REVISIONARY NOTES ON NORTH AMERICAN TEPHRITIDAE (DIPTERA), WITH KEYS AND DESCRIPTIONS OF NEW SPECIES

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ABSTRACT—*Orellia undosa* (Coq.) is transferred to *Chaetostomella* Hendel; San Diego, CA specimens of *Cryptotreta pallida* (Cole) of Blanc and Foote are redescribed as *C.* **cislimitensis** Steyskal, n.sp.; *Rhagoletoides* Foote is made a new synonym of *Oedicarena* Loew, and a new key to the species of the latter is presented; *Eurosta* **floridensis** Foote, n.sp., is described from Jasper and Orlando, FL, and a key to *Eurosta* spp. is presented for the first time; *Valentibulla* **steyskali** Foote, n.sp. is proposed for the concept assigned to *Valentibulla munda* (Coq.) by Foote and Blanc 1959, and a new key to the species of *Valentibulla* is provided.

This paper includes descriptions of several new species belonging to various New World genera of Tephritidae and presents necessary changes in the nomenclature of several taxa to bring the use of several names into conformity with the Manual of North American Diptera soon to be published by Agriculture Canada. We also present keys to the species of some genera for which published revisions have never been available, and we have updated others to make them more useful in the light of recent taxonomic developments.

The research reported herein is in large part that of the senior author; the junior author reviewed, concurred in, and edited the manuscript, and provided the description of one new species in a very minor way. Both authors are deeply pleased to honor Alan Stone with this contribution to the published record of a family to which he made important taxonomic contributions.

Genus *Chaetostomella* Hendel

Chaetostomella Hendel, 1927: 21, 124. Type-species, *Trypeta onotrophes* Loew, 1846, by original designation.

In the American fauna, this genus finds its place with a small group of non-dacine and non-myopitine genera characterized as follows: dorsocentral bristles anterior to halfway between supra-alar and acrostichal bristles; scutellum not distinctly swollen nor polished; posterior upper fronto-orbital bristles convergent. This group includes also *Orellia* Robineau-Desvoidy and *Neaspilota* Osten Sacken, from both of which it may be easily distinguished by a few well-developed setae on the anterior oral margin that are larger than adjacent setae. Only the following species is known from North America.

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Chaetostomella undosa (Coquillett), **new combination**

Trypeta undosa Coquillett, 1899: 262.
Orellia undosa (Coquillet) McFadden and Foote, 1961: 256.

Chaetostomella undosa is very similar in general external characters to the type of its genus, *C. onotrophes* (Loew). The wing pattern and venation and the characters of color, color pattern, chaetotaxy, and vestiture are virtually identical in the 2 species, except in the development of 6 black spots on the last preabdominal tergum. These spots in both species consist in a median anterior pair and a pair in the anterior and posterior ends of each lateral margin. The posterolateral spots may sometimes be absent. Only in *C. onotrophes* have we seen these spots fused into a pair of roughly L-shaped marks. The only reliable external character we have found is the height of the cheek. In *C. onotrophes* we have found the cheek to vary between 0.17 and 0.26 of the eye-height (average, 0.22), whereas in *C. undosa* the proportion is 0.31 to 0.43 (average, 0.38). Lack of sufficient specimens of the female sex of *C. undosa* (only holotype is available) has induced us to defer examination of the postabdomen.

Cryptotreta pallida (Cole)

Eurosta pallida Cole, 1923: 472.
Cryptotreta pallida (Cole) Blanc and Foote, 1961: 82.

Eurosta pallida Cole was described from a single male specimen captured at San Francisquito Bay, Baja California, Mexico, about 640 km southeast of San Diego, California, on the Gulf side of the peninsula of Baja California. The species was recorded from San Ysidro, San Diego County, California by Blanc and Foote (1961) at the time they designated it as the type of their new genus *Cryptotreta*. Since that time we have received additional material from the vicinity of San Diego. This material is consistently different from the type of *C. pallida*, which one of us (Steyskal) examined in 1968. The San Diego specimens are therefore described below as a new species.

Cryptotreta cislimitensis Steyskal, new species
figs. 1–6

Very similar to *Cryptotreta pallida* (Cole), except as follows. Group of hyaline spots forming contrasting mottled area about a squarish spot in middle of discal cell, as in figure ascribed to *C. pallida* by Blanc and Foote (1961, fig. 4). In *C. pallida*, such an area is hardly contrasted with adjacent areas and entire wing pattern is much less contrasty than indicated in Cole's drawing (1923, fig. 10). Dark band of wing extending from pterostigma to anal lobe includes about twice as many small pale spots in the type of *C. pallida* as are shown in Cole's figure or in *C. cislimitensis*. Last 2 abdominal terga blackish, with narrow mesal yellow

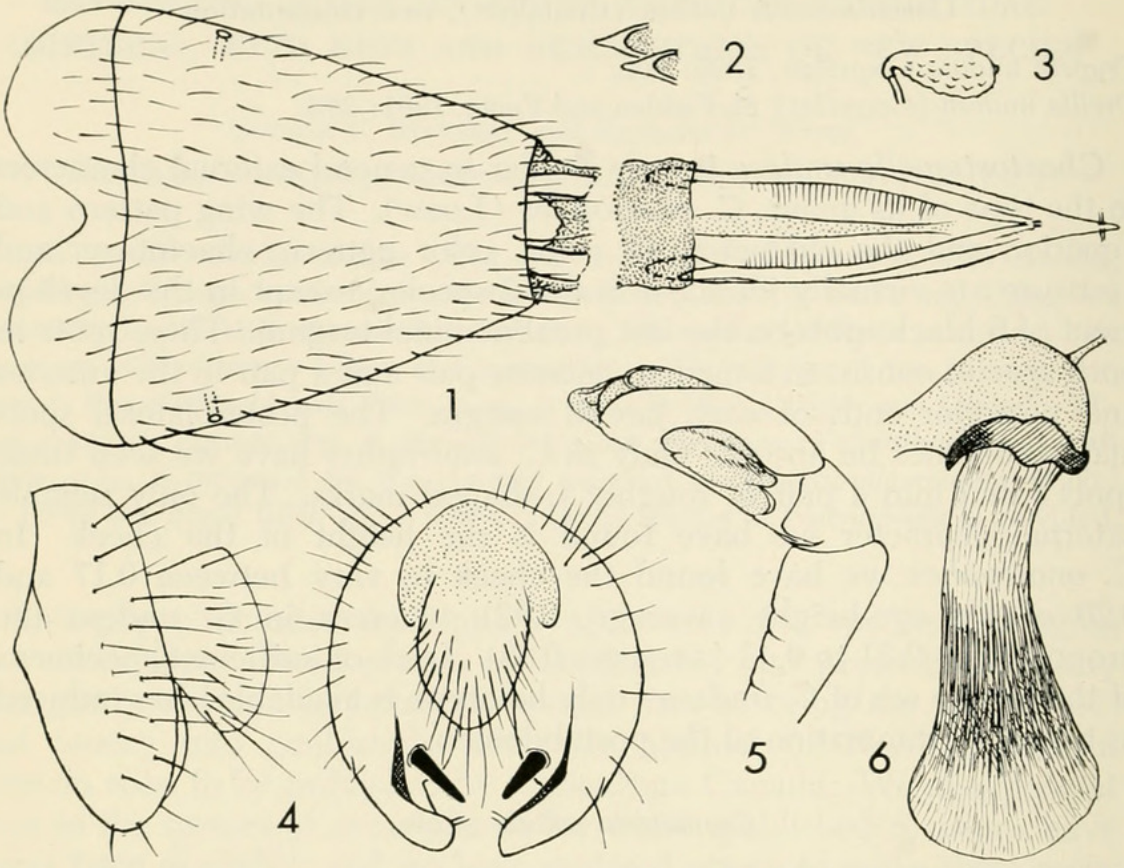

Fig. 1–6, *Cryptotreta cislimitensis.* 1, ovipositor sheath and ovipositor, dorsal view. 2, largest spicules of rasper. 3, spermatheca. 4, profile and posterior views of male postabdomen. 5, tip of aedeagus. 6, sperm-pump.

stripe (in *C. pallida* uniformly brown). Scutellum of both species yellowish, in *C. cislimitensis* with conspicuous but diffuse brown area at base of each lateral seta. Postabdomen of female as in figs. 1–3; of male as in figs. 4–6. Ovipositor sheath blackish above, with diffuse, roundish, orange central area and largely orange with black ends ventrally.

Holotype, male, allotype, and 8 paratypes (4 each of each sex), Chula Vista, San Diego County, California, April 3, 1968 (E. D. Algert); one female paratype, San Diego, California, April 9, 1968, black light trap; all in U.S. National Museum, type no. 74004.

The species name is an adjective derived from the Latin noun *limes* 'limit, border' and meaning 'pertaining to this side of the border.'

Eurosta floridensis Foote, new species
fig. 7–10, 17

Length of wing 6.75–7.4 mm. General appearance very similar to other species in the genus, the small appressed setae covering most of body and legs very light golden or colorless under artificial light. Head and body without distinctive color pattern. No discernible differences in sexes except for postabdominal features. Differences from the described species of *Eurosta* reside chiefly in color pattern of wing. *Eurosta floridensis*, as shown in the accompanying key is ap-

parently most closely related to *E. fenestrata* Snow, a species found in central and northern North America, east to Oklahoma and Ontario. Numerous, rather distinct, rounded golden spots scattered over disk, lighter in color than disk but not hyaline except at wing margins. Apical hyaline arc very narrow, restricted almost entirely to apex of 2nd posterior cell, usually a small isolated spot immediately anterior to it in apex of 1st posterior cell. Postpterostigmatal marking with "comma" distinct. A small but distinct round hyaline spot present in 1st posterior cell immediately distad of apex of costal cell. Light area in posterior proximal area of wing disk rather solidly hyaline in 3rd posterior cell, especially anteriorly where a distinct, sometimes discrete, hyaline spot is present, usually with irregular margins as if the spot were a result of the complete coalescing of reticulation; hyaline area in 3rd posterior cell clearly reticulate but more hyaline than pigmented.

Female. Ratio of length of dorsum to greatest height of ovipositor sheath 1:1.6; ratio of length of ovipositor tip to entire length of ovipositor 1:3.4 (figs. 7, 8); largest spicules of rasper (fig. 9) somewhat heavier than in *E. fenestrata* (Snow) (fig. 14).

Male. Postabdomen as in fig. 10; apical margin of epandrium emarginate in profile; tip of aedeagus as in fig. 17.

Holotype female (USNM Type No. 74005), Jasper, Fla., 11–18 Nov., 1930, Allotype, Dunellon, Fla., Dec. 16, 1930, D. J. Nicholson. Paratypes as follows: 1♀, same data as holotype; 1♂, 1♀, same data as holotype but Dec. 5 and 19, respectively; 1♀, 6 mi W. Jasper, Fla., Oct. 28, 1930; 1♀, 1♂, Orlando, Fla., Dec. 19–29, 1930 and Jan. 21–28, 1931, respectively; 1♀, Paradise, Fla., Dec. 5, 1930. Holotype, allotype, and all paratypes were bred from *Solidago* sp. roots by D. J. Nicholson. An additional male represented in the study series was reared from *Solidago fistulosa* ¼ mi east of Orlando on Dec. 29, 1930 by D. J. Nicholson.

Hosts of *Eurosta elsa* and *E. comma*

In the paragraph preceding the original description of *Eurosta elsa* Daecke (1910, p. 342), the author states, "The flies reared from *Solidago juncea* proved to be the true form of *Eurosta comma* Wied. (see plate), but those from *Solidago rugosa* taken at Richmond Hill, L.I., differed uniformly from this species and proved to be a form new to science." However, on page 343 he states, "The figure of upper left-hand corner of Plate X shows the galls of *Eurosta comma* on the root of *Solidago rugosa* Mill. The rest of the plate pictures *Solidago juncea* with the galls of *Eurosta elsa.*" In the paragraph preceding the first quotation (p. 342), Daecke also states, ". . . where I also collected *E. comma* in September. After a little search I located the galls and was surprised to find them on *Solidago rugosa* Mill., while those from Richmond Hill, L.I., were taken on *Solidago juncea* Ait."

Phillips (1923, p. 144, but not 1946, p. 114) ascribes to *Eurosta elsa* the host *Solidago rugosa* and to *E. comma* the host *S. juncea*, as

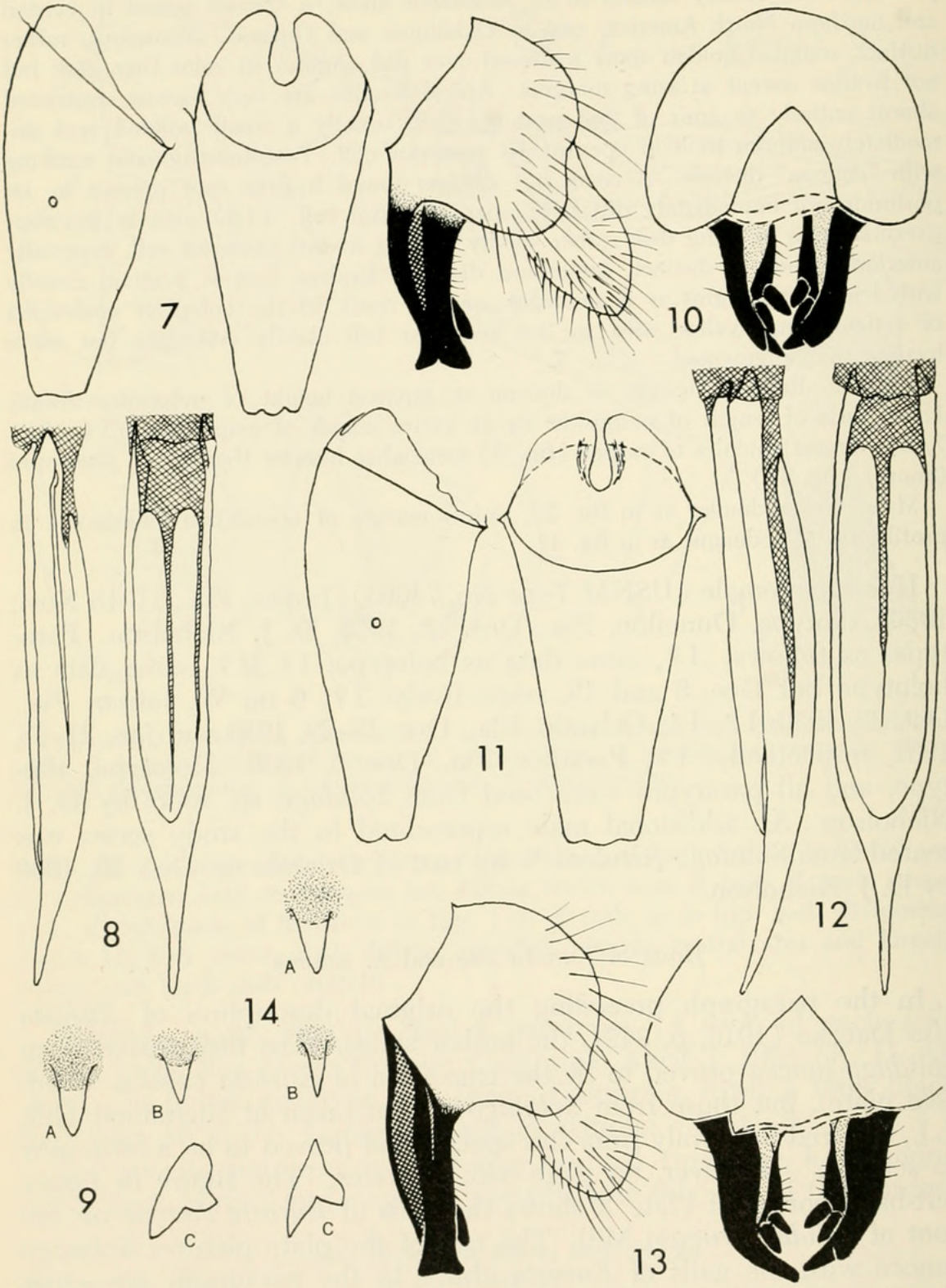

Fig. 7–14, *Eurosta* species. 7, *Eurosta floridensis*, dorsal and lateral views of ovipositor sheath. 8, ibid., dorsal and lateral views of ovipositor. 9, ibid., largest spicules of rasper (a, ventral; b, dorsal; c, lateral). 10, ibid., profile and posterior views of male postabdomen. 11, *Eurosta fenestrata*, White Mts., New Mexico, dorsal and lateral views of ovipositor sheath. 12, ibid., dorsal and lateral views of ovipositor. 13, ibid., profile and posterior views of male postabdomen. 14, ibid., largest spicules of rasper (a, ventral; b, dorsal; c, lateral).

stated in the first quotation above. Benjamin (1934, p. 28) also cites Daecke as stating that S. *juncea* is the host of *E. comma*. Novak et al. (1967) cite S. *juncea* as a new host record for *E. elsa*.

Daecke's statement in the first quotation is evidently a lapsus reversing the host names. The 2 other statements by Daecke, as well as the labels on 2 of the 5 type specimens of *E. elsa* in U.S. National Museum "reared from *Solid. juncea*" on "Type (1)" and "bred from *Sol. juncea*" on "Type (2)", as well as the rearing by Novak et al., apparently represent the true host of *E. elsa*. The female "Type (2)" is hereby selected as lectotype.

Key To The North American Species Of The Genus *Eurosta*

1(8) Apex of wing with narrow crescentic hyaline mark, sometimes broken into 3 small spots by darkening about ends of 3rd and 4th veins ..... *Comma* group

2(3) Wing with reduced postpterostigmatal spot not divided by median bar, without anal pale mark ..... *E. elsa* Daecke

3(2) Postpterostigmatal spot equilateral-triangular, extending into submarginal cell and divided by median transversa bar or "comma."

4(5) Pale mark at end of anal vein little developed, not extending over ½ way across 3rd posterior cell; ovipositor sheath short (fig. 15); male postabdomen (fig. 16), lower margin of epandrium square and straight, tips of claspers very sharp ..... *E. comma* (Wied.)

5(4) Wing with conspicuous pale mark extending inward from end of anal vein; ovipositor sheath long (figs. 7, 11); male postabdomen (figs. 10, 14) with profile of lower margin of epandrium concave, tips of claspers not as sharp.

6(7) Anal pale spot of wing with discrete margins; ovipositor (fig. 12) and claspers (fig. 13) longer ..... *E. fenestrata* Snow

7(6) Anal pale spot reticulate, at least around wing margin; ovipositor (fig. 8) and claspers (fig. 10) shorter ..... *E. floridensis* Foote

8(1) Hyaline apex of wing broad, with several spots extending well inward from wing tip.

9(10) Wing with 3 triangular pale areas broadly based on wing margin, 1 postpterostigmatal which is divided by median bar and 2 in 2nd and 3rd posterior cells respectively, usually non-reticulate; postpterostigmatal mark and the one in 2nd posterior cell sometimes connected ..... *E. solidaginis* (Fitch)

a. Postpterostigmatal mark and that in 2nd posterior cell fully connected, forming an uninterrupted hyaline band extending transversely across wing from anterior to posterior margins ..... var. *fascipennis* Curran

b. Postpterostigmatal mark distinctly separated from that in 2nd posterior cell ..... var. *subfasciata* Curran

10(9) Wing marked otherwise, postpterostigmatal hyaline triangle not extending into first posterior cell, posterior hyaline triangles more or less reticulate, broken into spots, or reduced.

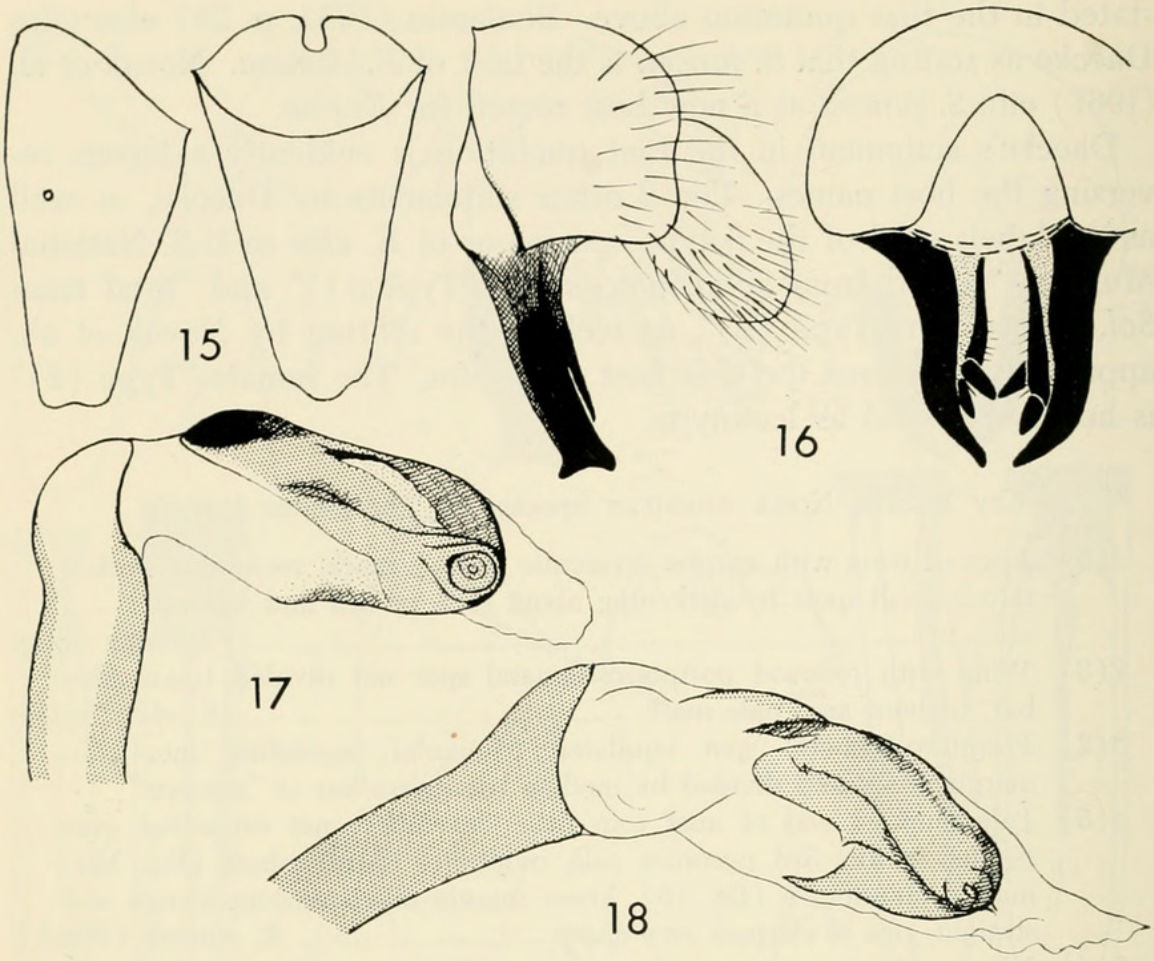

Fig. 15–18, *Eurosta* species. 15, *Eurosta comma,* College Park, Maryland, dorsal and lateral views of ovipositor sheath. 16, ibid., profile and posterior views of male postabdomen. 17, *Eurosta floridensis,* tip of aedeagus. 18, *Eurosta fenestrata,* tip of aedeagus.

11(12) Postpterostigmatal spot closely followed around tip of wing into 2nd posterior cell by a series of approximately equal spots, bulla of 1st posterior cell especially large and deep ..... *E. latifrons* Loew

12(11) Spots as described above not present.

13(14) Posterior hyaline areas reduced, that in 3rd posterior cell not triangular, attaining posterior margin narrowly or not at all; apex of wing with hyaline spots widely separated ..... *E. lateralis* (Wied.)

14(13) Posterior hyaline areas of wing well developed as reticulated triangular areas or triangles of closely grouped spots.

15(16) 4th posterior cell with about 15 hyaline spots ..... *E. reticulata* Snow

16(15) 4th posterior cell with only about 6 hyaline spots ..... *E. conspurcata* Doane

Genus *Oedicarena* Loew

Oedicarena Loew, 1873: 247. Type-species *O. tetanops* Loew by original designation; Foote 1960b: 114.

Rhagoletoides Foote, 1960a: 145. Type-species *Spilographa latifrons* Wulp, by original designation. *New Synonym.*

When the genus *Rhagoletoides* was proposed in June, 1960, it was compared with *Rhagoletis*, *Zonosemata*, *Trypeta*, *Euleia*, and *Chaetostoma*, but in December, 1960 (Foote, 1960b p. 114), it was stated, "*Oedicarena* very closely resembles *Rhagoletoides* Foote (1960) in having a prominent facial carina, golden mesonotal pollen, and a suggestion of paired brown mesonotal spots, but differs from that genus in lacking strong femoral spines and (having) a narrow gena." In reexamining the pertinent species during construction of the key to the Tephritidae for the forthcoming Manual of North American Diptera, we found that the difference in genal (cheek) height is indeed appreciable, but the strong femoral spines are only a little heavier in *latifrons* than in *tetanops*. We therefore now consider these differences as insufficient for generic separation, while the many similarities indicate a very close phylogenetic relationship of all the species in the following key.

Key To Species Of *Oedicarena* Loew

1(2) Cheek 0.26–0.32 of eye-height; parafacials at narrowest point 0.66 of greatest width of 3rd antennal segment; apical spot of wing single and widely separated from preapical transverse band or row of spots; apex of scutellum usually with blackish spot. ..... *O. latifrons* (Wulp), n. comb.

2(1) Cheek 0.5–0.63 of eye-height; parafacials at narrowest point 0.75 of greatest width of 3rd antennal segment; apical spot of wing connected with preapical band or row of spots or wing with 2 apical spots, one each at tips of veins R_5 and M_1; apex of scutellum concolorous with base.

3(4) Apical spot forming part of costal band meeting transverse band..... *O. persuasa* (Osten Sacken)

4(3) Apical spots 2, one each at ends of veins R_5 and M_1 ..... *O. tetanops* Loew

Since Foote (1960a) cited records for *O. latifrons*, an additional United States specimen has come to hand: ♂, Pawnee National Grassland, Weld County, Colorado, 9 August 1970 (R. T. Bell), in U.S. National Museum.

Valentibulla steyskali Foote, new species

Valentibulla munda (Coq.) Foote and Blanc, 1959: 152, misidentification

The holotype of *Euaresta munda* Coquillett (1899: 265) in the U.S. National Museum is represented at this time by only a small fragment of the thorax glued to a pin; part of the ventral portion of the thorax with leg fragments is also present and glued upside down on the top label of the same pin, but all other body parts are missing.

However, enough of the holotype is present to verify that part of Coquillett's original description: "Thorax and scutellum opaque, densely gray pruinose."

The senior author correctly points out that the insect described as *munda* by Foote and Blanc (1959) is not that species due to its shining dorsal thoracic and scutellar surfaces and other features differing from Coquillett's original description. Consequently, I (Foote) here name the species incorrectly identified and described as *Valentibulla munda* (Coq.) by myself and Blanc in 1959 as *Valentibulla steyskali* Foote, n.sp. The holotype is a female (USNM Type No. 74006) from Lucky Park Reservoir, 18 mi E. Boise, Idaho, reared from *Chrysothamnus nauseosus* April 24, 1961, by R. B. Ferguson.

The morphological characters in the key presented here will serve to distinguish the true *munda* of Coquillett.

Key To The Species Of The Genus *Valentibulla* Foote And Blanc

1(2) Dorsum of mesoscutum (at least in posterior ⅔) polished black, bearing only macrochaetae and short, thick setae; apical wing spot ⅓ length of cell R_5, anterior preapical hyaline spot in cell R_5 (against vein R_5) larger than posterior spot (cf. fig. 6, Foote and Blanc, 1959) ..... *V. steyskali*, n.sp.

2(1) Dorsum of thorax tomentose, dull gray; apical wing spot shorter, about ¼ length of cell R_5.

3(4) Spot in cell R_3 posterior to middle one of 3 in cell R_1 lacking, discal cell without hyaline spot, preapical hyaline spots in cell R_5 lacking or very small ..... *V. mundula* Coquillett

4(3) Hyaline spot present in cell R_3 posterior to middle one of 3 in cell R_1; apical parts of discal cell and cell R each with well developed hyaline spot; preapical hyaline spots in cell R_5 usually present on veins R_5 and M, the former usually smaller and sometimes lacking.

5(6) Hyaline incisions in 2nd posterior cell (2nd M_2) narrower than blackish intervening areas; hyaline spot posterior to apical spot in cell R_1 usually present and apicad of that spot ..... *V. thurmanae* Foote

6(5) Hyaline incisions in second posterior cell broader than intervening brown or blackish areas; hyaline spot posterior to apical spot in cell R_1 absent or contiguous to that spot.

7(8) Legs, especially middle and hind ones, with femora and tibiae largely blackish ..... *V. munda* Coquillett

Legs usually wholly yellowish ..... *V. californica* Coquillett

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