

THE GENUS *MESENTOTOMA*
(COLLEMBOLA: ENTOMOBRYIDAE)

BY KENNETH A. CHRISTIANSEN

Grinnell College, Grinnell, Iowa

In 1942 Salmon described a new genus and species of littoral Collembola under the name of *Mesentotoma exalga*. As he pointed out, these animals had a number of peculiar characteristics, not the least of which was the littoral habitat. Two species previously described as members of the genus *Entomobrya* also display many of these peculiar characteristics, including the littoral habitat. These are *E. laguna* Bacon and *E. dollfusi* Denis, and both are clearly separated from the remainder of the members of *Entomobrya*. Of the three species mentioned above, *dollfusi* is most similar to the members of the genus *Entomobrya*, and *laguna* is least so. In text-figure one below, it can be seen that the three species give the appearance of steps in a linear series of species, becoming more differentiated from the typical *Entomobrya* body structure. The differences between *dollfusi* and the typical *Entomobrya* species is so great that it is difficult to tell to what group of the genus it is allied. The most likely candidate appears to be the *E. marginata* group, and if we accept this hypothesis, then the idea of a linear relationship among the species is considerably reinforced by the structure of the male genital plate and the empodial appendage. While the basal position of *dollfusi* is fairly clear, some specializations of *exalga* would tend to indicate that it is not directly ancestral to *laguna*, although much less differentiated from the members of the genus *Entomobrya*. In the remainder of this paper the genus is redefined, and the three species belonging to it are described and figured. Although the unusual habitat makes this animal difficult to find, eventually more species will probably be turned

up, and these may serve to fill out some of the blank spots in the phylogeny of the group.

Genus *Mesentotoma* Salmon

Mesentotoma Salmon, 1942. Records of Dominion Museum, 1: 58,59.

Body form oval to elliptical, circular in cross section. *Antennae*. Lengths of segments variable, commonly 1-2.5-2.5-3. Second segment with a more or less definite indication of basal subsegmentation. Apical bulb of fourth antennal segment present or lacking. *Head* oval, only slightly longer than broad. Labral papillae lacking setae. Labial appendage with a well developed differentiated external seta. *Legs* with all setae ciliate except for normal apical internal smooth setae on third pair of legs. Tenent hair clavate or acuminate. Empodial appendage quadrilamellate, widened for basal one-half to one-third of length and sharply acuminate for apical remainder. Internal distal edge often excavate. Unguis with from two to four internal teeth. The basal pair enlarged, often basally joined. Internal teeth large, basal in position and usually heavily reinforced. External teeth small or wanting. *Mucro* lacking basal spine, with small antepical and large apical teeth.

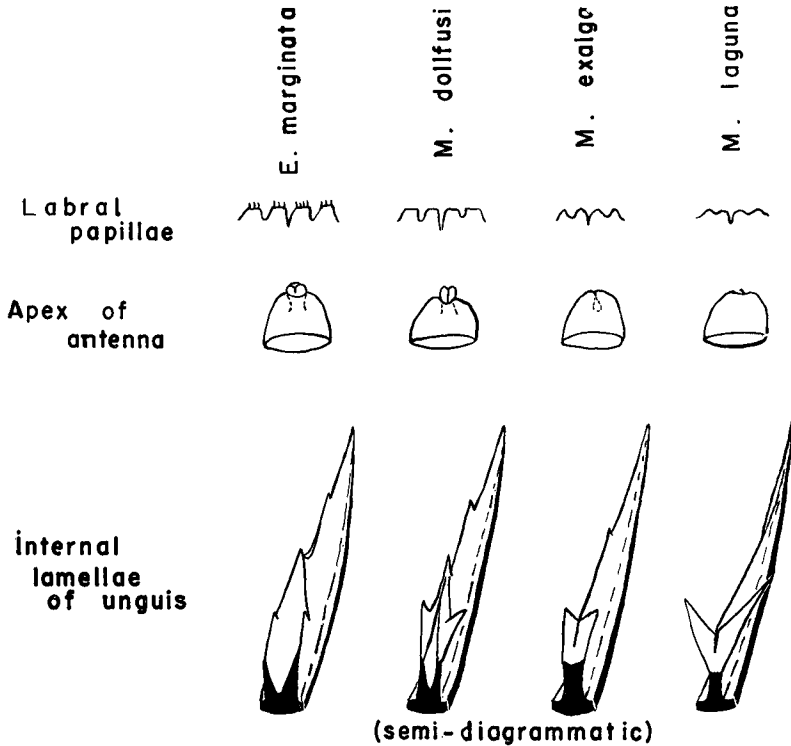
Mesentotoma exalga Salmon

Figs. 8-10

Mesentotoma exalga Salmon, 1942. Records of Dominion Museum, 1: 58,59.

Color and pattern. Background color yellow, pigment blue as follows: all of antennal segments two, three, and four; basal and apical rings on antennal segment one, plus ventral surface of this segment; ring around each antennal base and a connecting band. Small irregular spots over surface of head and a V-shaped mark in mid-region. Thoracic segment three through abdominal segment three largely blue except for scattered small pale spots and pale regions along the posterior edges of dorsum of abdominal segments one and two. Anterior and posterior margins of abdominal segment four with large oval dark areas. Anterior margin of fifth and all of sixth segment dark. Distal part of legs slightly darkened, remainder

of body pale. *Head.* Labial appendage with external differentiated seta slender, acuminate, reaching only two-thirds of the distance from base of seta to apex of same papilla. Labral papillae rounded. Fourth segment with apical pit, but no retractile bulb. *Legs.* Smooth setae on third pair of legs slightly curved. Tenent hair with clavate tip very flat and thin. Unguis with three or four internal teeth, basal pair large, remainder small to minute. Lateral teeth very large, basal in position and reinforced by heavy ridges. Empodial appendage triangular, strongly



Text-figure 1. Representation of the condition of various organs in the species of *Mesentotoma* and in *Entomobrya marginata*.

excavate along inner distal surface. *Dens and mucro*. Dens basally with a number of short heavy ciliate setae, blunted apically. Mucro typical of genus. *Clothing* generally as in genus *Entomobrya*. Large flexed clavate setae with expanded apex unusually large and projecting. Small common setae covered with short cilia along one side.

Discussion: The "bow-like lamella" mentioned by Salmon requires further study before its taxonomic importance can be evaluated. I have found structures similar, if not identical, to it in many species of *Entomobrya*, but present in only a few specimens of large series. The short knob-like projections on the venter of the manubrium are clearly seen in the one specimen examined; however, the possibility of their being artifact, combined with the complete lack of homologous structures in the Collembola, has caused me to leave them out of the description until further series are available for examination.

Distribution: *New Zealand*: Island Bay, Lyall Bay, Wellington (from bundles of seaweed).

Mesentotoma dollfussi (Denis) (New Combination)

Figs. 1-7

Entomobrya dollfussi Denis, 1924. Ann. Soc. Ent. Fr., 93: 232.

Entomobrya nigrina Womersley, 1928. Ann. Mag. Nat. Hist., (10) 2: 63.

Entomobrya atrata Womersley, 1929. Ann. Mag. Nat. Hist., (10) 4: 304.

Color and pattern. Background color white to yellow, pigment blue to purple. Second and third antennal segments apically darkened. Remainder of body with irregular pigmented bands and spots (see figures). *Head* slightly longer than broad. Labial appendage with external differentiated seta almost attaining level of apex of same papilla. Labral papillae truncate. Antennae with apical bulb of fourth segment bilobed, in a deep apical pit. Sense organ of third segment with two angled blunt thick setae, one conical guard seta. Second segment with two similar blunt setae more widely separated than those on third segment. Second segment with definite basal subsegment,

weakly demarcated. *Legs.* Tenent hair well developed, with normal clavate apex. Empodial appendage strikingly truncate, with one inner lamella excavate apically. Unguis with normal four internal teeth, basal pair partially joined by an incomplete lamella. *Mucro and genital plate.* Mucro typical of genus. Male genital plate of twelve smooth setae. Basal seta pair flattened, blade-like, remainder slender, acuminate. *Clothing.* Small underlying setae conical and unilaterally ciliate, with short ciliations.

Discussion: There is considerable variation in the pattern of this species, as is shown by the figures; however, this is less striking than in many species of the genus *Entomobrya*. The external differentiated seta of the labial appendage may reach the apex of the same papilla. The truncate nature of the labral papillae is not always clear. The species has been taken from Southern France, England, and North Africa, but may be widely distributed and uncollected elsewhere.

Distribution: *England:* Lundy Island; *France:* Greve de Vert, St. Jean Doigt; *North Africa:* Oued Ykem.

Mesentotoma laguna (Bacon)
(New Combination)

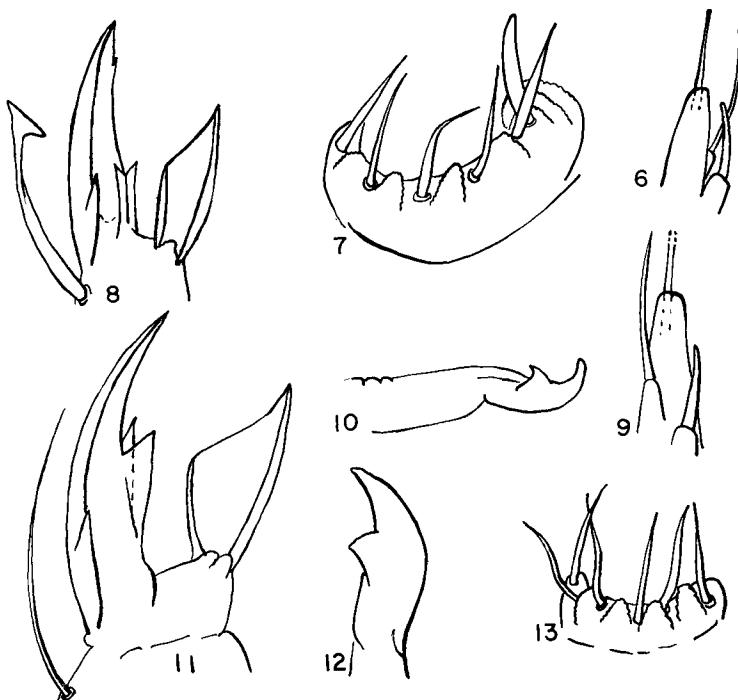
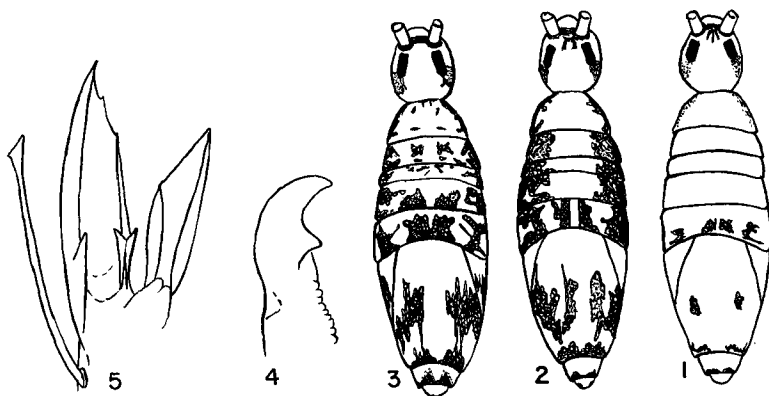
Figs. 11-13

Entomobrya laguna Bacon, 1913. Jour. Ent. Zool. Claremont, Calif., 5:202-204. Bonet, 1934. Eos, 9:157. Essig, 1942. College Entomology, 83. Gisin, 1944. Verh. Naturf. Ges. Basel, 55:71.

Color and pattern. Pigment gray-brown to gray-blue except for appendages which are always blue. Pigment generally distributed over body, except for mid-region of venter. Many small pale spots scattered over body.

EXPLANATION OF PLATE 1

Characteristic structures of the genus *Mesentotoma*. Figures 1-7 of *M. dollfusi*: 1-3, various patterns from France; 4, left mucro; 5, hind unguis and empodial appendage; 6, external setae of labial appendage; 7, half of male genital plate (basal seta to right). Figures 8-10 of *M. exalga*: 8, hind unguis and empodial appendage; 9, external setae of labial appendage; 10, right mucro. Figures 11-13 of *M. laguna*: 11, hind unguis and empodial appendage; 12, right mucro; 13, half of male genital plate (basal seta to right). All figures greatly enlarged.



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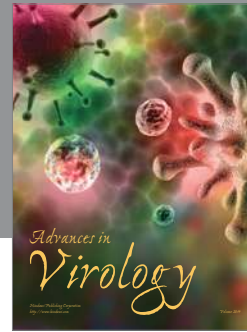
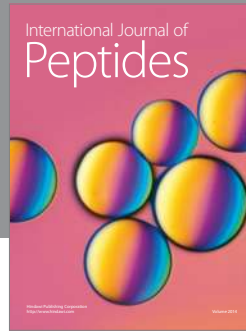
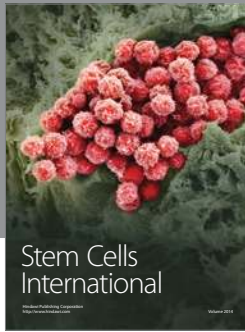
Head with a double V-shaped pale mark running from the posterior corner of each eye to the mid-posterior head region. Irregular pale areas occur on the dorsum of the fourth segment, and all intersegmental membranes are pale. *Antennae*. Apex of fourth segment with four or five flat knobs. Largest setae of antennae clubbed and ciliate, similar to but shorter than clubbed setae of body. Second antennal segment with distinct subsegment or partial suture. *Head*. Labial appendage with external differentiated seta contracted only at apex. Apex not reaching apex of same papilla, and slightly wider than normal setae. *Clothing*. Large flexed clavate setae unusually long (longest longer than antennae), with expanded tip produced into a slender filament.

Discussion: Only a few specimens were seen. The most striking variation concerns the color which varies from gray-blue to pale brown. The subsegment of the second antennal segment may be incomplete but at least part of the dividing suture is clearly visible in each case. The knobs at the apex of the fourth antennal segment may be very small or indistinct. Bacon illustrates an external tooth on the empodial appendage but this was not visible on any specimen in the series here examined.

Distribution: California: Palos Verdes (under submerged rocks) Laguna Beach (lower tidal zone, under rocks).

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