 2. 63, M. McQuillan; 1 ♂, Christman I., Dr. C. W. Andrews, 1909—66; 1 ♂, Ascension Island, E. A. G. Duffy.

Paratypes: *Sarcophaga ceylonensis* Parker, 1 ♂, South India, Coimbatore, from a dead snake, 9. 10. 1913, Fletcher coll., *Sarcophaga ceylonensis* R. R. P., R. Parker (prep. BM-113), red label; *Sarcophaga ceylonensis* R. Pkr., Paratype.

*Sarcophaga craggi* Parker, 1 ♂, Nyassaland, Blantyre, 30. 3. 1914, Dr. J. B. Davey, 30. 3. 14, from Pupa, *Sarcophaga craggi* R. P. R., red label; *Sarcophaga craggi* R. Park., (prep. BM-114).

*Sarcophaga dux* var. *sarracenooides* Aldrich, 1 ♂, College Station Texas, 6-23-20, H. J. Reinhard Collector; 1 ♂, Chespk. Bch. Md., 27. 7. 1913, Fredk. Knab Collector; 1 ♂, S. Joaquin R., Newman Cal., J. M. Aldrich Coll., 6-15-24, *Sarcophaga dux* var. *sarracenooides* Ald., det. Aldrich [paratypoid (prep. BM-115)].

### **Parasarcophaga (Liosarcophaga) marshalli (Parker, 1923)**

*Parasarcophaga (Liosarcophaga) marshalli* (Parker, 1923) Parker 1923, Ann. Mag. Nat. Hist. London, [9] 11: 126—127 (*Sarcophaga*).

This species was described after a holotype from France (*S. vito* d'Norm., 31. 5. 1905) and sent to Parker by Bezzi. Verves [1981] attributes this name to the species figured by Rodendorf [1975] (*Sarcophagi* dae from S. Spain, Steenstrupia). I studied several males, from Dalmatia, Italy (see figs. 10, 11) and Palestine, determined (by Coe and Hargreaves) as *Sarcophaga exuberans* Pand., which is a surprising fact because these indentifications were obviously revised by Rodendorf, who

did not change this determination. The male genitalia figured by Rodendorf (1937, 1970) as *exuberans* Pand. belong clearly to *P. (L.) dux* (Thoms.), and Séguy (1941) figured schematically (p. 121, fig. 148) a part of paraphallus of „var. *exuberans* Pand.“ which could easily be conspecific with *marshalli* Park. For the present time the name „*marshalli*“ appears to be unambiguous because „*Sarcophaga exuberans* Pand.“ is involved with misidentifications of the „*miserata*“ auct. group. It cannot be excluded, however, that Pandellé, an excellent expert of Sarcophagidae, did know and describe *marshalli* (as *euberans*).

The male genitalia of *P. (L.) marshalli* (Park.) belong to the biggest among the species of *Liosarcophaga* End. and are absolutely characteristic by several structures, first of all by their long and slender paraphallus membrane. The paraphallus proper (fig. 10, 11) is characterized by a slender ventrally curved membranous process having only a moderate membranous tip. The ventral processes of the paraphallus base are prominent, with a folded tip. The corpus of paraphallus is strongly vaulted having slender and bifurcated lateral ledge. While postgonite is rather broad and moderately curved, pregonite appears extraordinary prolonged, rather parallell-sided, only its tip being shortly curved. Cercus

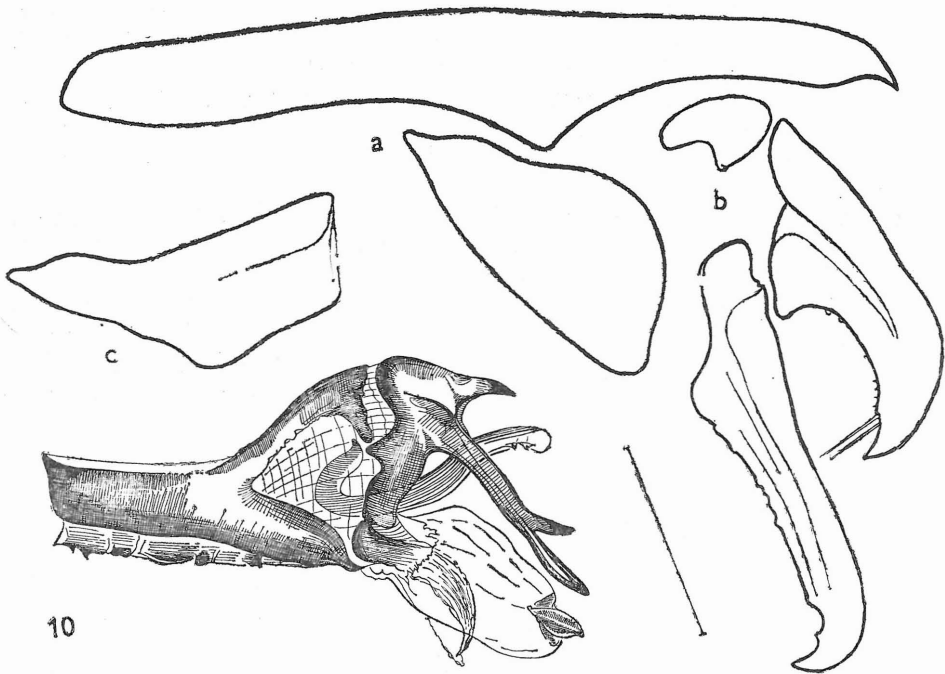


Fig. 10: *Parasarcophaga (Liosarcophaga) marshalli* (Parker, 1923), paraphallus, cercus with coxite (a), gonites (b) and membranous tube (c), (Dalmatia, Novi Grad.).



(fig. 28) also very long and slender, with a characteristic tip similar to that of *P. (L.) harpax* (Pand.). The genital segment is dark or reddish.

Distribution: Little known. According to the present knowledge the species appears to be typically holomediterranean [Spain, France, Italy, Yugoslavia (Dalmatia)] and Palestine.

Ecology: The species flies in hot and rocky eremic habitats, e. g. dry riverbeds, stony sunlit slopes and hills with sparse subtropical vegetation and with high midday temperatures. Bionomics is unknown.

Material studied: 1 ♂, on a stony hill slope, Dalmatia: Novi Grad, 27.—31. 5. 58, R. L. Coe (preparation BM-112); 1 ♂, Polje in Valley, Dalmatia: Novi Grad, 27.—31. 5. 58, R. L. Coe; 1 ♂ Adria, Pag, E. VII. 1933; 1 ♂, Italy, Faganko, 1919, E. Hargreaves [prep. BM-102]; 1 ♂, Jericho, Palestine, P. A. Buxton, 1. 1. 22—24. 8. 22.

### **Parasarcophaga (Liosarcophaga) harpax** (Pandellé, 1896)

Pandellé, 1896, Rev. d'Ent., 15: 189 (*Sarcophaga*)

This species treated mostly as „*tuberosa* var. *harpax*“ auct. or as „*miserata* var. *harpax*“ auct. was rehabilitated by Rodendorf (1937) who recognized correctly its specific value. Morphologically *P. (L.) harpax* is closely related to *P. (L.) marshalli*, as seen from the far-reaching similarity of both paired ventral processes of paraphallus and of cercus (fig. 12). The membranous process is, however, slightly thicker and not so prominently curved ventrally. The ventral process of paraphallus base is membranous with a simply curved but not folded tip. The longitudinal ledge of the paraphallus tip has only a shallow bifurcation. Postgonite short and broad, pregonite more slender and prolonged but not parallell-sided and without the strongly curved tip characteristic of *P. (L.) marshalli* (Park.). Cercus has a short curved tip, coxite is extended. The most characteristic difference from *P. (L.) marshalli* is in the membranous tube which is essentially shorter.

Distribution: An obviously holarctic species, widely distributed in the temperate zone of Europe, Asia including Japan and North America.

Ecology: The species accompanies little disturbed forest biocenoses of deciduous and mixed character, avoiding purely coniferous (spruce) stands. In Europe it is characteristic especially of warm lower elevations. It seems to be a parasitoid of insects, mainly of bombycoid caterpillars and it seems to be endangered by air pollution together with several other species of this subgenus and group. It is increasingly rare in Europe.

Material studied: 2 ♂♂, N. C. B. Columbia, 54° 41' N., 125° W., Base Camp, 2300 ft, 14. 8. 53, H. J. Moore; 1 ♂, Gipsy Moth Lab., USA, 3305, 6. 1. 11; 1 ♂, Cedar Pt. O., VIII. 1919, D. M. De Long Collector, Brunetti Coll.; 1 ♂, Letrayas, Var, France, 6. 8. 1932, O. W. Richards; 2 ♂♂, Bavaria, Ucker mark, 1952, among debris in conif. woods attacked by *Dendrolimus pini*, Com. Inst. Ent., Coll. No. 13203; 1 ♂, Frankfurt/Oder, M. P. Riedel; 1 ♂, On trunks of large felled Pinus, Serbia: Nr. Sid., Morović,

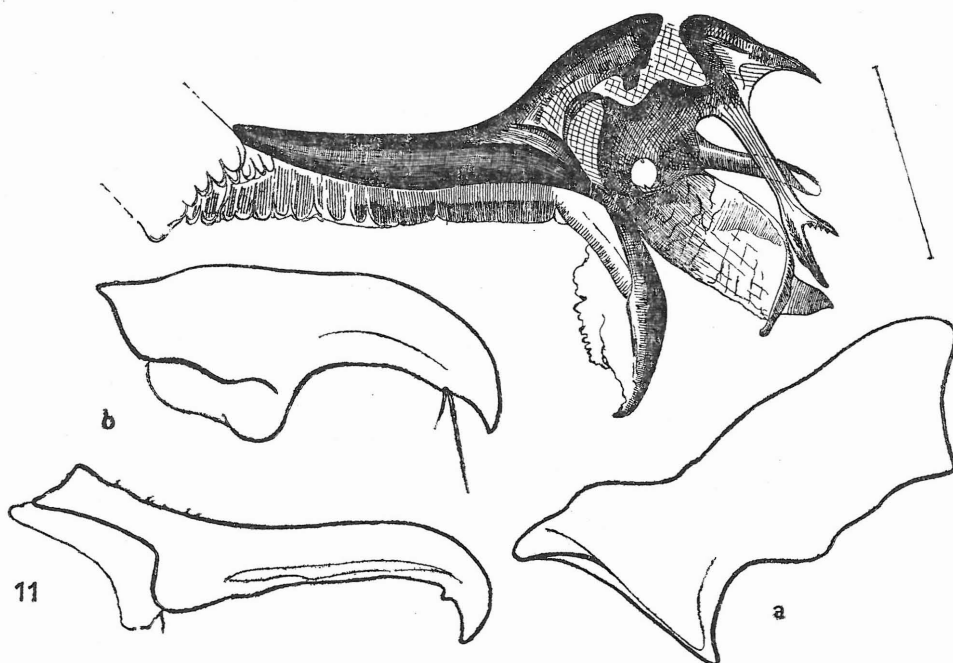


Fig. 11: *Parasarcophaga (Liosarcophaga) marshalli* (Parker, 1923), paraphallus, membranal tube (a), and gonites (b), (Italy, Faganko).

29.—30. 6.; Jugoslavia, 1955, R. L. Coe; 1 ♂, Kanazawa, Kaga, Ishikawa (Honshu), Japan, 7. June 1964, coll. Kurahashi; 1 ♂, Yoshino, Nara Pref., 21. June 64, H. Tange & S. Shinonaga; 1 ♂, Kogesawa, Tokyo, 21. June 1963, T. Okazaki; 2 ♂♂, Mohelno, 24. 6. 1977; 13 ♂♂, Nejdek (near Lednice), June 1979, both localities in Moravia mer., Czechoslovakia (leg. Povolný); numerous males from several localities in southern Slovakia, e. g. Hegyfárok, Čenkov, Chl'aba, Chýnorany, Zobor, Kolárovo, Zadiel etc.

#### ***Parasarcophaga (Liosarcophaga) brevicornis* (Ho, 1934)**

Ho, 1934, Bull. Fan Mem. Inst. Biol., 5: 23

This species is characterized by a very short unpaired tip of paraphallus, by its comparatively short moderately curved lateral ledge with a shallow bifurcation and by a simple-tipped membranal process which is more strongly sclerotized than the shorter ventral process of the paraphallus base. Postgonite short and rather strong, pregonite moderately elongate. Cercus with hooked tip, coxite subtriangular (figs. 13, 14). This species is closely related to *P. (L.) dux* of southeastern Asia and is frequently mixed with it by taxonomists.

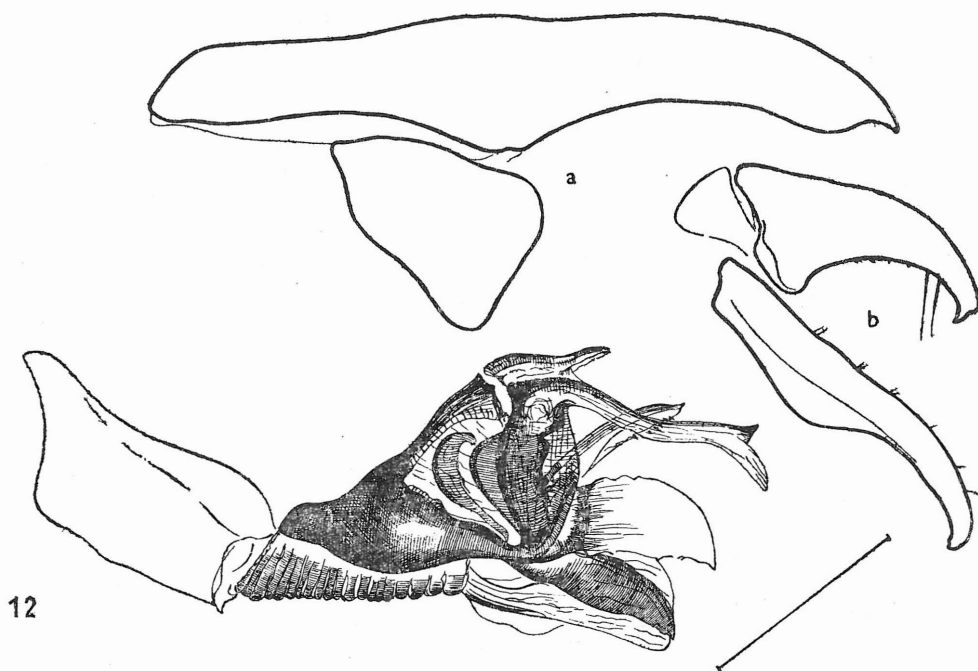


Fig. 12: *Parasarcophaga (Liosarcophaga) harpax* [Pandellé, 1896], paraphallus, cercus with coxite (a), and gonites (b), [Pálava, South Moravia]. Abscissa equals 0.25 mm.

Distribution: China, Japan, Ryukyu Islands and Ceylon, Probably also India.

Ecology: After Kano, Field, Shinonaga (1967), a widely distributed schizophagous species accompanying shores of rivers and sea where its maggots develop in dead fish and other vertebrate carcasses.

Material studied: 8 ♂♂, Ceylon, Suduganga, 3. 6. 18, 19. 4. 22, 19. 12. 22, 12. 12. 22, 25. 7. 25 [prep. BM-109, 110]; 1 ♂, Gogoshima, Fanme, 8. Aug. 1961, det. S. Shinonaga; 2 ♂♂, Hainan Exped., III. 7. 1934, ex. coll. Chi Ho.

### ***Parasarcophaga (Liosarcophaga) aegyptica* (Salem, 1935)**

Salem, 1935, Univ. Fac. Med., 5: 38

syn.: *Parasarcophaga (Liosarcophaga) parkeri* Rodendorf, 1937, Fauna SSSR, sem. Sarcophagidae, 19: 217–218

The synonymy of *P. (L.) parkeri* was first recognized by Gregor & Povolný (1960) and is now generally accepted (Rodendorf, 1970). This species is absolutely characteristic by the obtuse membranous tip of

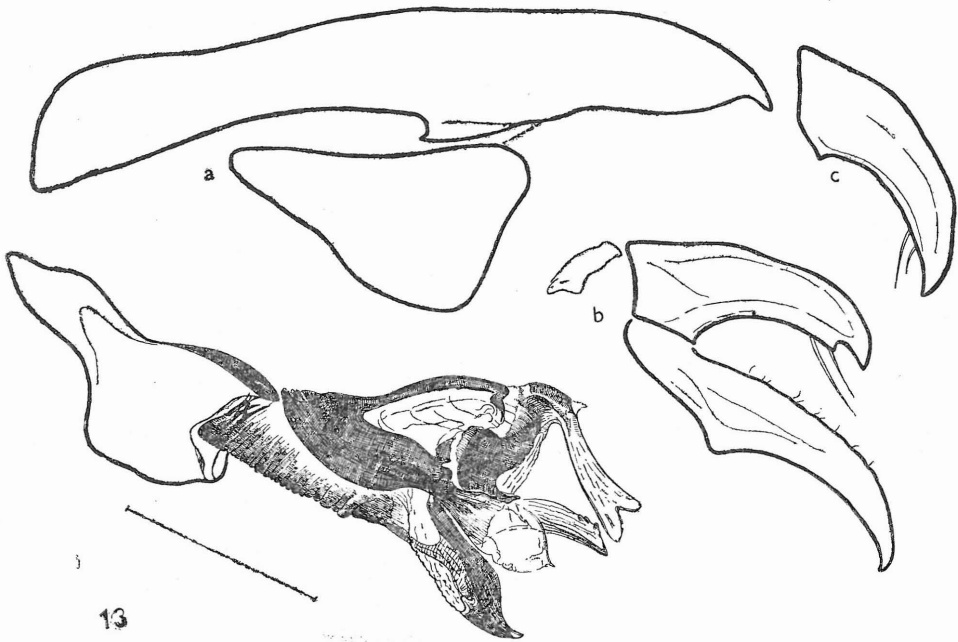


Fig. 13: *Parasarcophaga* (*Liosarcophaga*) *brevicornis* (Ho, 1934), paraphallus, cercus with coxite [a], and gonites [b] same postgonite in a slightly turned (dorsoventral) position [c], (Hainan).

paraphallus, by the simple lateral paraphallus ledge having no bifurcation, by a very slender and moderately curved membranous process of the paraphallus base, by very sharp but narrow membranous process provided with several thorn-like tips as well as by the very characteristic form of the pregonite the tip of which is shortly curved. Postgonite short, with a broad base. (Figs. 15, 16).

Distribution: Central Asia, Iran, European Pontomediterranean (shores and steppes around Black Sea, the Balkan Peninsula, Basin of Danube (including Hungary, southern Slovakia and eastern Lower Austria), parts of North Africa (Egypt) and Eastern Mediterranean.

Ecology: After Rodendorf (1937) the larvae develop in carcasses of insects and vertebrates. Adults frequently visit decaying meat and feces (Gregor & Povolný, 1960). The species inhabits dry semidesert to steppe habitats. The species is increasingly rare.

Material studied: 1 ♂, Žembovice (Slovakia mer.), 19. 6. 1957 (leg. Slamečková); 2 ♂♂, Královský Chlmec, 22. 5. 63 (leg. Slamečková), Štúrovo, VI. 86 (leg. Povolný). Additional material see Gregor & Povolný (1960).

**Parasarcophaga (Liosarcophaga) lypai** Verves, 1977

Verves, 1977, Dokl. Akad. nauk. Ukrainskoj SSR, 4: 354

The slender lateral ledge of the paraphallus tip is not bifurcate in this species which is also characterized by the form of the two paired ventral membranous processes [fig. 41]. According Verves (1977) the species is related with *Parasarcophaga (Liosarcophaga) fedtshenkoi* Rohd. The holotype male was collected near Ankavan in Armenia. The existence of this Central Asia species indicates that still new discoveries of the species of this group can be expected.

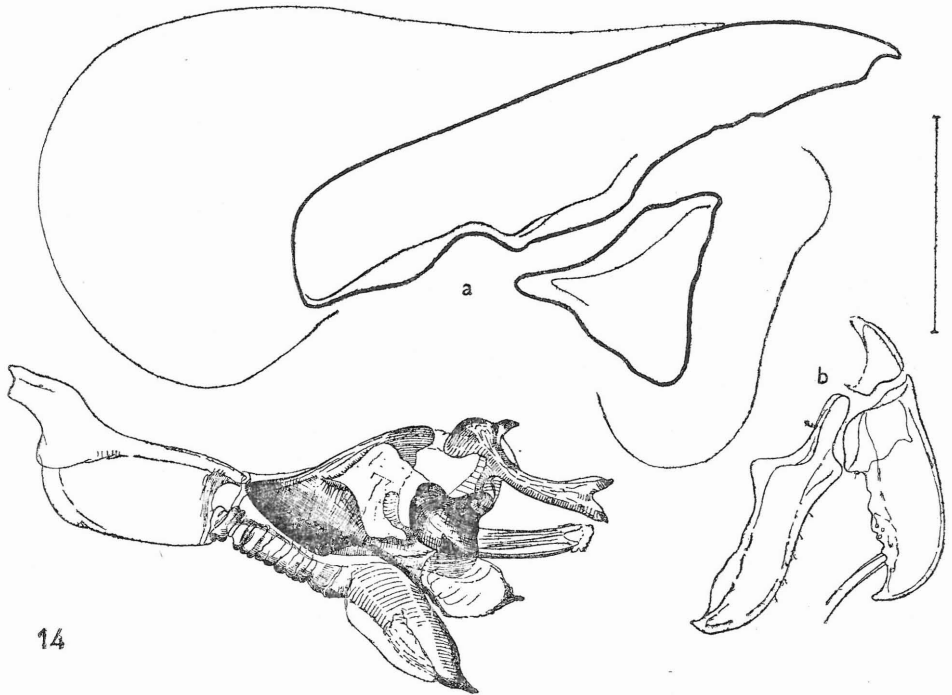


Fig. 14: *Parasarcophaga (Liosarcophaga) brevicornis* (Ho, 1934), paraphallus, cercus with coxite (a) and gonites (b), (Ceylon, Suduganga).

**Parasarcophaga (Liosarcophaga) tuberosa** (Pandellé, 1896)

Pandellé, 1896, Rev. d'Ent., 15:192

The specific status of this very characteristic species was definitely cleared by Rodendorf (1937) and irrespective of Séguy (1941) the species has since been recognized in literature [e.g. Gregor & Povolný

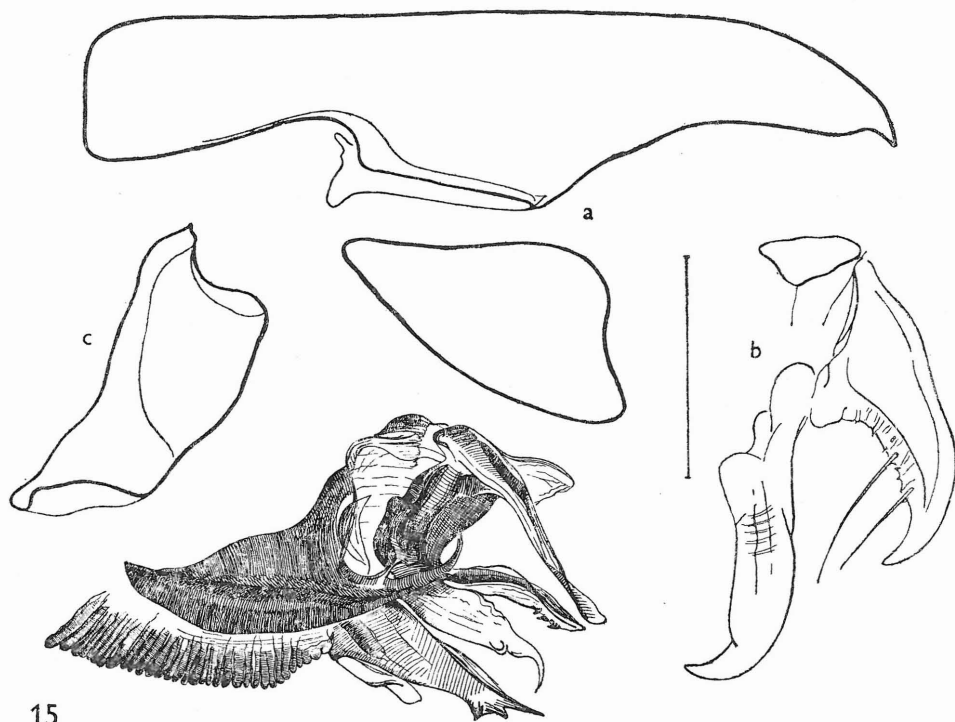


Fig. 15: *Parasarcophaga (Liosarcophaga) aegyptica* (Salem, 1935), paraphallus, cercus with coxite (a), gonites (b) and membranal tube (c), Kolárovo, South Slovakia).

[1960], Kano, Field, Shinonaga, [1967]). It is characterized and immediately recognizable by its s-curved, slender and sharply pointed cercus, short coxite and by several characteristic structures of phallosome (figs. 18). The latter (fig. 18) is provided with a prominent tip and with a deeply hanging lateral ledge having mostly an asymmetrical shallow bifurcation. Of the two ventral processes the membranous one is deeply hanging with transparent margin, centrally pigmented and tipped. The process of paraphallus base is shorter and moderately sharp. The species possesses also striking gonites, postgonite being extremely short with a broad base and moderately curved, whereas pregonite is slender and scythe-formed.

Distribution: Transpalearctic including Europe, North Africa, Central Asia and Japan.

Ecology: Little known but indications exist that, similarly as the related forms, it is a parasitoid or pseudoparasitoid of insect (especially noctuid) larvae. In Central Europe the species accompanies warm deci-

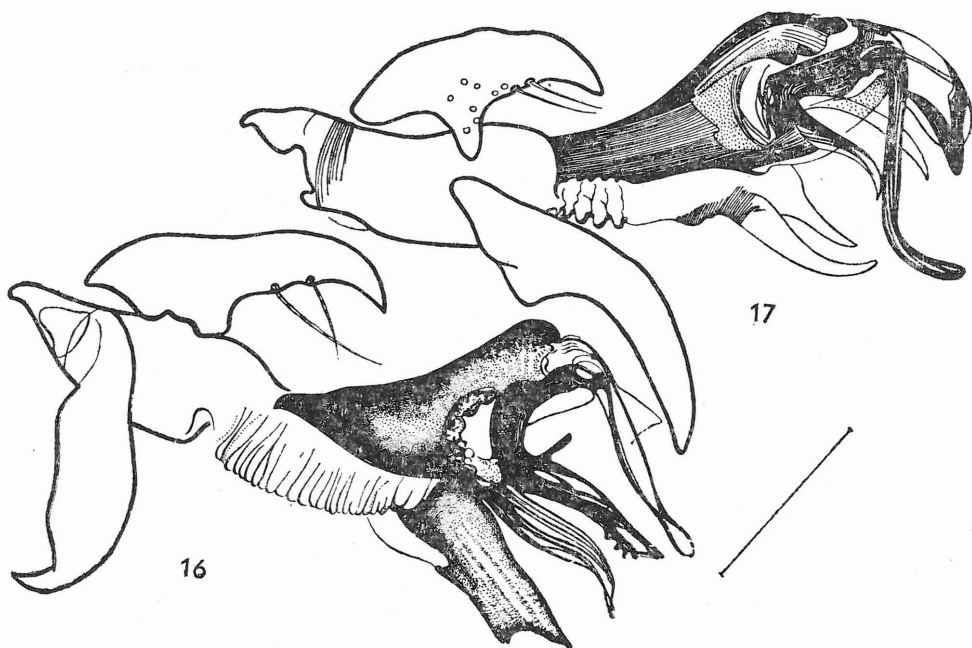


Fig. 16, 17: Paraphalli with gonites of *Parasarcophaga (Liosarcophaga) aegyptica* (Salem, 1935), [16], (Gemenc, Hungaria), and *Parasarcophaga (Liosarcophaga) similis* (Meade, 1876), paraphallus with gonites, [17] (Butrint, Albania). Abscissa equals 0.25 mm.

dous forests and forest steppes. During the last 3—4 decades the densities rapidly decreased and the species seems to withdraw eastwards.

Material studied: 1 ♂, Lugano Italia, 14. 5. 1913; 1 ♂, Colline di Firenze, m 400, Toscana, Italia centrale, 19. Settembre 1918 Querci; 1 ♂, Polje in Valley, Dalmatia: Novi Grad, 27.—31. 5. 1958, Jugoslavia, R. L. Coe; 3 ♂♂, Peiping, 1. 8. 32, China, pres. by Dr. Chi Ho; Hisamatsu, Miyako, Ryukyu, 19. May 1963, K. Kaneko, S. Shinonaga; additional material see Gregor & Povolný (1960, 1961); 2 ♂♂, Pavlovské vrchy, 14. 5. 1979; 1 ♂, Lednice, 17. 6. 80, both leg. Povolný, (South Moravia).

#### ***Parasarcophaga (Liosarcophaga) portschinskyi* Rodendorf, 1937**

Rodendorf, 1937, Fauna SSSR, sem. Sarcophagidae, 19: 226—227

This is a very good and important species of *Liosarcophaga* characterized, first of all, by a long lateral ledge of the paraphallus tip with an indentation in about the half of its length. Ventral process of paraphallus base dilated and provided with a folded tip dorsally shortly before its convexly rounded apex. Postgonite also rather characteristic

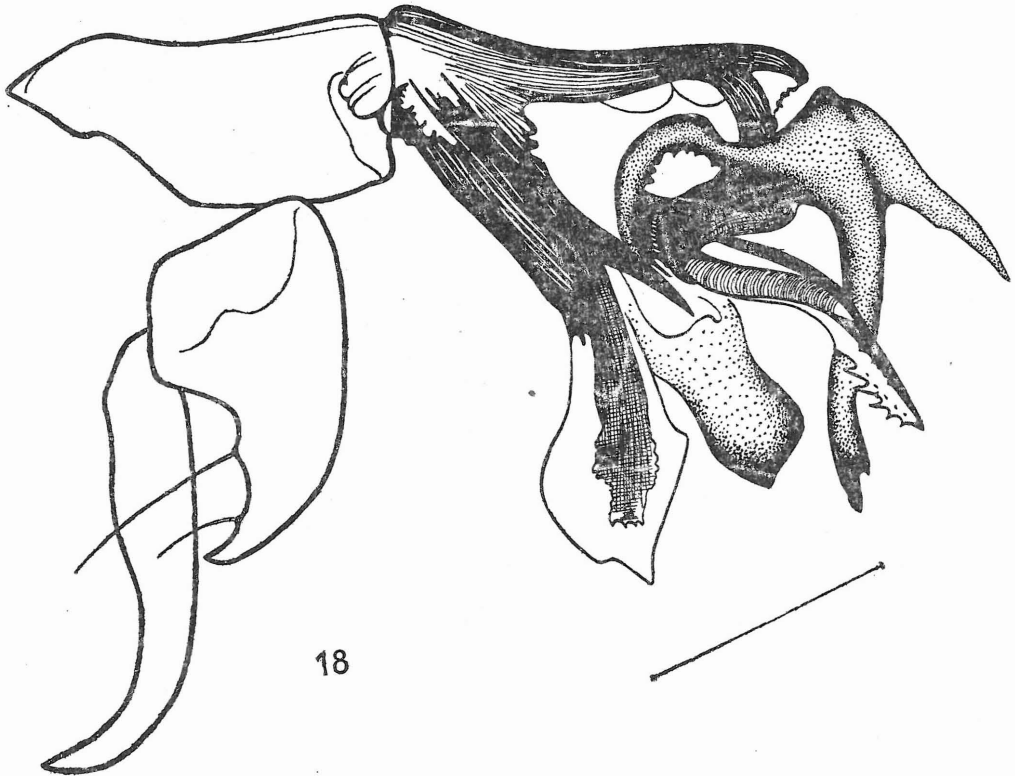


Fig. 18: *Parasarcophaga (Liosarcophaga) tuberosa* (Pandellé, 1896), paraphallus with gonites, (Balatonkenese, Hungaria). Abscissa equals 0.25 mm.

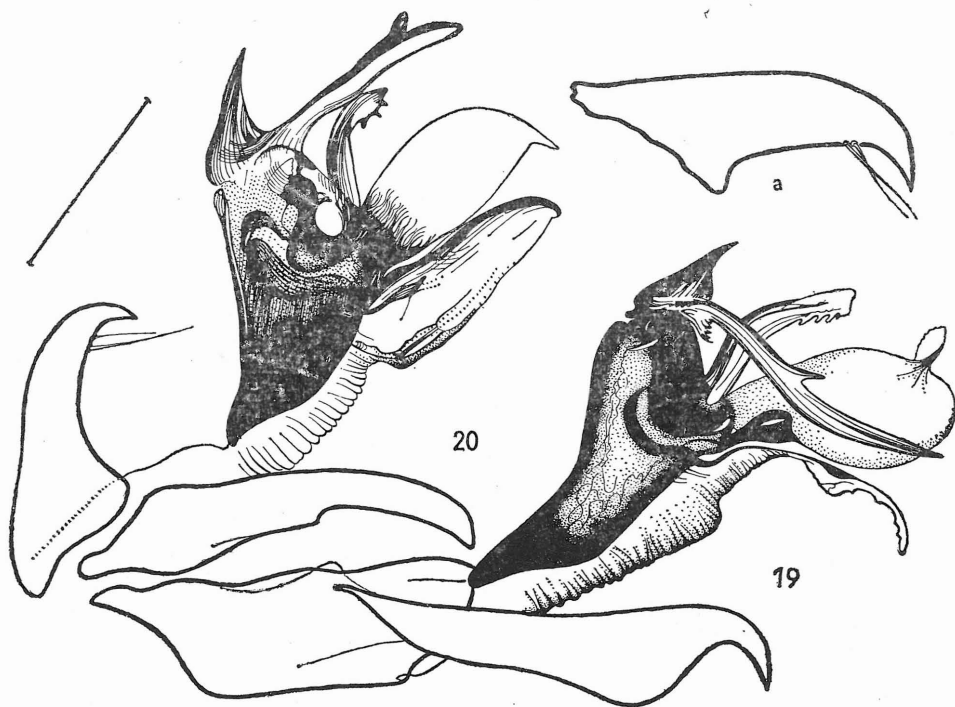
having a slender base and getting thicker apically whereby it shows a characteristic sickle-formed tip. Membranal process extremely narrow (fig. 19).

Distribution: From China, Mongolia and Central Asia to the Caspian and Black Sea regions, basin of Danube including southern Slovakia, southern Moravia and Lower Austria, the Balkan peninsula (Macedonia, Dalmatia), France and Italy. It reaches its northern limit in Poland and in lower Scandinavia.

Ecology: The species has not been reared so far but it frequently visits the same substrates as the related forms of *Liosarcophaga* (decaying meat and feces). It accompanies semideserts, steppes and forest steppes as well as lowland forests in warm sites of Central Europe and dry sunlit sandy habitats (Bzenec in southern Moravia) and sandy dunes of the Baltic Sea shore.

Material studied: 1 ♂, Ke Trayas, Var, France, 31. 7. 32, O. W. Richards; 1 ♂, Firenze, Plan Mughone, 200 m, Toscana, Italia centr., 31.





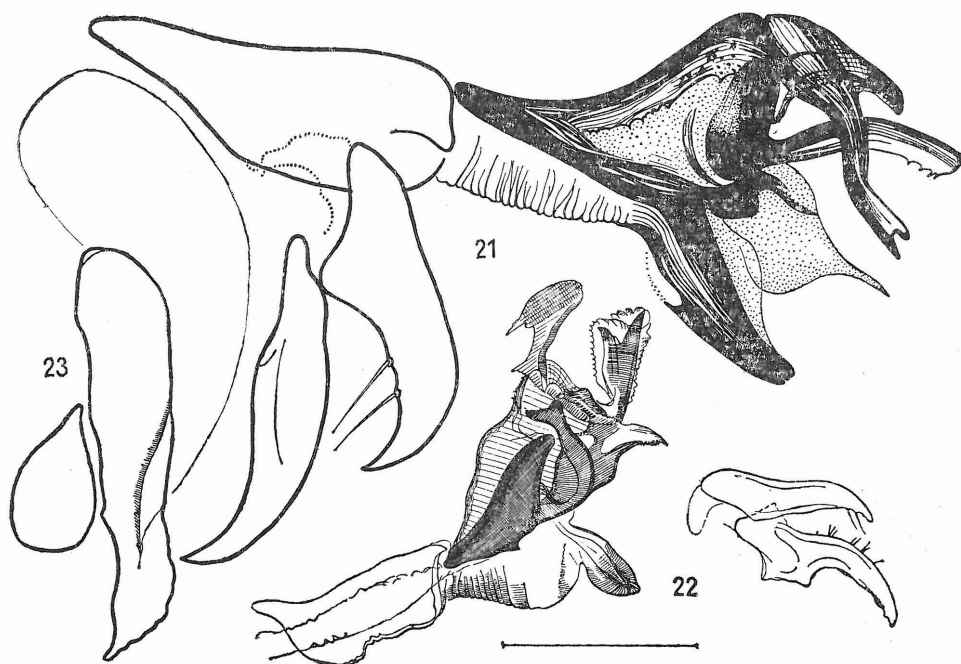
Figs. 19, 20: Paraphalli with gonites of *Parasarcophaga (Liosarcophaga) harpax* (Pandellé, 1896), (Ruská Poruba, East Slovakia), [20], and *Parasarcophaga (Liosarcophaga) portschinskyi* Rodendorf, 1937 postgonite separated (a), [19], (Struma, Bulgaria).

Agosto 1918, Querci; 1 ♂, Dalmatia, Korčula (East End), 22.—27. 5., Yugoslavia 1955, R. L. Coe; 1 ♂, Macedonia, Prespa Geul Otesevo, 9.—21. 6., Swept from oakscrub by Lake; 1 ♂, Greece, M. Holtz, 1903. 162, Morea merid., Tayget. 1500/2000, 10. 7. 1901, Holtz; numerous series of males from Pálava, Bzenec, Přerov, Ivančice (southern Moravia) and numerous habitats in southern Slovakia (leg. Povolný 1974—1982), where the species is widely distributed in dry lowland or forest steppe habitats. See also Gregor, Povolný (1959).

***Parasarcophaga (Liosarcophaga) jacobsoni* Rodendorf, 1937**

Rodendorf, 1937, Fauna SSSR, sem. Sarcophagidae, 19: 220—223  
syn.: *Parasarcophaga sachtlebeni* Lehrer, 1959, Beitr. Ent., 9: 903—905

This is another characteristic species of *Liosarcophaga*, characterized and recognized by Rodendorf (1937) by its very long, heavily sclerotized and pigmented membranous process with a rounded tip. Process of pa-



Figs. 21—23: Paraphalli and gonites of *Parasarcophaga (Liosarcophaga) jacobsoni* Rodendorf, 1937, [21], [Struma, Bulgaria], and *Parasarcophaga (Parasarcophaga) ruficornis* (Fabricius, 1794), [22], with cercus and coxite [23], [Sawbin Res., Burma], identified as „*miseria*“ [1].

raphallus base forming a membranous flap with a protruding sharp tip medially. The size and form of pregonite and postgonite are not so disproportionate as in several other species of *Liosarcophaga* (fig. 21).

Distribution: From China and Tibet through Turkestan and Central Asia to Caucasus and Iran; Palestina, North Africa (Morocco), Greece, Dalmatia, Basin of Danube including Hungary and southern Slovakia.

Ecology: A thermophilous species accompanying dry semidesert to steppe habitats where it develops in dead or dying insects (especially in locusts) and in other animal substrates. Adults visit decaying meat and feces. Very rare in its northern limits.

Material studied: 1 ♂, Polje in Valley, Dalmatia: Novi Grad, 27.—31. 5. 58, R. L. Coe; 1 ♂, Khan Yunus, 30. 7. 1917, S. Palestine, E. E. Austen, 1918—41; 1 ♂, Mazador Morocco, Flr. Senicio, Apr. 20., Cockerell; 2 ♂♂, Hegyfárok, 16. 9. 1957 (leg. Slamečková); 1 ♂, Lupka (near Nitra), 26. 6. 64 (leg. Slamečková); 1 ♂, Komárno, 3. 6. 82 (leg. Povolný) — all these habitats in southern Slovakia; 2 ♂♂, Harmáshatárhegy (Budapest), 16. 7. 82 (leg. Povolný).

***Parasarcophaga (Liosarcophaga) pleskei* Rodendorf, 1937**

Rodendorf, 1937, Fauna SSSR, sem. Sarcophagidae, 19: 230—231

This species has a very prominent and long tip of paraphallus and a terminally bifurcated, not very long lateral ledge of paraphallus. The membranous ventral process is medium long, comparatively narrow with a moderately sharp, ventrally curved tip. Proces of paraphallus base elongate, not very prominent, with a visible tip being strongly sclerotized. Postgonite thicker and generally stronger than pregonite — a unique situation within the species of this group (fig. 24).

Distribution: Transbaikalia, Tian Shan, Aral dube. Essentially the species seems to be endemic to the southern parts of Siberia and the adjacent territory. Ecology is unknown!

Material studied: 1 ♂, Zabajkal'je, L. B. Vytima u Macholonby, O. A. Čerkova, 7. 7. 61.

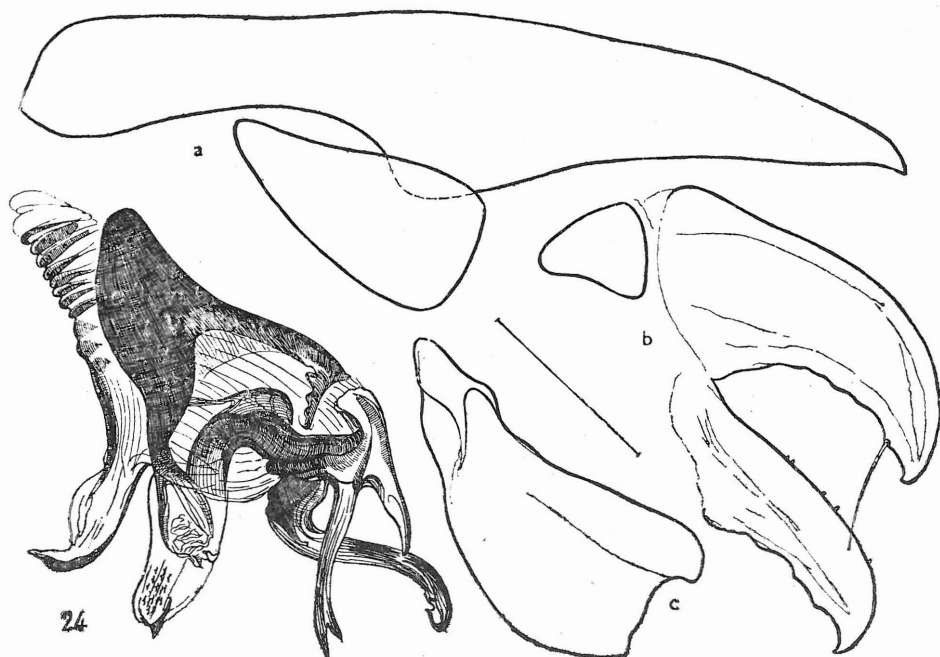


Fig. 24: *Parasarcophaga (Liosarcophaga) pleskei* Rodendorf, 1937, paraphallus, cercus (a), gonites (b) and membranal tube (c), [Zabajkal'je, Sibiria].

***Parasarcophaga (Liosarcophaga) jaroshevskyi* Rodendorf, 1937**

Rodendorf, 1937, Fauna SSSR, sem. Sarcophagidae, 19: 231—232

The species is similar and probably related to *P. (L.) pleskei* as seen from the morphology of its genitalia (compare fig. 39 with fig. 24). It differs from *P. (L.) pleskei* by the narrow but straight membranous process, by the thicker anterior apophysis and by cerci having dorsally a minor convexity (fig. 39).

Distribution: Far East, mainly the Ussuri territory. Ecology unknown. The schematic representation of the male genitalia is a sketch by Dr. J. Verves, Kiev.

***Parasarcophaga (Liosarcophaga) scopariiformis* (Senior-White, 1927)**

Senior-White, 1927, Spolia ceylonica, 14: 32 [*Sarcophaga*]

A very characteristic species of *Liosarcophaga* described however, as „*Sarcophaga dux* var. *scopariiformis*“. The species has a rather subtle paraphallus and is immediately recognized by its short and strong, deeply bifurcate lateral ledge of the paraphallus tip. The two paired ventral membranous processes are rather simple and slender, resembling

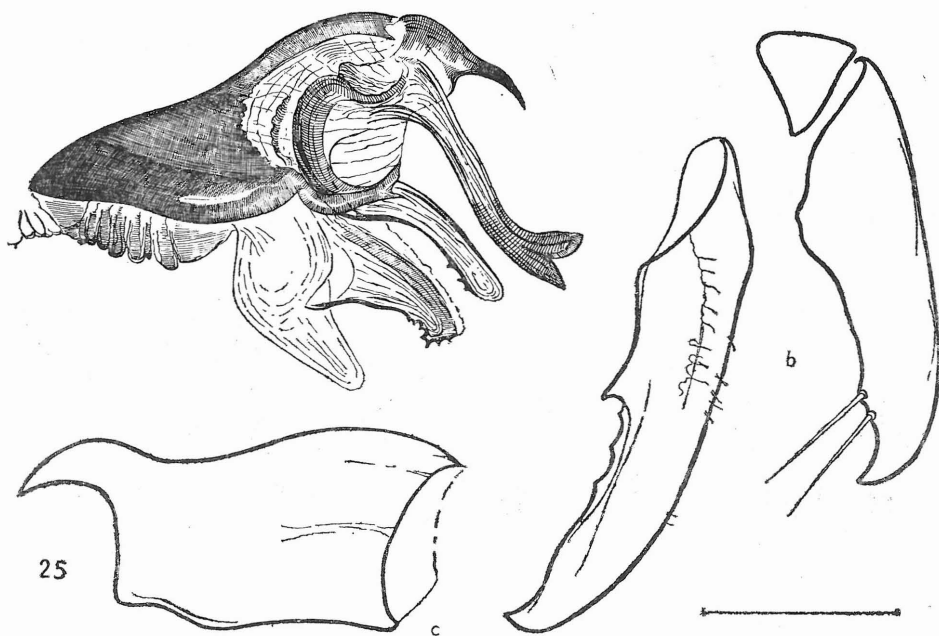
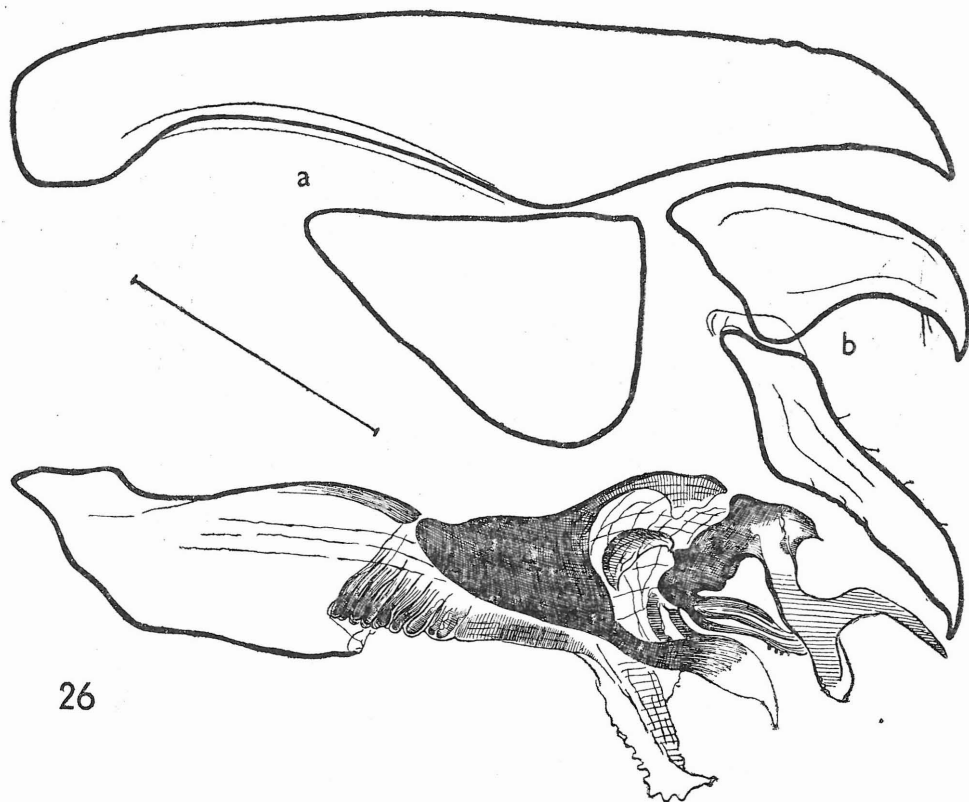


Fig. 25: *Parasarcophaga (Liosarcophaga) madeirensis* (Schiner, 1868), syntype; paraphallus, gonites (b) and membranous tube (c), (Madeira). Abscessa equals 0.25 mm.

somewhat those of *P. (L.) aegyptica*. Gonites comparatively short, postgonite thicker and a little shorter than pregonite (fig. 26, 27).

Distribution: According to Rodendorf (1937) the species is known from Ceylon and China but I identified a male specimen (fig. 27) collected in Kenya, so the species might be also Aethiopian. Further research of this very specialized form of *Liosarcophaga* is desirable which would reveal also its unknown ecology.

Material studied: 1 ♂, Sotik, S. A. L., Kenya, Le Pelley, Date. 1932, No. 2424, *Sarcophaga aegyptica* Salem, det. v. Emden, 1957 (prep. BM-116); ♂ Suduganga, Ceylon, 16. 5. 1925, Purch, from Senior-White, BM 1938-460, *Sarcophaga dux* Thoms., var. *scopariiformis* S. W., det. R. Senior White, Co-Type (red label), Paratype (rounded yellow label); 2 ♂♂, Hainan Exp., 30. 3. 34, ex coll. Chi Ho.



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Fig. 26: *Parasarcophaga (Liosarcophaga) scopariiformis* (Senior-White, 1927), paraphallus, cercus with coxite [a] and gonites [b], (Suduganga, Ceylon, Paratype).

## Additional material studied

The numerous misidentifications were responsible for incorrect determinations of several other *Parasarcophaga* spp. In the following list the correct names of such misidentified taxa are given. These data may contribute to the present knowledge of the distribution of such species.

*Parasarcophaga misera* (Walker, 1849) [syn. *Sarcophaga orchidea* Böttcher, 1913]: 1 ♂, Burpengary, S. Queensland, 2. 9. 1899, Dr. J. L. Bancroft, 1900. 71 [prep. BM-110]; 1 ♂, New Holland, J. Hunter.

*Parasarcophaga ruficornis* (Fabricius, 1794): 1 ♂, Arabia, Aden, 7. 3. 1939, G. H. Henry; 1 ♂, Belgian Congo, Léopoldville, 8. 9. 43, Dr. M. Wanson; 1 ♂, Parasitic on *Hybloea puera*, Burma, Dr. J. Atkinson, Sawbin Res., Zigon, R. Hla. Ogh., 20. 7. 30 [prep. BM-109]; 1 ♂, Malay Peninsula, 17. 7. 1939, A. G. Pillai, Bred 10615, in decomposing meat in Laboratory, Kuala Lumpur. The specimen from Burma was identified as „*misera*“ (!! — [fig. 22, 23]).

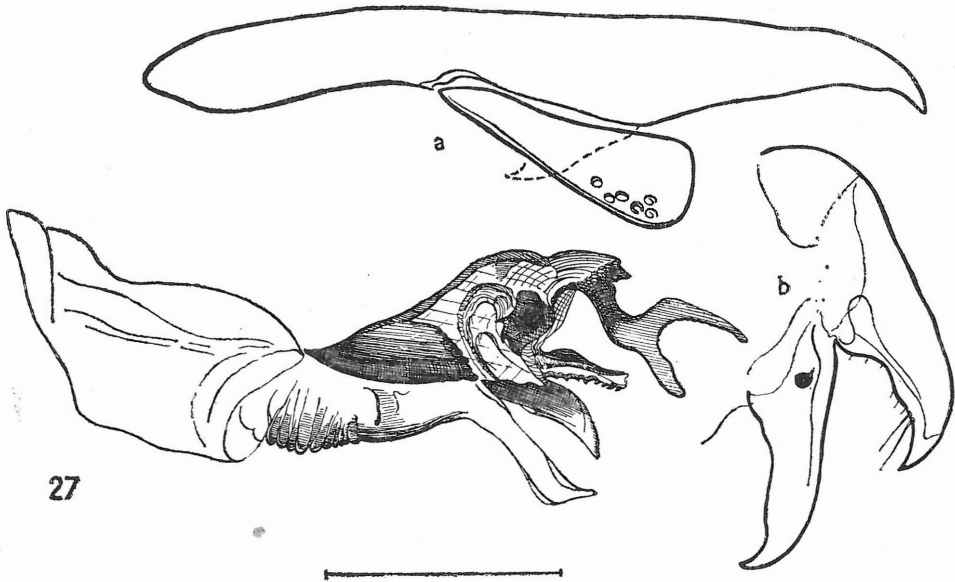
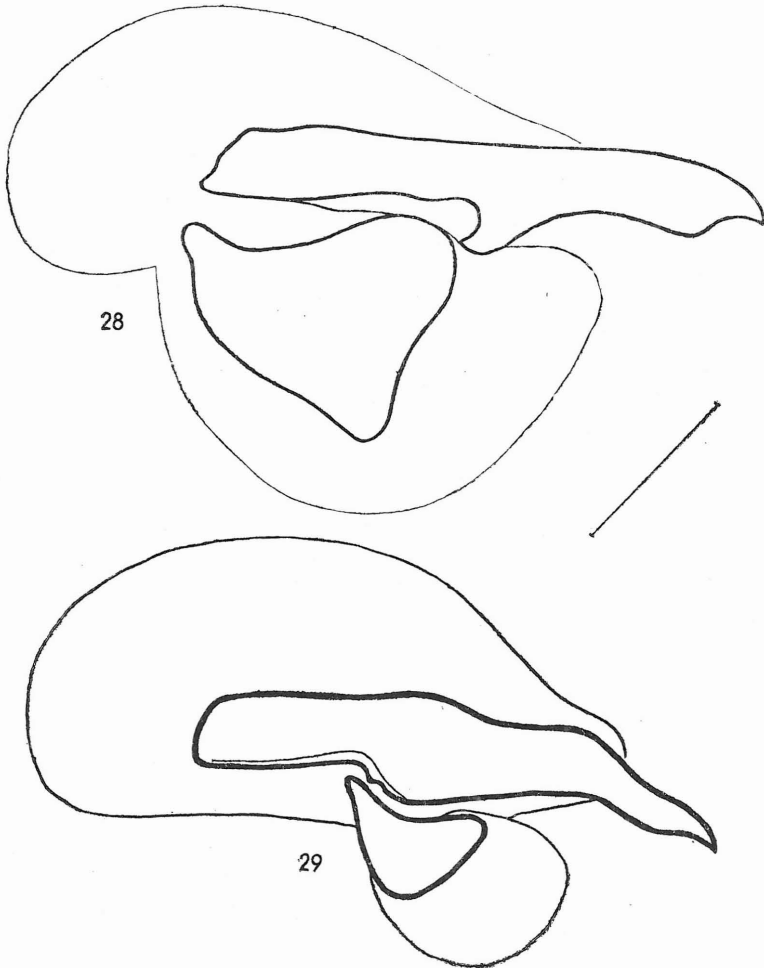


Fig. 27: *Parasarcophaga* (*Liosarcophaga*) *scopariiformis* (Senior-White, 1927), paraphallus, cercus with coxite (a) and ganites (b), [Sotik, Kenya].

*Parasarcophaga teretirostris* (Pandellé, 1896): 1 ♂, England, SH: Portsdown, 7. 6. 54, J. A. & D. J. Clark; 2 ♂♂, dtto, S. Hants, 24. 5. 57, D. J. Clark; 2 ♂♂, England, SD., Seaton, 23. 7. 53, J. A. J. Boyer & D. J. Clark; 1 ♂, England, SE., Hadleigh, Wood, 21.—22. 8. 54, J. A. & D. J. Clark;

1 ♂, Holkham, Norfolk, 12. 7. 1939; 1 ♂, Essex, Benfleet, 6. 7. 45; 1 ♂, Wiltshire, Salisbury, 2. 6. 1977, J. P. Dear; 1 ♂, Lyntom, 12. 8. 41, C. J. Wainwright; 1 ♂, Greve de Lacq., Jersey, 10. 9. 46; 1 ♂, Bolognola (Prov. of Macerata), Sibillini, 3600 ft., 15. 8.—15. 9. 0. Querci; 1 ♂, Firenze, Monte Sonarolo, 800 m, Toscana, Italia centr., 22. Aug. 1919, Querci; 1 ♂, Bex, Switzerland, 19. 5. 1910, C. J. Wainwright.

*Parasarcophaga emdeni* Rodendorf, 1970: 1 ♂, Galtür Paznauntal, Austria, Richards, 18. July 1933, Richards; 1 ♂, Hungaria, Kalocsa, Thalhammer; 1 ♂, Dalmatia, Novi Grad, 27.—31. 5. 58.



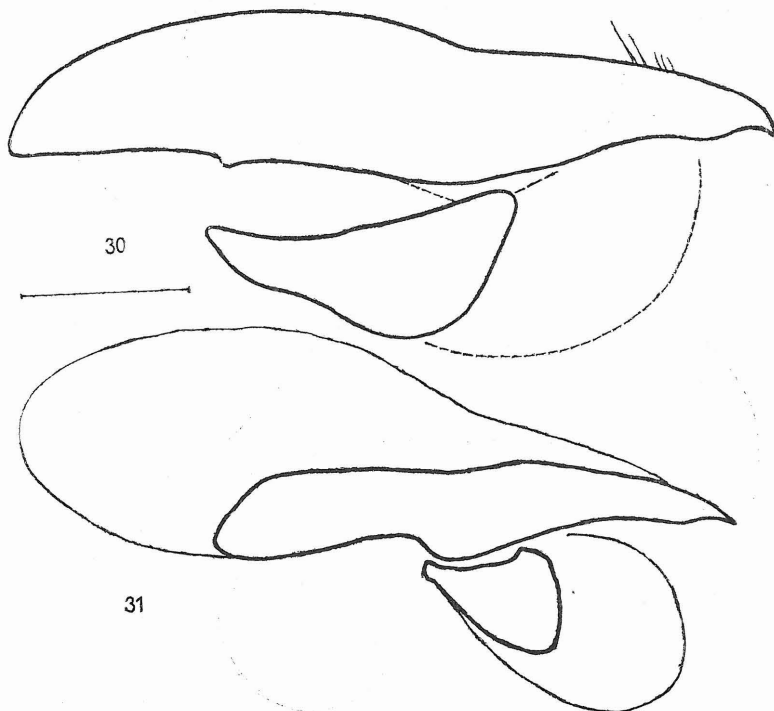
Figs. 28, 29: Cercus and coxite of *Parasarcophaga (Liosarcophaga) marshalli* (Parker, 1923), [Italy, Faganko], [29], and *Parasarcophaga (Liosarcophaga) tuberosa* (Pandellé, 1896), [29], [Balatonkenese, Hungaria].

This material of *P. teretirostris* and *P. emdeni* confirms that two closely related and obviously vicariating taxa are concerned. It remains unclear where there is their exact demarcation, because the specimens from Moravia, Slovakia, Hungary, Austria, Dalmatia and the South East Europe belong clearly to *P. emdeni*, whereas the specimens from England, France, Thuringia, Italy and Switzerland belong to *P. teretirostris* [see also Povolný & Slamečková [1979]].

*Parasarcophaga similis* (Meade, 1876): 1 ♂, Hengistbury-Head, 4. 6. 38, C. J. Wainwright; 1 ♂, England, SE: Lymington, 26. 5. 54, J. A. & D. J. Clark; 1 ♂, Mudeford Hans, 19. 7. 44; 1 ♂, Frankfurt/Oder, M. P. Riedel, 19. 6. 27; 1 ♂, Zi-Ka-Wei, 24. 9. 1917, from E. Seguy ex China; 1 ♂, Hainan Exp., 1. 6. 34, ex coll. Chi Ho; 2 ♂♂, Kanazawa, Kaga, Ishikawa, Honshu, Japan, 28. June 1964, H. Kurahashi.

### Acknowledgement

I feel greatly obliged to Dr. Adrian C. Pont, British Museum (Natural History), London, who offered me essential help reflected in our extensi-



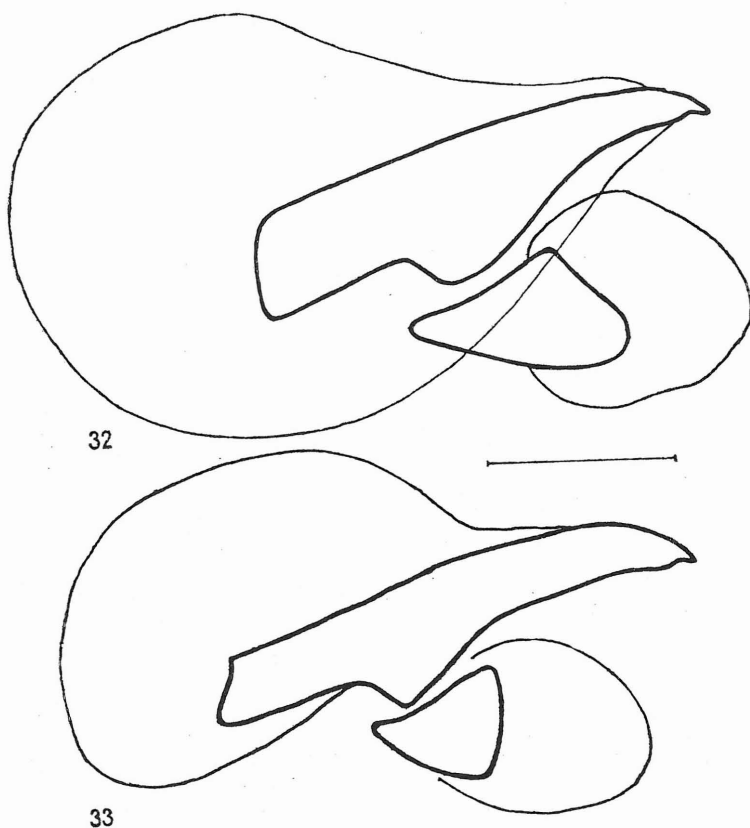
Figs. 30, 31: Cercus and coxite of: *Parasarcophaga* (*Liosarcophaga*) *madeirensis* (Schiner, 1868), syntype, (Madeira), [30], and *Parasarcophaga* (*Liosarcophaga*) *portschinskyi* Rodendorf, 1937, [31] (Struma, Bulgaria).



ve correspondence during the years 1981—1982. It should be emphasized that without his contribution the paper could never be finished. My thanks are also due to late Professor Dr. Boris B. Rodendorf, Moscow, my teacher in Sarcophagidae, who supported my endeavour for several decades and who contributed to this paper by his long-lasting effort to identify specimens of this group for the collections of the BMNH. Dr. Jurij Verves, Kiev, was helpful by important exchange of ideas and by offering me several species of *Liosarcophaga* as well technical help. Dr. Ruth Contreras-Lichtenberg, Naturhistorisches Museum, Vienna, was helpful during the investigation on the identity of *Sarcophaga madeirensis* (Schiner), similarly as Dr. F. Zumpt, Johannesburg, who offered information on some African species of *Parasarcophaga*. Dr. Ludvík Hoberland, Department of Entomology, National Museum, Prague, showed extraordinary understanding for this paper as the editor of this periodical.

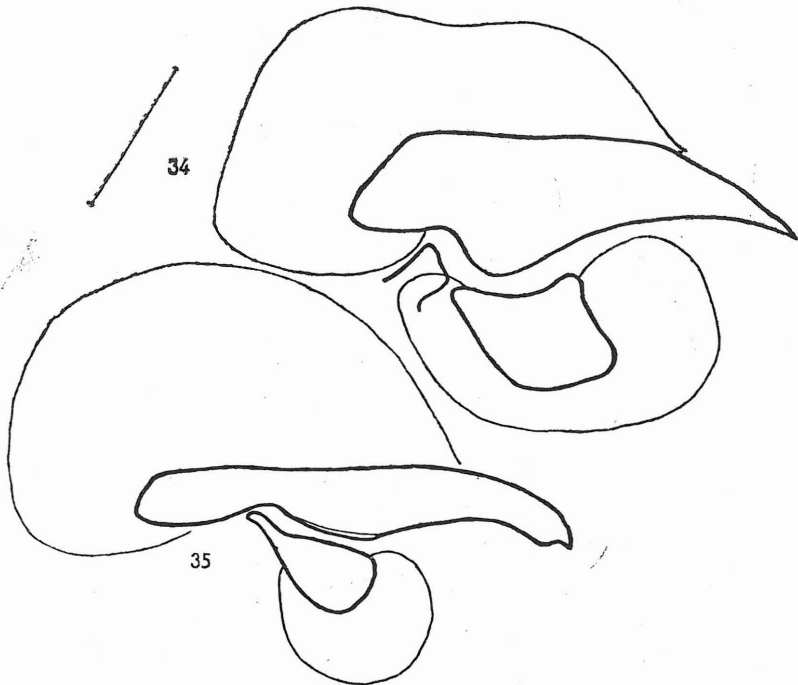
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Figs. 32, 33: Cercus and coxite of: *Parasarcophaga (Liosarcophaga) aegyptica* (Salem, 1935), [32], [Gemenc, Hungaria], and *Parasarcophaga (Liosarcophaga) jacobsoni* Rodendorf, 1937, [33], [Struma, Bulgaria].

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Figs. 34, 35: Cercus and coxite of: *Parasarcophaga (Liosarcophaga) similis* (Meade, 1876), [34], (Butrint, Albania), and *Parasarcophaga (Liosarcophaga) harpax* (Pandellé, 1896), [35], (Ruská Poruba, East Slovakia).

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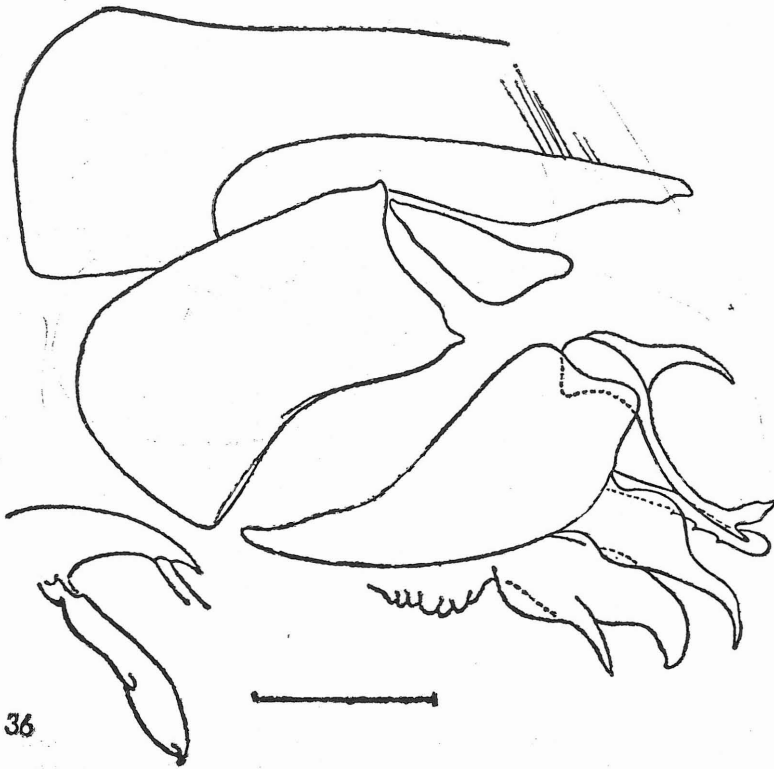


Fig. 36: *Parasarcophaga (Liosarcophaga) madeirensis* (Schiner, 1868), male genitalia of a syntype after a sketch by Dr. Pont. Ventral processes of paraphallus partly damaged [compare with figs. 25 and 30].

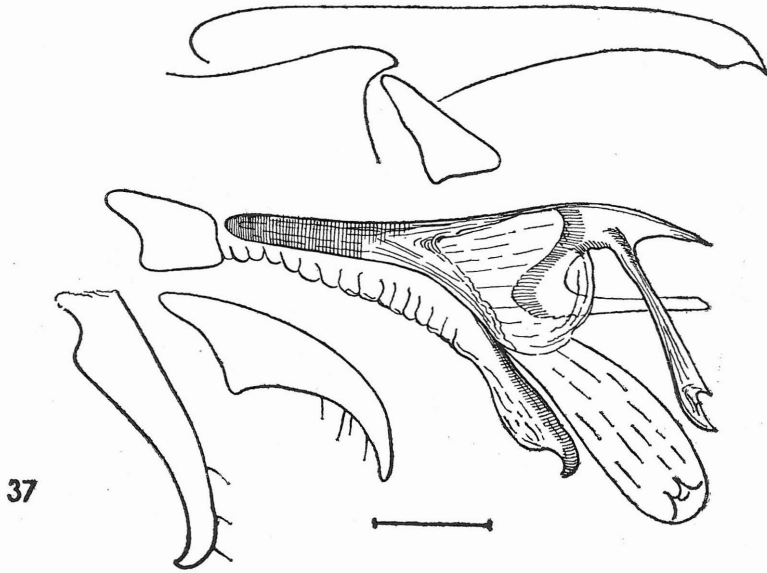


Fig. 37: *Parasarcophaga (Liosarcophaga) marshalli* (Parker, 1923), male genitalia after a sketch by Dr. Verves. Compare with figs. 10, 11 and 29. Abscissa equals 0.25 mm.

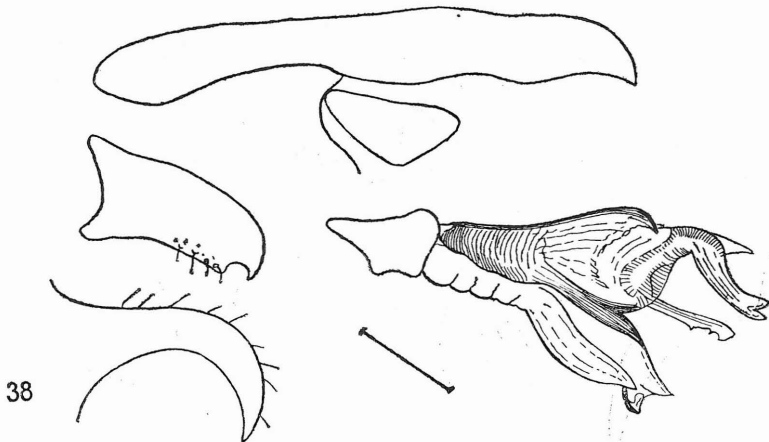


Fig. 38: *Parasarcophaga (Liosarcophaga) brevicornis* (Ho, 1934), male genitalia after a sketch by Dr. Verves. Compare with figs. 13, 14.

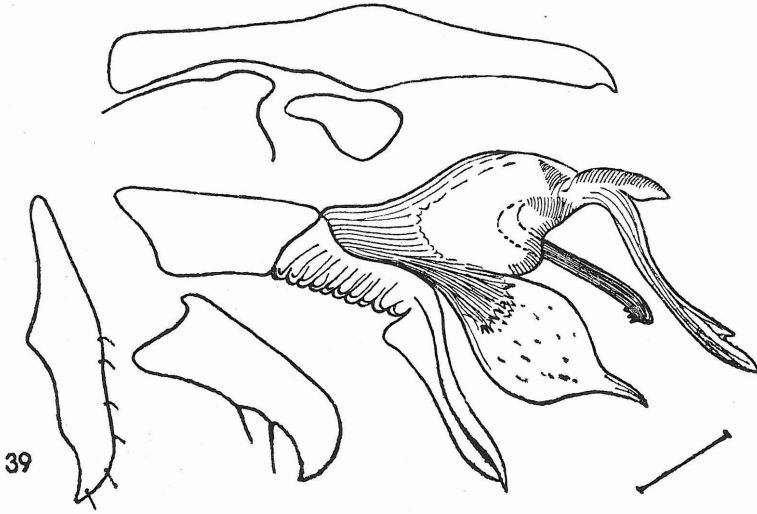


Fig. 39: *Parasarcophaga (Liosarcophaga) jaroshevskyi* Rodendorf, 1937, male genitalia after a sketch by Dr. Verves.

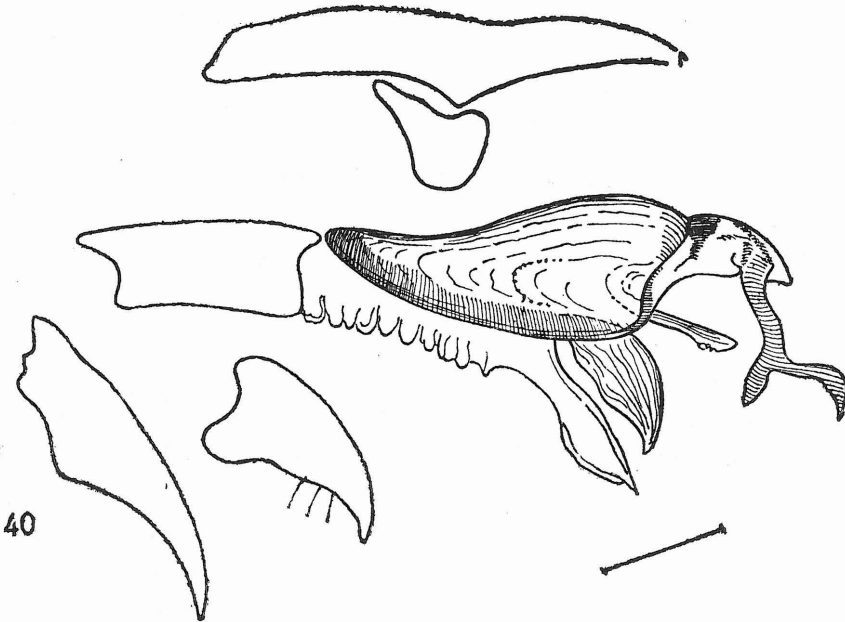


Fig. 40: *Parasarcophaga (Liosarcophaga) scopariiformis* (Senior-White, 1927), male genitalia after a sketch by Dr. Verves. Compare with figs. 26 and 27.

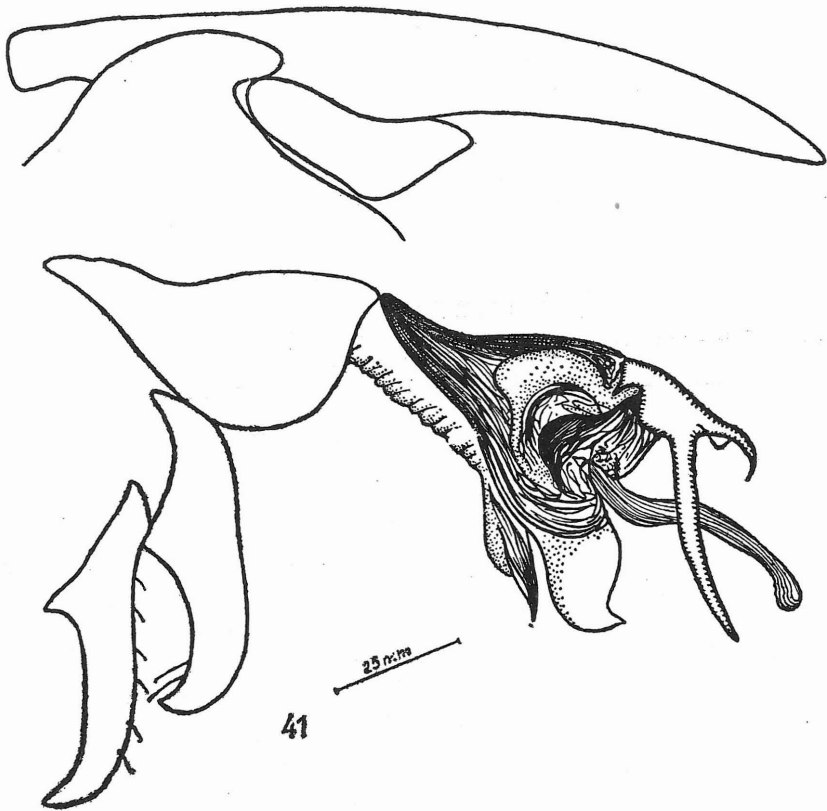


Fig. 41: *Parasarcophaga (Liosarcophaga) lypai* Verves, 1977, male genitalia (after the original sketch by Dr. Verves).

During the press of this paper the manuscript of which has been forwarded in February 1983 to the Editorial Board of this journal the following publication appeared: Verves Yu. G., 1986 (1987): Family Sarcophagidae, in: Catalogue of Palearctic Diptera, 12: 58—235, Akadémiai Kiadó, Budapest.

For technical reasons it was impossible to incorporate the results of this publication into the above paper.