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***Collembola* Fauna of Malta**

[Pp. 393—418, pls. XXVII—XXXVI]

**Fauna *Collembola* Maltj**

**Фауна *Collembola* Мальты**

**Abstract.** The present paper contains the results of the study of some *Collembola* collected in 1925 by Mr. Conte Guarano GATTO of Malta. Thirty species are diagnosed. Five of the studied species are very likely endemic to Malta. These are: *Protonura mediterranea* sp. n., *Entomobrya melitensis* STACH, *Orchesella melitensis* STACH, *Sminthurus gattoi* sp. n., and *Dicyrtoma melitensis* STACH. It is of much interest to note that one of the found species, namely, *Tricantella biroi* STACH, is a subantarctic element in the fauna of Malta.

Mr. G. GATTO, a naturalist of Malta, interested in my paper on some *Collembola* from Malta, published in 1924, started collecting those insects on Malta in great numbers. In spite of his thorough collecting in many localities on Maltj and on neighbouring islands, the found material contained only thirty species. Such a small number of species inhabiting Malta is probably due to its small dimensions (only about 95 square miles). The major part of Malta is rocky, the cultivated areas are rather small, lacking any river or lake, and consequently without exuberant vegetation and forests. In addition, Mr. C. G. GATTO had at his disposal insufficient equipment for collecting of *Collembola*.

A LIST OF THE *COLLEMBOLA* KNOWN FROM MALTA

*Hypogastrura tullbergi* (SCHÄFF.),  
*Hypogastrura varians* sp. n.,  
*Triacanthella biroi* STACH,  
*Friesea oligorhopala* CAROLI,  
*Protonura mediterranea* sp. n.,

*Anurida maritima* (GUÉRIN),  
*Xenylla maritima* TULLB.,  
*Isotoma notabilis* SCHÄFF.,  
*Isotomurus palustris* (MÜLLER),  
*Entomobrya nivalis* (L.),  
*Entomobrya lanuginosa* (NIC.),  
*Entomobrya marginata* (TULLB.),  
*Entomobrya albida* STACH,  
*Entomobrya melitensis* STACH,  
*Orchesella melitensis* STACH,  
*Seira domestica* (NIC.),  
*Seira italica* (CASSAG. & DELAM.),  
*Seira dollfusi* CARL,  
*Seira ferrarii* (PARONA),  
*Heteromurus major* (MON.),  
*Willowsia nigromaculata* LUBB.,  
*Lepidocyrtus curvicolis* (BOURL.),  
*Lepidocyrtus paradoxus* UZEL,  
*Lepidocyrtus lanuginosus* (GMELIN),  
*Pseudosinella alba* PACK.,  
*Cyphoderus albinus* NIC.,  
*Deuterosminthurus repandus* (AGR.),  
*Sminthurus viridis* (L.),  
*Sminthurus gattoi* sp. n.,  
*Dicyrtoma melitensis* STACH,

The zoogeographical character of the Maltese Collembolan fauna is, in major, of common European type with a slight addition of the South-European type, which is represented by some species distributed in south-east of Italy. Some very interesting species are known till now only from Malta, these are: *Hypogastrura melitensis* STACH, *Orchesella melitensis* STACH, *Dicyrtoma melitensis* STACH and *Sminthurus gattoi* sp. n. From the zoogeographical point of view, extremely interesting is *Triacanthella biroi* STACH, which represents a subantarctic element of this genus, appearing mainly on subantarctic islands of South America and in New Zealand.

### *Hypogastrura tullbergi* (SCHÄFFER, 1900)

[Pl. XXVII, Figs. 1—2]

This is a species very likely of a wide distribution, but sometimes confused with other ones.

The Maltese specimens of *H. tullbergi* (SCHÄFFER) agree with those described by BUTSCHEK in 1948, from the North-Eastern Alps, as *Hypogastrura elegantula*



BUTSCH. They also do not differ from specimens from Poland, identified by the present author in 1949 as *Hypogastrura aequipilosa* STACH.

Thus, the Maltese specimens show identical shape of the postantennal organ, the claw and the empodial appendage, tenaculum, dentes furnished with six setae and straight mucro with a narrow, convex, outer lamella, as well as identical form and length of the anal spines. The clothing is sparse, composed of very stout, pointed, more or less curved setae, arranged on the last abdominal tergite as is shown in the fig. 1. Most of the setae are as long as the ventral side of the claw; the fine sensory setae inserted dorso-laterally on the tergites are longer. The stout setae located near the anal spines are also longer.

The arrangement of the long, clavate tenent hairs on the legs is very characteristic of this species. These hairs are inserted in pairs on the fore and hind legs; rarely there are three tenent hairs frontally on the third pair of legs, they are arranged in one cross row, and in a good distance there appears the accessory fourth one. The median legs bear, in most instances, three tenent hairs frontally inserted in one cross row (Pl. XXVII, Fig. 2).

The length of the examined adults 2 mm.

Loc.: Argotti Gardens, under flower pots, fallen leaves and under stones, 14. V. 1925, 20 specimens.

Addolorato cemetery, frequent, 24. V. 1925.

Outside of Valetta, under stones, 9. I. 1926, 26 specimens.

Boschatto, Micabbiba, st. Paul's Bay, under stones, 25. XI, 8. I. 1926, several specimens.

GISIN, in 1961, described *Hypogastrura tullbergi* (SCHÄFFER) more accurately, however, he identified as that species *Hypogastrura elegantula* BUTSCHKE and *Hypogastrura aequipilosa* STACH.

Recently, in 1964, REYNAL examined some species of the *Hypogastrura*-group, which are characterized by two to four tenent hairs on the legs and he synonymized *Hypogastrura elegantula* BUTSCH. and *Hypogastrura aequipilosa* STACH with *Hypogastrura boldorii* (DENIS, 1931). In the synonymy of *Hypogastrura tullbergi* SCHÄFF., REYNAL listed following species: *Achorutes dubius* TULLBERG, 1876, *Proxenyllodes aberans* CASSAGNAU, 1952, *Hypogastrura boldorii* sensu DELAMARE DEBOUTTEVILLE and other authors, 1954, CASSAGNAU 1955—1962, *Hypogastrura subboldorii* DEL. DEB. and JAQUEMART, 1962, and *Hypogastrura browni* BAGNALL, 1940. According to REYNAL, both *Hypogastrura boldorii* (DEN.) and *Hypogastrura tullbergi* (SCHÄFF.) are well characterized by: „Présence de quatre ergots a la troisième paire de pattes et de deux soies capitées au sixième segment abdominal“.

However, no specimen of *Hypogastrura aequipilosa* STACH, from Poland, Ukraine, Spain and Malta, examined by the present author, shows a pair of clavate stout hairs on the sixth abdominal segment, and consequently this species cannot be considered as a synonym of *Hypogastrura boldorii* (DEN.).

*Hypogastrura varians* sp. n.

(Pl. XXVII, Figs. 3—4)

The granulation of the body moderately fine. The granules on the abdominal segment IV—VI are slightly larger than those on the anterior tergites. The chaetotaxy of the head and dorsum is composed of fine, short setae; on each tergite there are some stout, long macrochaetes. The latter are smooth, on the last tergites being about as long as the length of those tergites. The arrangement of the setae on Thor. II—III and Abd. IV—V is shown in Pl. XXVII, Fig. 3.

The antennae are somewhat shorter than the diameter of the head. The antennal organ III consists of two short, curved sensory rods located in a deep, narrow groove, guarded at either side by a single, moderately long, thick sensory seta. The fourth antennal segment is clothed with some long setae dorsally; it is also provided with six fine, curved sensory hairs; ventral side bearing variable number of minute peg-like setae; the tip of this segment is provided with a retractile sensory papilla. The reversible sac lacking.

The head is clothed with long, stout, straight bristles; no spines. Eight equally large ocelli at either side of the head; among these, there are one long and one short seta at either side. The postantennal organ is about twice as long as the diameter of an ocellus, armata type, two anterior tubercles elliptical, arranged in a straight line, two posterior ones are smaller and ovoid. Accessory tubercle rounded, situated close to the posterior ones.

The unguis is straight, narrow, normal in length, provided with a distinct inner tooth in half the length of the unguis. The lateral teeth always lacking. Unguiculus about half as long as the inner lamella of the unguis, furnished with a rounded lamella and an apical needle. The clavate tenent hair are lacking, but in some instances one of the dorsal setae is inserted near to the basis of the unguis, being distinctly longer and stouter than the other setae. It is, however, always sharply pointed.

The ventral tubus is furnished with 4+4 short setae.

The furcula is somewhat shorter than the antennae. The dentes are moderately thick, granulated dorsally and provided with six or seven setae. The basal seta as long as two-thirds of the dens; the remaining setae are moderately long, straight or curved, with no special modification. The mucro is similar to that in *Ceratophysella armata* (NIC.), two and one half times shorter than the dens. The tenaculum with four teeth on each ramus; no seta on the corpus.

The anal spines are long and weakly curved, inserted on high papillae, the bases of which are touching with each other. The length of the papilla plus spine is 1,6 times longer than the inner papilla of the unguis.

The ground colour of the body pale brownish. There are numerous small, in major part circular spots, formed by the black-violet pigment on the dorsal and lateral parts of the body.

The length of the body of the adult individuals: 1,6 mm.

Loc.: Valetta, Floriano, frequent under stones and rotten leaves, in moist localities, 12. I. 1924, 16 specimens.

Valetta, Porte Reale, under stones. 31. I. 1925, 8 specimens.

Argotti gardens, under fallen leaves, 4. II. 1925, 6 specimens.

Adolorato cemetery, 29. X. 1925, 3 specimens.

Because of the similarity of many body markings, the examined specimens of this species come near those from USA and Canada, published by YOSII, in 1962, as belonging to *Ceratophysella* cf. *denticulata* (BAGNALL, 1941). However, the new species differs distinctly from second species by the absence of an eversible antennal sac; in addition, the diagonal fascias on the abdominal segments IV and V in the new species is composed by much larger granules.

### *Triacanthella biroi* STACH, 1924

[Pl. XXVIII, Figs. 1—6]

The body of the *Hypogastrura*-type; it is sparsely clothed with moderately long and fine, curved setae, among which, on the head and the tergites, there are some protruding, long, stout, stiff macrochaetes. The latter are finely, indistinctly, sparsely ciliated, with blunt tips, being more or less distinctly capitate. The granulation of the skin fine.

The antennae slightly shorter than the diameter of the head; a simple, retractile, apical sensory papilla present.

The postantennal organ is distinctly smaller than an ocellus; it is composed of four ovoid tubercles arranged in a cross row. Eight black ocelli at either side of the head, two of which are invisible in the specimens soaked in the potassium hydroxidum, that is due to the fact that the corneae are unmarked in the integument.

The unguis is relatively long; it is armed with a minute inner tooth situated beyond half of the length of the lamella. The empodial appendage is half as long as the unguis; with no basal lamella, but tapering from the base to the apical filament. One tenent hair, distinctly clavate apically, as long as the unguis.

The furcula is well developed. The dens somewhat shorter than the manubrium, very slightly tapering caudad, furnished with 7—10 setae dorsally; the basal seta is about as long as the dens. A bladder-like, variable sized appendage on the outer side of the dens, close to the base of the mucro. The mucro four times shorter than the dens. The median shaft of the mucro with a basal, rounded protuberance; with apex curved upwards. A lamella running basad at either side to the end of the mucro; this lamella is narrow at inner side; at the outer side the lamella is provided with a high, curved flap situated at half the length of the lamella.

The tenaculum with 3—3 barbs. The ventral tubus with setae.

The sixth abdominal segment with a pair of stout, slightly curved spines, situated on high papillae the bases of which touch with each other; the third



spine, in most instances smaller and directed backwards, is situated below and in a small distance from the pair of curved spines. This odd spine or the upper pair of spines may be absent in abnormal specimens.

The ground colour of the living specimens is dark purple. However, the specimens preserved in the alcohol become rosy and then white.

The body length of the studied specimens 1,6—1,8 mm.

Loc.: Valetta, Marsa, frequent from November to March, under moist stones, debris, rotten leaves and fruit, branches, in the gardens of St. Antonio, 1924—1925, 65 specimens.

St. Giorgio, Birzebbugia, under stones, IV. 1925, 7 specimens.

Porto Reale, under stones, X. 1925, 4 specimens.

*Triacanthella biroi* STACH is an interesting species from the zoogeographical point of view.

According to the geographical distribution, the members of the genus *Triacanthella* SCHÄFF. can be divided into three groups as follows:

1. The species appearing in the western subantarctic areas: *Triacanthella michaelsoni* SCHÄFF., *T. rosea* WAHLGR. known from Tierra del Fuego, *T. clavata* WILL. occurring in the antarctic Patagonia, and *T. andina* DEL. and RAP. known from the Andes.

2. The species occurring in southern Europe: *T. perfecta* DEN., reported from the Pyrenees, the Apennines and the Raxalpes, *T. frigida* CASS., known from the Pyrenees, *T. biroi* STACH distributed in Italy and Malta, *T. inopinata* DEN. and *T. gridellii* DEN. occurring in Italy.

3. This group contains species of eastern-subantarctic distribution: *T. transilvatica* SALM., *T. setacea* SALM., *T. rubra* SALM. and *T. perfusa* SALM. known from New Zealand, *T. alba* CARP., *T. serrenseni* SALM. and *T. enderbyensis* SALM. occurring in the Campbell Islands.

The most typical characters of the body in the members of the genus *Triacanthella* SCHÄFF. are: three spines situated at the end of the sixth abdominal segment, the bladder-like appendage, apical appendage situated on the outer side of the dens, and the shape of the mucro.

Of the European species of the genus in question, *T. perfecta* DEN. and *T. frigida* CASS. differ distinctly from *T. biroi* STACH. On the contrary, *T. inopinata* DEN. and *T. gridellii* DEN. show almost all body characters very similar to those in the species in question, and consequently they can be considered as only forms of *T. biroi* STACH. In the conclusion we can consider this species as distributed in Malta and Italy (Venezia, Forli).

*Triacanthella biroi* STACH is closer to the species occurring in the western subantarctic areas.

### *Friezea oligorhopala* CAROLI, 1914

This species is well characterized by the presence of eight ocelli at either side of the head, three strong, slightly curved anal spines, the claw provided with a distinct inner tooth, two slightly clavate tenent hairs, the furcula which

is reduced to wart-like denticles; and not clavate body setae. The body light blue; length about 1,5 mm.

*F. oligorhopala* CAROLI was described from Tripolitania (Libia). It has subsequently been reported from Malta (STACH, 1949), CASSAGNAU (1958) found this species in a garden in Nîmes (south-east France).

Loc.: Argotti Gardens, under fallen leaves, 5. I. 1924, one specimen.

St. Paul's Bay, under stones in moist localities, 28. X. 1925, three specimens.

### *Anurida maritima* (GUÉRIN, 1836)

This is typical maritime species occurring frequently along the Atlantic shores of Europe. It is also known from the seashores from Denmark to France, and on the shores of the Mediterranean Sea and Black Sea. Reported also from North America.

*A. maritima* (GUÉRIN) was collected on Malta on the sea shores and under stones in the brackish waters.

Loc.: Marsascirocco, Gregarius, under stones in the brackish water in the fish ponds, XII. 1924 — I. 1925, common.

### *Xenylla maritima* TULLBERG, 1869

This species is characterized by proportionately long mucrodens, with gently upturned apex and a long, straight lamella. The sixth abdominal segment with a pair of very small annal spines. For more details and figures see: STACH, 1949.

Loc.: Casal Zebbug, under the bark of the orange trees in a garden, 13. V. 1925, 27 specimens.

This cosmopolitan species appears frequently on the seashores under stones and fucus detritus, however, its name „maritima“ is misleading as it is most often found in the localities distant from the water reservoirs, under loose bark of various trees, rotten leaves and needles-litter, in moss and lichens.

### *Protanura mediterranea* sp. n.

[Pl. XXIX, Figs. 1—4]

The shape of the body and the coloration generally similar to *Protanura monticelli* CAROLI, 1910, from Italy (Neapol), but differing in the armature of the mouth parts and somewhat in the arrangement of the body tubercles.

The skin rather coarsely granulated. The tuberculate areas well developed on the head and on the tergites, but they are not hill-like erect over the skin surface; furnished with one or more stout, smooth macrochaetes of various length. Most of the long macrochaetes are situated in the centres of the rosettes, which are formed by five to seven more or less regular, triangular or quadrangular

gular, granulated areas. These granulated areas are separated from each other by narrow grooves giving a distinct reticulation at the bases of the tubercles.

The head furnished with 11 tubercles, of which the central one is joined with the reticulate part frontally, being separated as an anterior-median tubercle in other species. An ocular tubercle appears at either side of the central tubercle; it is elongate, very narrow, armed with one long macrochaeta situated close to the middle and another one posteriorly. The ocular tubercles are so close to the central tubercle that they seem to be confluent with each other. One narrow, lateral tubercle is located behind the ocular tubercle, at either side of the head; it is provided with three macrochaetes and some short setae. A cross row of the tubercles at either side of the posterior part of the head. In the middle there is a small tubercle armed with one longer and the other short seta; the second tubercle is situated dorso-laterally and is slightly larger than the median one; the third lateral tubercle is the largest one and is armed with four setae and two macrochaetes each of which is inserted in a rosette.

The antennae conical and shorter than the head. The basal segment shows a reticulate area on dorsum. The third segment anchylosed with the fourth one; it is provided with a sensory organ. The fourth segment with five olfactory hairs and with a bilobed sensory apical papilla surrounded with numerous short setae.

The mouth parts proportionately strong. The mandible without molar area, with terminal portion broadened; the sharp inner edge armed with a row of three large and some small teeth. The maxilla with head distinctly marked; it is formed of an elongated median shaft provided with apical four teeth. A very long, delicate, narrow, apically toothed lamella at either side of the shaft (Pl. XXIX, Figs. 3, 4).

Three ocelli without pigment at either side of the head; they are situated at the external edge of each tubercle, two rather close to each other frontally, and the third one close of the posterior edge.

The postantennal organ lacking.

Unguis with one small, inner tooth. The empodial appendage and the tibio-tarsal tenent hair lacking.

The arrangement of the tubercles as follows: the tergite of Thor. I with a pair of small, dorso-internal tubercles medially, each tubercle consisting of one quarter of a rosette, at either side provided with a seta of medium length; the dorso-external tubercle is located farther and is armed with one long macrochaeta and one seta; the dorso-lateral tubercle is situated at the edge of the tergite. The second and the third thoracic segments longer and broader than the first segment. The arrangement and the number of the tubercles on the second and the third thoracic segments are similar as on the first segment, except the reticulate areas which are slightly broader.

Abdomen with segments becoming narrower and shorter caudad, except the fourth segment which is as long and broad as the third thoracic segment.



The tubercles of the fourth abdominal tergite, except the dorso-interior ones, are grouped in row one the lateral edge of the tergite. The dorso-interior tubercles of the fifth abdominal tergite lying close to each other in the midline and joined with each other; the remaining tubercles form a knob at either side of the tergite; the knob shows a broad reticulation furnished with three macrochaetes, two shorter bristles and one delicate sensilla. The last tergite reticulated in the midline and provided with a pair of rosettes at either edge.

The body colour pale blue, but the pigment is distributed irregularly, being better developed on the tubercles and reduced on the intersegmental parts.

The body length of the examined adults 2,5 mm.

Loc.: Argotti Gardens, under fallen leaves, 5. I. 1925, one specimen.

St. Paul's Bay, under stones in moist localities, 28. XI. 1925, three specimens.

So far, *Protanura mediterranea* sp. n. is known only from Malta.

### ***Isotoma notabilis* SCHÄFFER, 1896**

This is a common and very widely distributed, and very likely a cosmopolitan species. It is characterized by the short body, three to four ocelli at either side of the head, the large postantennal organ, and the narrow, tridentate mucro with an unusual strongly protruding outwards outer tooth.

Loc.: Misida Gardens, under stones, 5. V. 1925, two specimens.

Argotti, under flower pots, 14. V. 1925, four specimens.

Addolorato cemetery, under stones, 17. VII. 1925, four specimens.

### ***Isotomurus palustris* (MÜLLER, 1776)**

A cosmopolitan species, frequent also in Malta.

The Maltese specimens of *Isotomurus palustris* (MÜLLER) do not differ in the body characteristics from the continental population. The body densely clothed with numerous smooth setae of various length; some long macrochaetes appear among the setae on the last abdominal tergites. Unguis with only one pair of lateral teeth. Empodial appendage provided with a broad rounded lamella, which, in most instances, is armed with a tooth. Mucro quadridentate with a small apical tooth, two large teeth arranged in a line dorsally, and one small, thorn-like, outer tooth.

The body colour in most instances greenish; lateral parts more or less irregularly darkened with violet pigment; the darkened areas variable; in f. *maculata* SCHÄFFER, dorsum with a dark violet line.

Loc.: Frequent in many localities: Valetta, Marsascirocco, St. Antonio Gardens, Casal Zebbug, Bugibba, Ghadira Melleha, Misida, Gozo Zanika, etc., under stones and flower-pots, over whole the year.

***Entomobrya nivalis* (L.)**

[Pl. XXX, Fig. 1]

This is the most common European representative of the genus *Entomobrya* ROND. However, in Malta, it is found in not great numbers being less common than other species of *Entomobrya* ROND. The Maltese specimens show the most characteristic pattern of this species (Pl. XXX, Fig. 1).

Loc.: St. Antonio Gardens, under decayed vegetable matter, 6. XII. 1924, one specimen.

Casal Balgan, under flower pots, 14. I. 1925, three specimens.

Marsascala, in fields under decayed bundles of *Inula*, 18. I. 1925, two specimens.

Concezione, under stones, 29. I. 1925, two specimens.

Casal Zebbug, in a garden under decayed oranges, six specimens.

Gozo, Zenika, under stones, 2. I. 1926, six specimens.

***Entomobrya lanuginosa* (NICOLET, 1842)**

[Pl. XXX, Fig. 2]

The ground colour of the living specimens is more or less pale greenish or white, except for the black eye-patches and a small spot situated between the bases of the antennae.

This species is well characterized by the shape of the labral papillae, which are broadly rounded with completely smooth surface.

*Entomobrya lanuginosa* (NIC.) has often been incorrectly considered as only a form of *Entomobrya multifasciata* (TULLB.) or a form of *Entomobrya nivalis* (L.).

This species usually is found on lawns or in meadows. It is often abundant in cultivated fields.

Loc.: Addolorato, in grass, 22. I. 1924, 49 specimens; on plants and under stones, 17. V. 1925, 3 specimens.

Porte de Bombes Floriano, under stones, 2. III. 1925, 15 specimens.

Braxia, cemetery, under decayed leaves and plants, 4. V. 1925, nine specimens.

Ghadira, Mellaha, under decayed bundles of *Inula*, 2 specimens.

St. Paul's Bay, frequent under stones and on plants, 28. XI. 1925.

Wied Dalam, under decayed plants, 28. XI. 1925, two specimens.

Gozo, Zenika, under stones, 3. I. 1926, four specimens.

***Entomobrya lanuginosa* f. *maritima* REUTER, 1890**

Specimens with body colour more or less pale violet; appearing sometimes among the typical specimens. The violet colour is more resistant to the alcohol than the greenish colour, and in most instances it does not disappear from

the preserved specimens. Such violet coloured specimens were found on Malta most often in the localities close to the sea shore.

*Entomobrya lanuginosa* f. *maritima* REUTER is considered by some authors as a distinct species.

Loc.: Valetta, under plants, 4. V. 1925, violet and two greenish specimens.

Birzebbugia, under stones, 13. I. 1926, 18 greenish and three violet specimens.

### ***Entomobrya melitensis* STACH, 1963**

[Pl. XXX, Figs. 3, 4]

This is a species resembling *Entomobrya nivalis* (L.) in some body characters. However, the two species show different pattern, which is characteristic especially on the tergite of the fourth abdominal segment. The pattern of the fourth abdominal segment consists of two pairs of black, short, longitudinal, parallel to each other dashes, situated dorso-laterally at either side of the anterior part of the tergite, and of an irregular cross stripe at the posterior margin of the tergite. The shape of the labral papillae is also different in both species; in *Entomobrya melitensis* STACH each papilla is provided with an apical pair of minute, conical processes.

Loc.: Malta, under stones, 4. II. 1905, some specimens leg. L. BIRÓ.

Gain il ebira, Valetta, Braxia cemetery, Porta des Bombes, Malleha, Casal Balgan, Mistra, Misida, Casal Zebbung, Addolorato, Gozo Zenika, on plants, under stones and decayed leaves and fruits, V—VII, 1925, numerous specimens, leg. G. GATTO.

*Entomobrya melitensis* STACH is so far known only from Malta and is likely a Maltese endemite.

### ***Entomobrya albida* STACH, 1963**

[Pl. XXX, Fig. 5]

In the shape and in the absence of the black pigment very similar to *Entomobrya lanuginosa* (NIC.), but differing in the eye-patches and a small spot situated between the bases of the antennae. The living specimens of the two species differ also in the ground colour of the body, which is white in *Entomobrya albida* STACH and more less pale greenish in *Entomobrya lanuginosa* (NIC.), or violet in *Entomobrya lanuginosa* f. *maritima* REUTER. The specimens preserved in the alcohol loose their green pigment, but they are distinguishable on the armature of the labral papillae, which in *Entomobrya albida* STACH are provided with three or four minute accessory cones, being completely smooth in *Entomobrya lanuginosa* (NIC.).

Loc.: Found in many localities: Addolorato, Valetta Braxin, Iddoli Argotti, St. Antonio Gardens, Gozo and others; on various plants, under decayed leaves, flower pots and stones, in 1925, numerous specimens, leg. G. GATTO.

The species is so far reported only from Malta.



*Entomobrya marginata* (TULLBERG, 1871)

[Pl. XXX, Fig. 6]

This species is well characterized by the long, narrow cross black stripes situated at the posterior margin of each tergite. Ground colour of the body generally greyish-violet, but in some Maltese specimens is greyish or dirty white. The labrum show always three cross rows of 5,5, 2—2 papillae, each furnished with a single setula at the tip.

The body length about 1,8 mm.

Loc.: Addolorato, under a stone, 7. V. 1925, two specimens.

Argotti Gardens, frequent under plants in pots; 13. VIII. 1925, under various decayed fruits.

Casal Balgan, under flower pots, 6. X. 1925, eight specimens.

Ghadira, Melleha, frequent on plants, 5. XI. 1925.

*Entomobrya marginata* (TULLB.), is widely distributed in Europe. It was also reported from North America (U.S.A.) and from Australia.

*Orchesella melitensis* STACH, 1963

[Pl. XXX, Figs. 7—9]

Ground colour white. The blue-black pigment forms at either side of the second abdominal segment a dorso-lateral, distinct, triangular, medium sized patch, and on dorsum of the third abdominal segment an irregular, broad, transverse stripe, which does not reach the lateral part of the tergite. The dark pigment of other segments, in the very light coloured specimens, is weakly developed, forming only small, indistinct, irregular spots. The specimens with well developed pigment show broader black stripe of the third abdominal segment, and the fourth abdominal segment shows a rather rectangular, blue-black, variable in size patch, which covers the major portion of the median part of the tergite. Along the middle of the dorsum runs a very delicate line, commencing from the anterior margin of the second thoracic segment to the fourth abdominal segment. The lateral lines are very narrow, being well marked only on the second and the third thoracic segments. The head, antennae and legs white.

The body length of adult specimens 3,5—4 mm.

Loc.: Wied Babu, under stones in dry grassy localities, 14. I. 1925, 3 specimens.

Bugibba, under a stone, 28. XI. 1925, one specimen.

St. Paul's Bay, under stones, 29. XI. 1925, one specimen.

Gozo, Zenika, under stones, 3. I. 1926, eighth specimens.

At the first look, the specimens of this species resemble very much *Orchesella cincta* (L.), but are separable on the very characteristic pair of triangular patches on the second abdominal segment, always light head, the long antennae and some other characters.

So far, this species is known only from Malta. Maybe a Maltese endemite.

*Seira dollfusi* CARL, 1899

[Pl. XXXI, Figs. 1—4]

*Seira dollfusi* CARL was described from specimens collected in Nice, France. DENIS (1921 and 1924) described this species accurately from France, and HANDSCHIN (1925) reported it from Morocco and other localities in North Africa.

In 1942, HANDSCHIN examined a rich material of *Seira* LUBB., from Palestine. The specimens were very variable in colour. HANDSCHIN found that all those specimens, as well as other quoted by him and other authors as separate species, of the genus *Seira* LUBB. are only forms of one species, *Seira squamoornata* (STSCHERBAKOV). Consequently he considered *Seira dollfusi* CARL as f. *principalis* of *Seira squamoornata* (STSCHERBAKOV).

However, the HANDSCHIN opinion was not accepted by the major part of the collembologists, and GISIN (1960), in his key entitled „*Collembola Europas*“, separated *Seira dollfusi* CARL as a distinct species.

In 1962, GISIN and DA GAMA examined the arrangement of the larger setae of the body of *Seira domestica* (NIC.), *Seira dollfusi* CARL. and *Seira sexatilis* GISIN & DA GAMA. The figures given by those authors show distinctly that the chaetotaxy of *Seira dollfusi* CARL is very different from that in *Seira domestica* (NIC.).

The present author also examined the chaetotaxy of many species of the genus *Seira* LUBB. It was found that the arrangement of the larger setae in the specimens of *Seira domestica* (NIC.) from Malta is similar to that figured for this species by GISIN. However, the arrangement of the setae in the specimens considered by the present author to be *Seira dollfusi* CARL. is distinctly different from that given by GISIN. It seems that the figure 5 of GISIN given for *Seira dollfusi* CARL is result of a misidentification of a species of the group *squamoornata* STSCHERBAKOV.

I have determined the Maltese specimens of *Seira dollfusi* CARL on the ground of the diagnosis given by DENIS (1924), and of the figures given by HANDSCHIN (1925). The GISIN diagnosis agrees rather with that given by GISIN (1960) in his key.

Most of the Maltese specimens of *Seira dollfusi* CARL are entirely dirty yellowish, except for the black eye-patches and a small spot between the bases of the antennae. Some specimens are in part blue, and the blue pigment is restricted to some parts of the head, the coxae and the lateral areas of the body (Pl. XXXI, Fig. 2). I figure also the arrangement of the setae on the ventral tube of the species.

*Seira dollfusi* f. *pallens* DENIS, 1923

Among the more or less blue specimens of *Seira dollfusi* CARL, there appear on Malta entirely white specimens belonging to the typical population. DENIS, in 1923, named such specimens as „*pallens*“.

The chaetotaxy of the white specimens is identical as in coloured ones (Pl. XXXI Fig. 2) and agrees with that in *Seira domestica* (NIC.).

An identification of white specimens can be based only on some other body characteristics of both the species.

*Seira dollfusi* CARL is one of the frequent Maltese *Collembola* species. It appears mostly under the stones, dead leaves and various decayed plants.

Loc.: St. Antonio Gardens, under decayed vegetable matter, 6. XII. 1924, three specimens.

Misida Gardens, under stones, 2. V. 1925, and on walls of a water reservoir, eight specimens.

Casal Balgan, under flower pots, VI. 1925, four specimens.

Argotti Gardens, under plants, VII. 1925, three specimens.

Braxia cemetery, frequent under grass and various plants, 4. V. 1925, 16 specimens.

Ghadira, Melleha, under dried decayed bundles of *Inula*, 5. X. 1925, six specimens.

Gozo, under stones, 7. VI. 1925, five specimens.

*Seira dollfusi* CARL is widely distributed throughout Mediterranean Region, but also reported from Switzerland and Germany.

### *Seira domestica* (NIC.).

[Pl. XXXI, Figs. 5—8]

The specimens are entirely white, except for the black eye-patches and a small spot situated between the bases of the antennae. The body markings are characteristic for this species.

Slender, about 3 mm long; antennae three times as long as the head; the fourth antennal segment indistinctly annulate; unguis with a pair and two singular inner teeth; and a pair of small lateral teeth situated almost in the same level as the pair of the inner teeth; empodial appendage very indistinctly serrate; length ratio of the abdominal segments III and IV is 1:6; mucro falciform; body scales elliptical, without pigment.

The number and the arrangement of the stout setae on the tergites is constant. The variation is here very slight and rare (Pl. XXXI 5, Fig.).

It is of interest to note that similar arrangement and number of the setae of the body was found by the present author also in the white and more or less blue coloured specimens of *Seira dollfusi* CARL.

It seems that both *Seira domestica* (NIC.) and *Seira dollfusi* CARL are very closely related to each other, showing a great resemblance of their body markings and the chaetotaxy.

The more slender shape of *Seira domestica* (NIC.), its relatively longer antennae and white body, are probably recent modifications due to the change of the living conditions of the species. *Seira domestica* (NIC.) lives in the human houses and in their close neighbourhood.



*Seira domestica* (NIC.) was collected on Malta mostly under the flowerpots, but also, in fewer number, under the stones in the vicinity of houses.

Loc.: Addolorato cemetery, in moss, 22. I. 1924, two specimens.

Braxia cemetery, under decayed plants, 5. V. 1925, two specimens.

Argotti Gardens, under flowerpots, 14. V. 1925, two specimens.

Ghadira, Melleha, frequent under dry decayed bundles of *Inula* 6. XI. 1925.

*Seira domestica* (NIC.) is widely distributed throughout Europe, but generally in South and Central Europe. Reported also from Madeira. Known from U. S. A.: California, South America: Argentina and Costa Rica, and from Australia.

### *Seira italica* (CASS. & DELAM., 1953)

[Pl. XXXII, Figs. 1—5]

Syn.: *Lepidocyrtinus italicus* CASS. & DELAM. 1953

In 1953, CASSAGNAU and DELAMARE DEBOUTEVILLE gave a short description of this species from Italy. The specimens found on Malta gave an opportunity to complete the diagnosis and figures.

The body of the Maltese specimens is yellowish-white, in major part covered with more or less dark blue pigment. The head is always yellowish, except for the black eye-patches and a narrow stripe running along the posterior margin of the head. The whole median part of the second thoracic segment, the antennae and the tibiotarsi are also yellowish. The blue pigment forms dark cross stripes at posterior margins of the Th. III — Abd. III; the median portions of those tergites are also dark. The fourth abdominal tergite is greyish-blue with the anterior part sprinkled with numerous white, elliptical spots and with a pair of longitudinal very narrow lines (Pl. XXXII, Figs. 1, 2). Coxae and trochanteres blue-black, femores pale bluish.

The body is densely covered with fine, translucent, rounded apically, variable in colour and size scales. The pale areas of the body are clothed with white scales, and the blue areas show the pale brownish scales. Proximal parts of the legs also scaled. On ventral portions of the dentes appear narrow-seta-like scales.

The setae situated in small patches on the head and on the tergites, are of „flexed macrochaetes“ type. Their arrangement on three anterior tergites is shown in Pl. XXXII, Fig. 5, and differs distinctly from that in *Seira domestica* (NIC.).

Antennae relatively short, 1,9—2,2 times as long as the diameter of the head; they are densely clothed with setae of various length; the third segment provided with a small sensory organ; the fourth segment with a retractile, globular, sensory papilla; no trace of any annulation in the fourth segment.

Eight large ocelli of even size at either side of the head.

Legs of normal length, clothed with numerous setae; dorsal and ventral edges of all segments with some additional long macrochaetes. Stout spines and

modified bristles lacking. Trochanter of the third leg with a group of stout, fine, rather long spines. Unguis in shape similar to that in other species of the genus *Seira* LUBB.; slender, with a pair of insignificant lateral teeth and four inner ventral teeth; two of which are situated in a pair at the base and the two remaining ones are unpaired; the subapical tooth of the latter teeth is very minute. The basal pair of the teeth is situated a little above the lateral pair of teeth. Empodial appendage lancet-like, as long as about two-thirds of the unguis. Tibiotarsal tenent hair well developed, almost as long as the unguis, flattened apically.

The basal part of the ventral tubus provided with three pairs of long, stout, finely ciliated macrochaetes, at anterior face; terminal portion with some fine setae.

The ratio of the length of the abdominal segments III and IV is 1:3—4.

Furcula well developed, armed with numerous, fine, long setae dorsally and scaled ventrally. The long, fine ciliated hair appear also near the base on the dorsal side of the dentes; the dentes with spines or differentiated stout bristles. Dorsal crenulation of the dentes coarse, abruptly terminated in a distance before the mucro. Ventral scales long, narrow, seta-like. Mucro falciform, in the Maltese specimens with no trace of any anteapical dens.

Tenaculum furnished with four dentes on each ramus and with one seta on corpus.

Body length of the adult specimens 2 mm.

Loc.: Ghadira, Melleha, abundant under rotten plants and dry stones in sandy soil, rather close to the sea shore, 30. VII. 1925, 17 specimens.

Malta nad Gozo, frequent under stones, III—IV, 1925.

Valetta, Marsa, on bastions under stones, close to snow, 16. II. 1924, three specimens.

So far, *Seira italica* (CAS. & DELAM.) is known only from Malta and Italy

### *Seira ferrarii* (PARONA, 1888)

[Pl. XXXII Figs. 6—7]

Syn.: *Seira banyulensis* DENIS, 1924.

This is an East Mediterranean representative of the genus *Seira* LUBB. The description of Parona is rather poor. Type locality Pavia, Italy. DENIS, in 1924, gave a correct description of this species, based on the specimens collected in Banyuls-sur-Mer, France, under a name *Seira banyulensis* DENIS.

The Maltese specimens preserved in the alcohol are scaleless, yellow with a dark violet pigment occurring on the anterior margin of the mesonotum, the base of coxa of the foreleg, and as a cross stripe at the posterior margin of the third abdominal tergite (Pl. XXXII, Figs. 6, 7).

Antennae short, twice as long as the diameter of the head. The fourth abdominal segment four times as long as the third abdominal segment. The claw



is slender, armed with similar teeth as in other European species of the genus *Seira* LUBB. Empodial appendage with a smooth outer lamella. Mucro falciform. Body length 1,8—2 mm.

YOSII, in 1959, examined the chaetotaxy of the specimens collected by him in Madrit, Spain. The present author found that the chaetotaxy of the Maltese specimens of *Seira ferrarii* (PARONA) perfectly agrees with that given by YOSII.

Loc.: Fort Manuel, under bushes of *Capparis rupestris*, 7. IX. 1925, two specimens.

Misida, under decayed vegetable matter, 31. X. 1925, one specimen.

So far, this species is known from France, Italy, Spain and Malta.

### ***Heteromurus major* MONIEZ, 1889**

[Pl. XXXIII, Figs. 1—3]

Syn.: *Heteromurus melitensis* STACH, 1924.

A good number of Maltese specimens allowed for an accurate examination.

Body of the adult specimens very densely clothed with scales variable in size, but in major part ovoid, very finely longitudinally striped, translucent, greyish-brown or without pigment. Setae of different length and shape on the individual parts of the body. The stout, long, flexed bristles, which are characteristic of the *Entomobryini*, appear on the head, close to the antennae, and they are very numerous along the anterior margin of the second thoracic segment. From the third thoracic tergite, the number of these bristles is small and the bristles are arranged irregularly. The abdominal segments five and six are furnished with numerous long and short, distinctly ciliated setae.

Antennae with five segments, somewhat shorter than half the length of the body, about two and one half times as long as the diameter of the head. First segment short, clothed around with minute setulae. Second and third segments densely clothed with scales at bases, with apices furnished with a ring of moderately long setae. Fourth segment with some scales, numerous short setae and with an apical sensory organ, which is composed of two short, curved sensory rods situated in a small, narrow groove. Fifth segment densely clothed with short setae, distinctly annulated into about 20—25 secondary segments.

Eight ocelli at either side of the head; they are grouped in a black eye-patch. Of these, ocelli G and H are distinctly smaller than the remaining ones.

Labrum with three cross rows of setae (5,5,2—2) and with two pairs of tubercles arranged in a row, situated at oral margin. The pair of smaller tubercles situated in the middle of the row; one larger, elliptical tubercle laterally at either side. Four moderately long, smooth, praelabral setae at upper edge of the labrum.

Legs normal in length, clothed with setae and scales. The major part of the setae are smooth (observed in 300 times magnification); only stout bristles on the ventral edge of the tibiotarsus are finely, shortly ciliated. The trochanteral organ is composed of many fine, short, spine-like rods, grouped in a triangu-



lar area; the rods situated at the upper corner of the trochanter are thin and longer than the remaining ones. Unguis slender with a small outer tooth at the base and with a pair of lateral teeth. The outer lamella with a slightly developed pair of inner teeth situated nearly in its middle; another, singular, small tooth above the pair of the inner teeth; in some instances second singular, very minute, subapical tooth. Empodial appendage about half as long as the unguis; its outer lamella with a very small, median tooth in most instances very slightly developed. Tibiotarsal hair fine, dilated apically, rarely sharply pointed; shorter than unguis.

Tenaculum with 4—4 teeth and one seta on corpus.

Third abdominal segment as long as fourth abdominal segment (1:1,12).

Furcula about as long as antenna. Manubrium densely clothed with fine and mostly ciliated hair of various length, dorsally; scaled ventrally. Dentes about twice as long as manubrium, densely ringed, clothed with fine, long hair at either side laterally; scaled ventrally. The terminal part of dens is not ringed, being 4,7—6 times as long as the mucro. The latter with two equally large teeth and a basal spine.

Ground colour of the body pale yellowish-brown; lateral parts of the head and the vicinity of the bases of the antennae with more or less dark blue, almost black pigment. In many instances the lateral parts of the thoracic and the first abdominal segments also coloured. Three apical antennal segments and the tibiotarsi blue. Posterior margins of some abdominal tergites rarely blue. Length of the adult specimens about 2—2,5 mm.

Loc.: Antonio Gardens, under decayed vegetable matter, 6. XII. 1924, seven specimens.

Marsa, under stones and plants, 25. V. 1925, three specimens.

Casal Balgan, under flower pots, 2. VI. 1925, 15 specimens.

Addolorato cemetery, 23. X. 1925, five specimens.

Wied Dalam, under decayed and dried plants, 19. XII. 1925, six specimens.

Birzebbugia, under stones, 3. I. 1926, two specimens.

The species with 8—8 ocelli in the genus *Heteromurus* WANK. are as follows: *Heteromurus major* (MONIEZ, 1889), described from France, till now known mainly from whole of southern Europe; *Heteromurus caeruleus* BÖRNER, 1903, from Sicily; *Heteromurus melitensis* STACH, 1924, described from Malta, and *Heteromurus (Heteromuricus) stachi* DENIS, 1925, known from Ethiopia.

DENIS, in 1927, after a comparison of *Heteromurus major* (MONIEZ), *H. caeruleus* BÖRNER and *H. melitensis* STACH, concluded that their body characteristics are similar and that they can be considered as only local modifications of one species, namely, *H. major* (MONIEZ).

In 1954, SALMON redescribed the genus *Heteromuricus* IMMS from India, and placed in it *H. caeruleus* BÖRNER and *H. stachi* DEN. According to the SALMON redescription, to the genus *Heteromuricus* IMMS belong also species in which: „Abd. IV is 4—5 times longer than Abd. III“, and: „Abd. VI is generally more or less elongated posteriorly, but not necessarily so“.

However, according to DENIS (1925), *Heteromurus stachi* DEN. has Abd. VI somewhat elongated posteriorly and the length ratio of four last abdominal tergites is 30:47:20:10, and *Heteromurus melitensis* STACH has Abd. VI not elongated.

My present study of *Heteromurus* species from Malta and a comparison of those species with numerous specimens of *Heteromurus major* (MONIEZ) collected in Hungary and Bulgaria showed that *Heteromurus melitensis* STACH is a synonym of *Heteromurus major* (MONIEZ).

### ***Willowsia nigromaculata* (LUBBOCK, 1876)**

This species is mostly considered as only a variation of *Willowsia platani* (NIC.). However, the colour pattern of *Willowsia nigromaculata* (LUBB.) is rather constant and this species is easily distinguishable from other species or variations of the genus *Willowsia* SHOEBOOTHAM. The morphological characters and the chaetotaxy of the Maltese specimens of *Willowsia nigromaculata* (LUBB.) agree with those in the Japanese specimens of this species examined by YOSHII (1955) and with those from Indochina studied by DENIS (1948).

*Willowsia nigromaculata* (LUBB.) is mainly a corticicole animal appearing on Malta more rarely, than in other countries. It is to be found under the dead leaves and bundles of the cultivated plants.

Loc.: Fort Manuel, under bushes of *Capparis*, 17. IX. 1925, four specimens.

Marsa Scala, in fields under drying bundles of *Inula*, 13. X 1925, six specimens.

This species is widely distributed throughout Europe and is reported from whole of the Holarctic Region.

### ***Lepidocyrtus curvicollis* BOURLET, 1839**

[Pl. XXXIII, Fig. 4]

A species rarely found on Malta. The adult specimens are easily recognizable because of strongly forwards prominent mesonotum, yellowish-white colour (brownish in the specimens preserved in the alcohol) and black pigment of the coxae.

Loc.: Ghain in ebira, under stones, 3. V. 1925, five specimens.

*Lepidocyrtus curvicollis* BOURL. is widely distributed throughout Europe, registered also from North Africa, Japan and North America (U. S. A.).

### ***Lepidocyrtus paradoxus* UZEL, 1890**

[Pl. XXXIII, Fig. 5]

Similar to the preceding species, but distinctly separable by more strongly prominent and often slightly curved apically mesonotum. In addition, the whole body is blue. This species is on Malta found more rarely than *Lepidocyrtus curvicollis* BOURL.

Loc.: Addolorato cemetery, on plant, 17. V. 1925, one specimen.

Misida, under decayed vegetable matter, 22. VI. 1925, one specimen.

So far, *Lepidocyrtus paradoxus* UZEL is known only from Europe.

### ***Lepidocyrtus lanuginosus* (GMEL.) TULLB.**

Smaller than the preceding species, about 1—1,5 mm. long. Mesonotum not prominent; yellowish or pale brownish; 8—8 ocelli grouped in black path at either side of the head; antennae only slightly longer than the diameter of the head; unguis with a pair of equally large basal teeth and an additional tooth; very indistinct lateral teeth on unguis; empodial appendage with a moderately broad lamellae; mucro bidentate with a basal spine.

Found under stones and in grassy localities.

Loc.: Porte de Bombes Floriano, in grassy localities, 4. V. 1925, six specimens.

Valetta, Porte Reale, under stones and on grass, 15. VI. 1925, four specimens.

This species is widely distributed throughout Europe.

### ***Pseudosinella alba* (PACKARD, 1873)**

This species is characterized by the presence of a pair of ocelli at either side of the head, situated close to each other in a black cross path. Antennae short, 1,2—1,5 times longer than the head. Unguis with a pair of unequal, long, basal teeth and a singular subapical tooth at the inner lamella. Empodial appendage slender, without teeth. Body length 1 mm.

Loc.: Zenka, Musta, under stones, 16. V. 1925, five specimens.

This species is widely distributed in Europe, reported also from North America (U. S. A.; Canada), Costa Rica and from New Zealand.

### ***Cyphoderus albinus* NICOLET, 1841**

[Pl. XXXIII, Fig. 6]

Immature specimens were found together with the adult ones. Mucro in adult specimens straight, longer than the inner distal dens-scale, provided with a slightly curved apical tooth and a straight, somewhat longer subapical tooth. Unguis furnished with a pair of teeth at base; of these, the inner tooth is well developed, winglike, and the other is vestigial, in form of a thickened edge of the lamella. Empodial appendage with a distinct tooth at the outer lamella.

*Cyphoderus albinus* NIC. occurs mainly under the stones, in company with the ants.

Loc.: Floriano, under flower-pots, 18. VII. 1925, seven specimens.

This species is widely distributed in Europe, North America and North Africa. It was also reported from Lebanon and Micronesia.



***Deuterosminthurus repandus* (ÅGREN, 1903)**

White except for the black eye-patches. Claw with a minute inner tooth. Empodial appendage with a very narrow, indistinct inner lamella and an apical needle reaching middle of the claw. Tibiotarsus of the third pair of the legs with moderately long setae dorsally. Subanal appendage similar to the narrow lamella, gradually broadening apicad.

Loc.: Valetta, in a garden, 3. V. 1925, five specimens.

Braxia cemetery, in May, on various plants, 14 specimens.

Misida, on *Acanthurus*, 15. V. 1925, two specimens.

Zenka, Musta, under stones, 16. V. 1925, four specimens.

*Deuterosminthurus repandus* (ÅGREN) is distributed throughout Europe, but also reported from the U. S. S. R. and North America (U. S. A.).

***Sminthurus viridis* (L.)**

[Pl. XXXIV]

A cosmopolitan species. Proportionately large (length up to 3 mm), easy to separate from other European species by the unguis provided with a distinct tunica and long pseudonychia, the empodial appendage with one inner tooth and a subapical bristle, the lack of the clavate tenent hair, the spoon-like mucro with smooth dorsal lamellae and the anal appendage which are long and fringed laterally at the apex.

The colour very variable, especially in the Maltese specimens (Pl. XXXIV). The pigment disappears after specimens being preserved for a long time in the alcohol.

Loc.: Porte de Bombes Floriano, 2. V. 1925, common.

Valetta, Porte Reale, under stones and in grassy localities, 17. VI. 1925, frequent.

Gozo Zenika, under stones, 3. I. 1926, two specimens.

Misida, on grass, 21. I. 1926, ten specimens.

Gham il ebira, on plants, V. 1925, six specimens.

***Sminthurus gattoi* sp. n.**

[Pl. XXXV, Figs. 1—6]

Integument of the body finely granulated. The vertex of the head with some stout, extremely indistinctly rough, long bristles. The stout bristles are shorter and smooth. Body clothed with numerous, slightly bent, long, fine smooth hairs, dorsally. The anterior portion of the dorsum with hairs as long as the mucro, but becoming gradually longer posteriorly, and close to the anogenital segment, twice as long as in front. Three trichobotria at either side of the abdomen, they are very fine, smooth, shorter than the hairs.

Antennae twice as long as diameter of the head. The ratio of the lengths

of the antennal segments is I:II:III:IV—1,5:3:4:10,5. The antennal segments sparsely clothed with short, fine hairs. Additionally, there are some stout, straight, longer setae on the second and the third segments. The fourth segment, except for the short basal and apical portions, is subdivided into 20 secondary segments. Each of the secondary segments is furnished with a whorl of 6—7 short setae. The tip of the fourth segment with a pair of very small, sensory papillae guarded with some fine hairs.

Eight, rather evenly sized ocelli at either of the head. Labrum as shown in fig. 2; it is provided with three semicircular, differing in length (5,5,2—2) rows of setae, and with a cross row of four small papillae at the oral margin.

Legs sparsely clothed with setae. Unguis slender, covered with a distinct tunica dorsally at two-thirds of its length. A long, relatively broad, deeply serrated pseudonychium at either side of the unguis. The pseudonychia join with each other at the unguis base, forming there one distinct, outer tooth. Unguis of the forelegs with a distinct tooth on the inner rib. The legs of the median and posterior pairs with the inner tooth reduced or vestigial. The empodial appendage of the forelegs differing from that of the second and the third pairs. The lamellate basal part on the forelegs narrower and provided with a rather long subapical needle, extending beyond the tip of the unguis. The lamellate part of the empodial appendage of the second and the third pairs of the legs is broader, serrate in the middle of the inner lamella, and the needle is very short. All the legs provided with distinct, clavate, tenent hairs, which are longer than the total unguis.

Each of the forelegs with a tenent hair. Other legs with two tenent hairs; of these, one is situated rather dorsally on the tibiotarsus and is distinctly thicker than the other, which is situated at the inner side of the tibiotarsus. Four pairs of similar, long but not clavate bristles, are arranged along the dorsal edge of each tibiotarsus. The ventral edge of the tibiotarsus with 2—4 bristles, which are long, stout at bases and finely pointed apically.

Furcula shorter than antennae. Dentes on the outer edge with a row of seven setae; inner edge with four setae and 11 setae dorsally. Three pairs of fine, long setae ventrally in terminal portion of dens; one short seta near the base of the dens. Mucro three times shorter than dens, gutter-like, with dorsal edges irregularly, bluntly notched; outer edge with a rather greater number of notches than the inner edge. A moderately long seta at the base of the mucro.

Tenaculum with three teeth on each ramus and two pairs of minute setulae at the tip of the corpus.

Subanal appendages in form of moderately wide, thin, obliquely truncate apically lamellae. Lamellae as long as the inner rib of the unguis.

Ground colour of the body yellowish-white. The black pigment in both sexes forms a pair of triangular spots on the dorsal side of the abdomen; another pair of smaller, quadrangular spots is situated a little behind the triangular spots; one spot on the tips of the anogenital segments. Lateral parts of the head and sides of the body more or less marbled with dark, almost black.

Length of specimens about 2 mm.

Loc.: Ghirghenti, a group of small islands in the vicinity of Malta, under decayed bundles of *Arundo*, 23. X. 1925, three specimens.

***Dicyrtoma melitensis* STACH, 1957**

[Pl. XXXVI, Figs. 1—5]

This species was shortly described by the present author, in 1957, from Malta. In many body markings it is similar to *Dicyrtoma fusca* (LUBB.), differing, however, in some details, but mainly in colour.

Ground colour yellowish-white, with dark pigment spread in more or less wide patches on body, but mainly on the lateral parts of the abdomen, where it forms a net; on the dorsum of the posterior part of the abdomen, the pigment forms very characteristic five regular, parallel cross stripes, which are reduced to five pairs of brown circular spots in weakly coloured specimens (Fig. 1.). Head, median portion of the dorsum, legs and furcula always pale coloured.

Body sparsely clothed with setae various in length and shape. A pair of moderately long, stout spines at the upper edge of the head. Five similar but slightly finer spines situated at either side of the head, at the conical, high protuberance and on the adjoining eye-patches. A row of 7—8 moderately long setae running along the front of the head from the frontal ocellus to oral area.

Three pairs of moderately long spines, rather remote from each other, in a row in the midline of the anterior half on the dorsum; some other spines scattered in the vicinity of the row of three pairs of spines.

Numerous minute, stiff spines arranged in parallel, longitudinal rows, situated on the posterior part of the abdomen. Some long, stout bristles dorsally on ano-genital segment and valves; the arrangement of these spines is similar as in *Dicyrtoma fusca* (LUBB.).

Antennae somewhat shorter than in *Dicyrtoma fusca* (LUBB.), about 1.4 times longer than the diameter of the head.

Claw slender, provided with two inner teeth, one minute outer tooth and two pairs of lateral teeth. Empodial appendage with a strong basal spine and a long, finely pointed filament.

Furcula well developed. Dentes furnished with setae similar in shape and number as in *Dicyrtoma fusca* (LUBB.), but the third seta, in the dorso-lateral outer row of stout serrate setae, is always two to three times as long as the second seta. Mucro straight, narrow, gutter-like, densely serrated at either edge.

Loc.: Valetta, Porto Reale, frequent under stones in grassy localities, 17. I. 1925, 30 specimens.

Marsascirocco, at rocks near the sea-shore, 27. XII. 1924, two specimens.

Birzebbugia, under stones, relatively frequent, 13. I. 1926.

*Dicyrtoma melitensis* STACH, is one of the common Maltese *Collembola*. In 1961, it was also reported from Stromboli I. (Lipa I.) by ALTNER.



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## STRESZCZENIE

Autor wymienia 30 gatunków *Collembola* zebranych na Malcie i pobliskich jej wysepkach w r. 1925 przez Conte Guarano GATTO. Gatunki te składają się w większości z elementów szeroko rozprzestrzenionych w Europie, kilkunastu ograniczonych w występowaniu do wybrzeży zachodnich Morza Śródziemnego i siedmiu prawdopodobnie endemitów Malty. Są nimi: *Hypogastrura varians* sp. n., *Prostanura mediterranea* sp. n., *Entomobrya albida* STACH, *Entomobrya melitensis* STACH, *Orchesella melitensis* STACH, *Sminthurus gattoi* sp. n. i *Dicyrtoma melitensis* STACH.

Автор перечисляет 30 видов *Collembola*, собранных на Мальте и близлежащих островках в 1925 г. через Conte Guarano ГАТТО. К ним принадлежат виды, в большинстве случаев, широко распространённые в Европе, а также виды, распространение которых ограничено до западных берегов Средиземного моря. На Мальте найдено семь, вероятно, эндемиков, а именно: *Hypogastrura varians* sp. n., *Protanura mediterranea* sp., *Entomobrya albida* STACH, *Entomobrya melitensis* STACH, *Orchesella melitensis* STACH, *Sminthurus gattoi* sp. n. и *Dicyrtomina melitensis* STACH.



## PLATES

Plate XXVII

*Hypogastrura tullbergi* (SCHÄFF.)

Fig. 1. Three last abdominal tergites.

Fig. 2. Apical part of second leg.

*Hypogastryra varians* sp. n.

Fig. 3. Chaetotaxy of tergites Thor. II, III, IV and V.

Fig. 4. Dens and mucro.

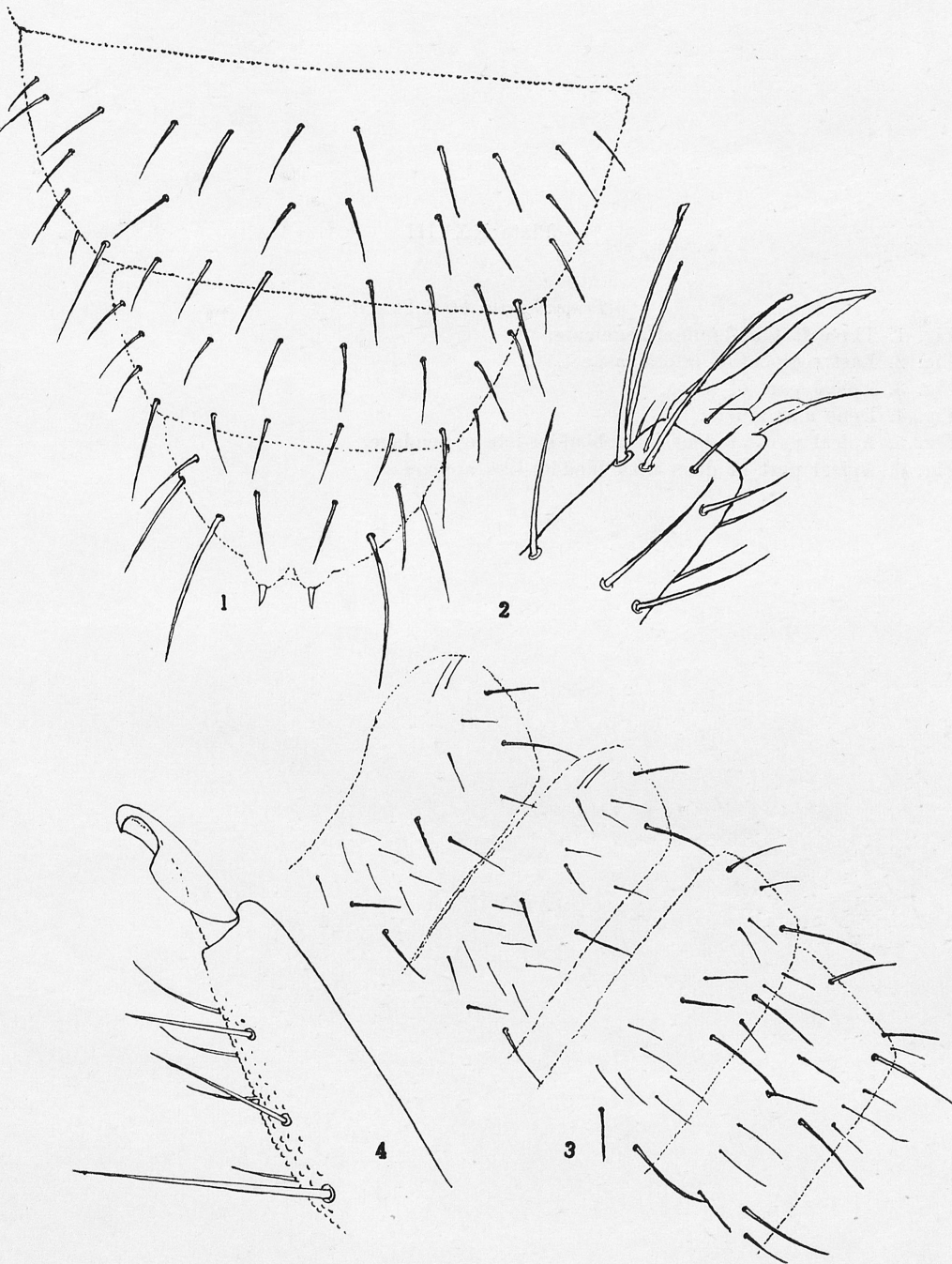




Plate XXVIII

*Triacanthella biroi* STACH

- Fig. 1. Three last abdominal segments.
- Fig. 2. Last segment — lateral aspect.
- Fig. 3. Apical part of a leg.
- Fig. 4. Dens and mucro.
- Fig. 5. Apical part of dens with bladder-like appendage.
- Fig. 6. Apical part of dens with bladder-like appendage.

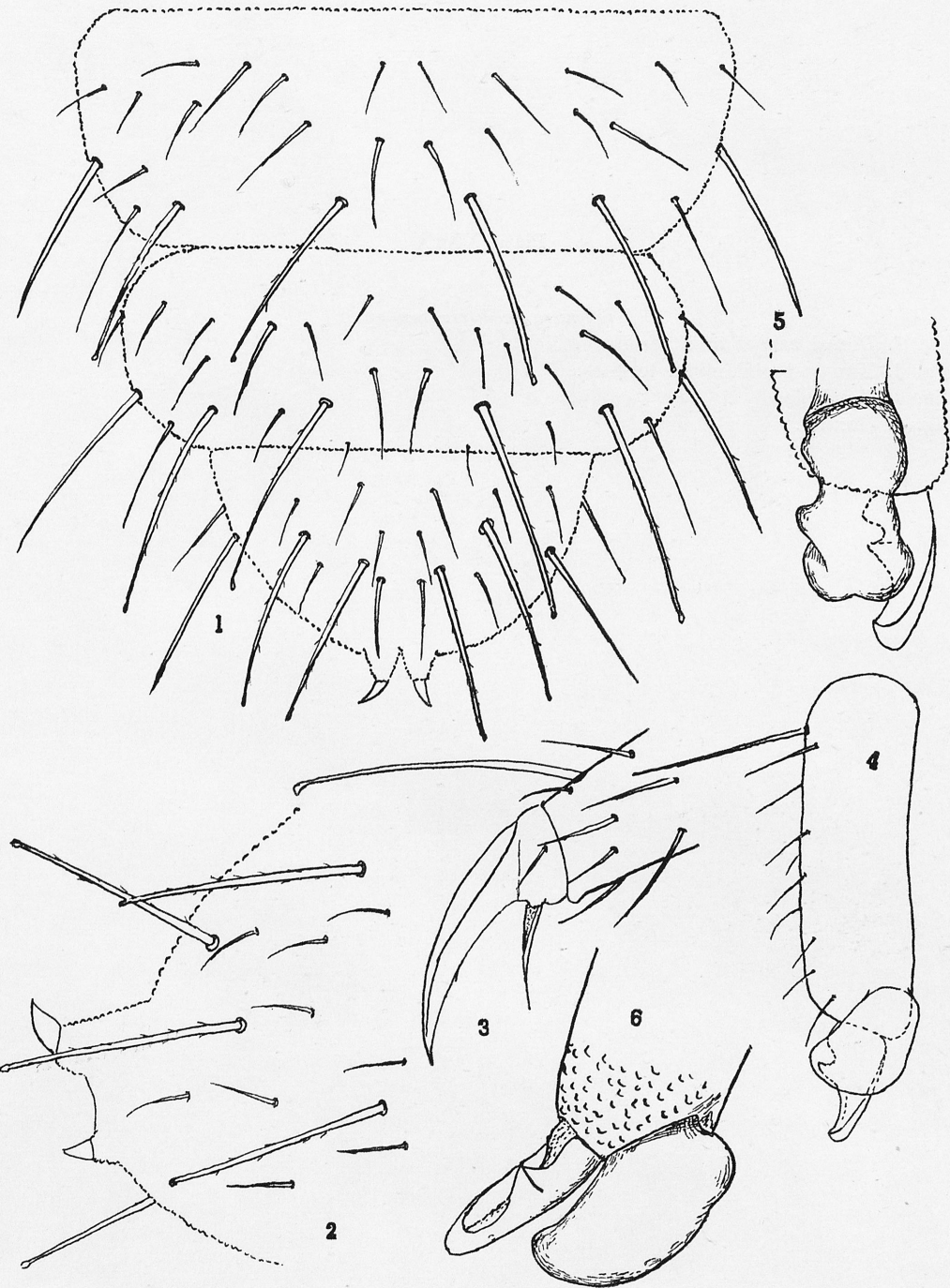


Plate XXIX

*Protanura mediterranea* sp. n.

- Fig. 1. Dorsal aspect of a specimen.
- Fig. 2. Two last abdominal tergites.
- Fig. 3. Mandible.
- Fig. 4. Maxilla.



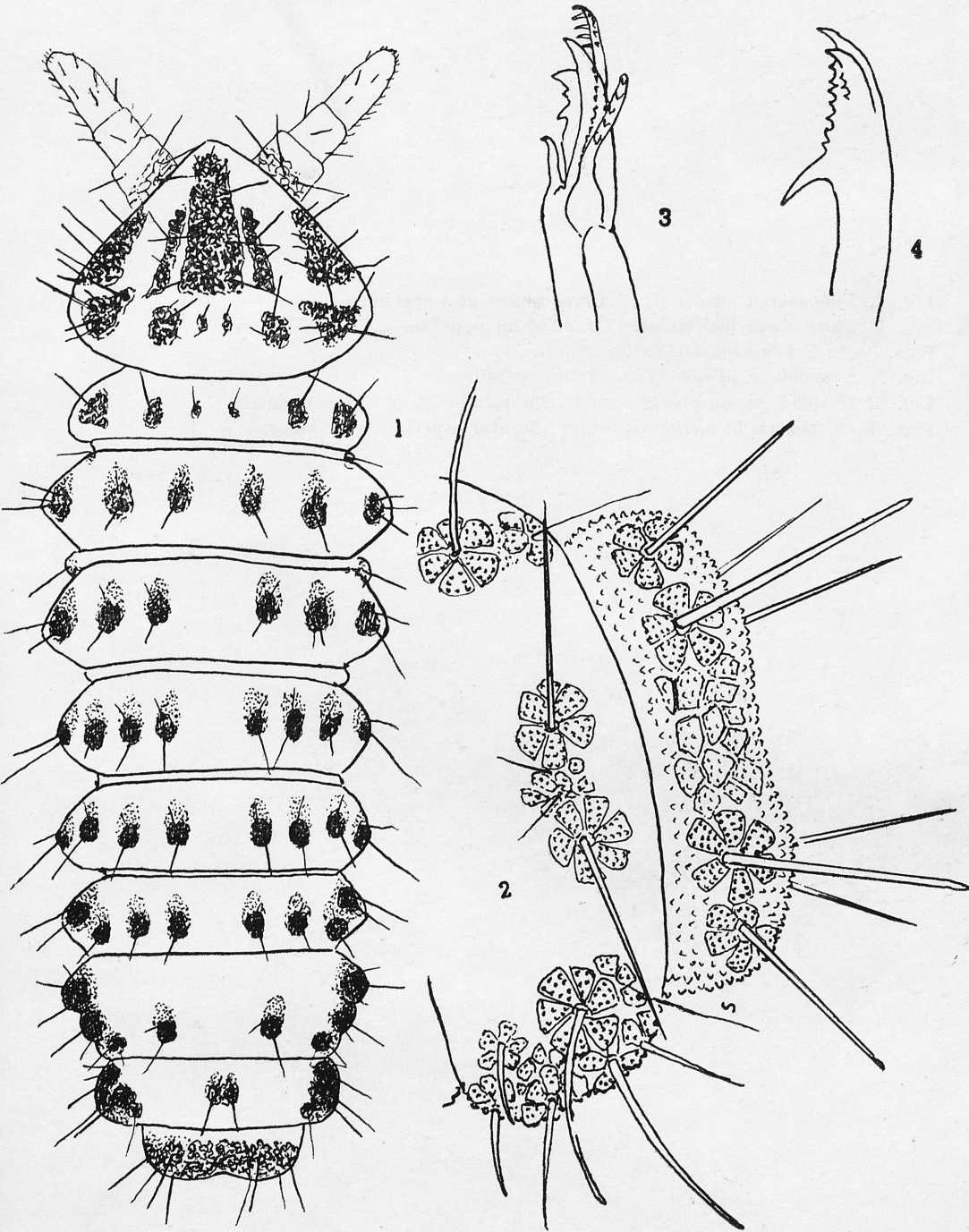


Plate XXX

- Fig. 1. *Entomobrya nivalis* (L.) Lateral aspect of a specimen.  
Fig. 2. *Entomobrya lanuginosa* (NIC.) Labral papillae.  
Figs. 3, 4. *Entomobrya melitensis* STACH.  
Fig. 5. *Entomobrya albida* STACH, labral papillae.  
Fig. 6. *Entomobrya marginata* TULLB., lateral aspect of a specimen.  
Figs. 7—9. *Orchesella melitensis* STACH, frontal aspect of specimens.

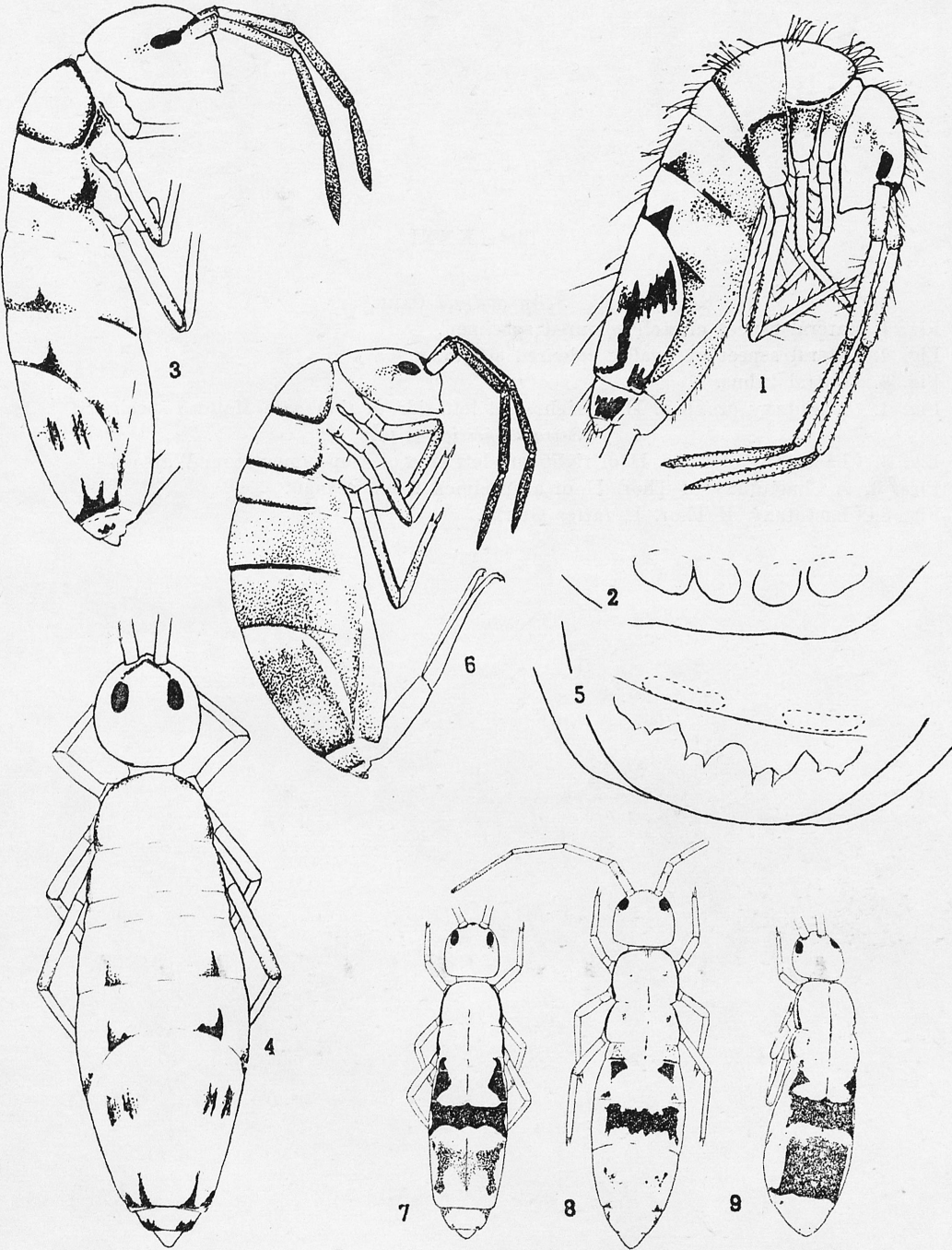




Plate XXXI

*Seira dollfusi* CARL.

Fig. 1. Lateral aspect of well coloured specimen.

Fig. 2. Lateral aspect of weakly coloured specimen.

Fig. 3. Ventral tubus.

Fig. 4. Chaetotaxy of Thor. II of right and left side of the same Maltese specimen.

*Seira domestica* (NIC.)

Fig. 5. Chaetotaxy of Thor. II of right and left side of a specimen from Warsaw.

Figs. 6, 7. Chaetotaxy of Thor. II of a specimen from Poznań.

Fig. 8. Chaetotaxy of Thor. II (after GISIN).

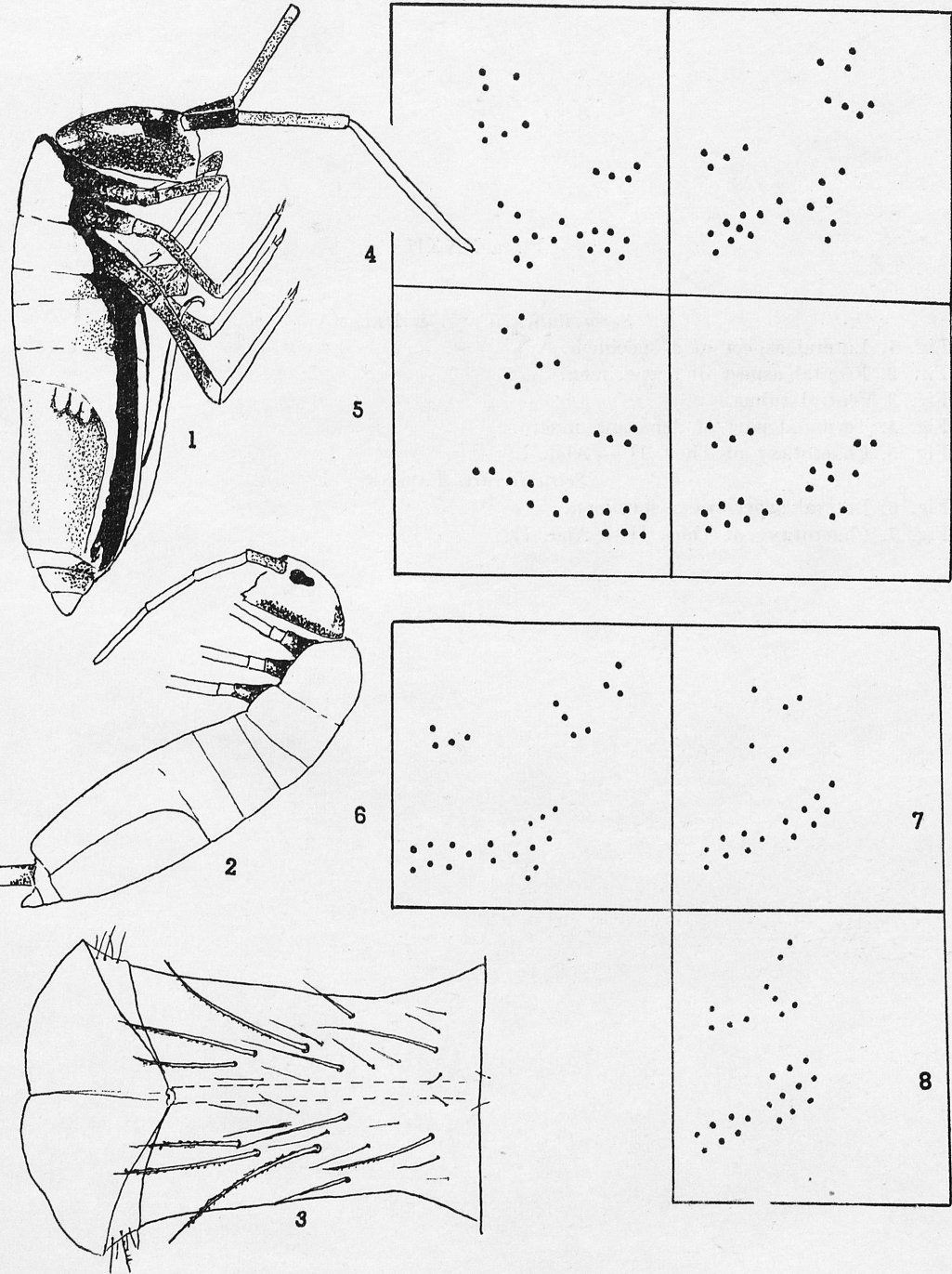


Plate XXXII

*Seira italica* (CASS. & DELAM.)

- Fig. 1. Lateral aspect of a specimen.
- Fig. 2. Frontal aspect of a specimen.
- Fig. 3 Ventral tubus.
- Fig. 4. Terminal part of dens and mucro.
- Fig. 5. Chaetotaxy of Thor. II — Abd. I.

*Seira ferrarii* PARONA

- Fig. 6. Lateral aspect of a specimen.
- Fig. 7. Chaetotaxy of Thor. II — Abd. II.



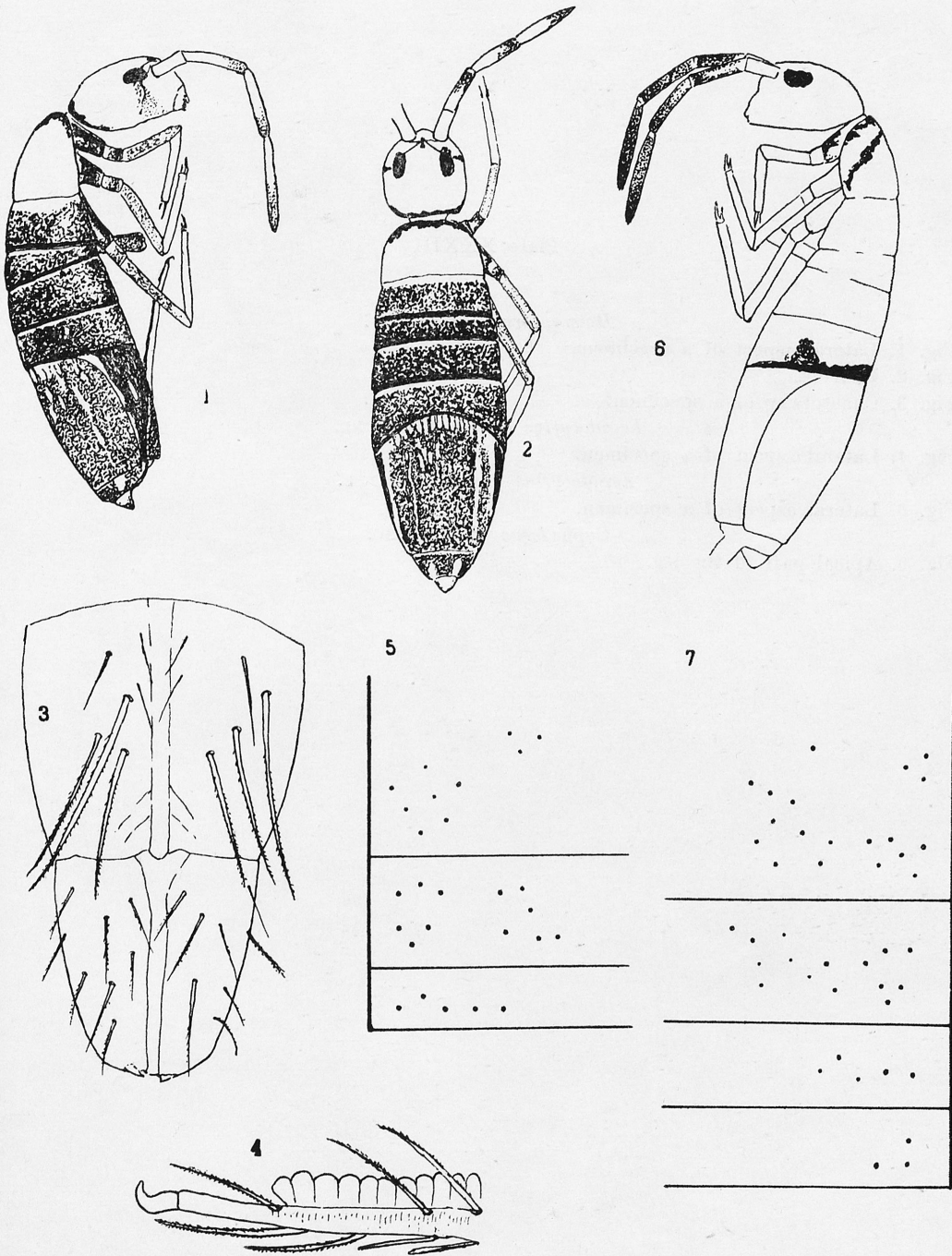


Plate XXXIII

*Heteromurus major* MON.

Fig. 1. Lateral aspect of a specimens

Fig. 2. Labrum.

Fig. 3. Chaetotaxy of a specimen.

*Lepidocyrtus curvicollis* BOURL.

Fig. 4. Lateral aspect of a specimen.

*Lepidocyrtus paradoxus* UZEL.

Fig. 5. Lateral aspect of a specimen.

*Cyphoderus albinus* NIC.

Fig. 6. Apical part of the leg.

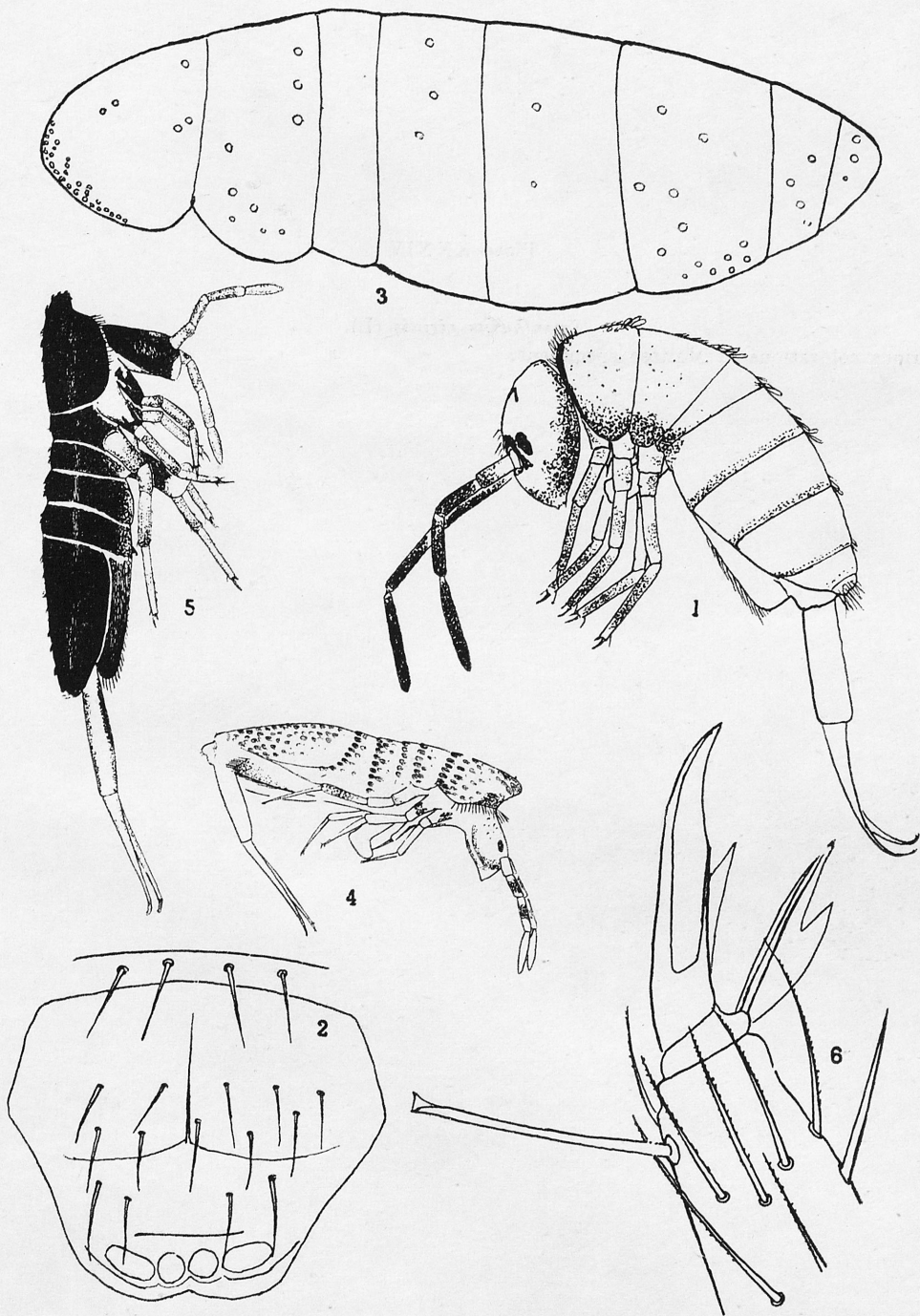




Plate XXXIV

*Sminthurus viridis* (L).

Various colorations of Maltese specimens.

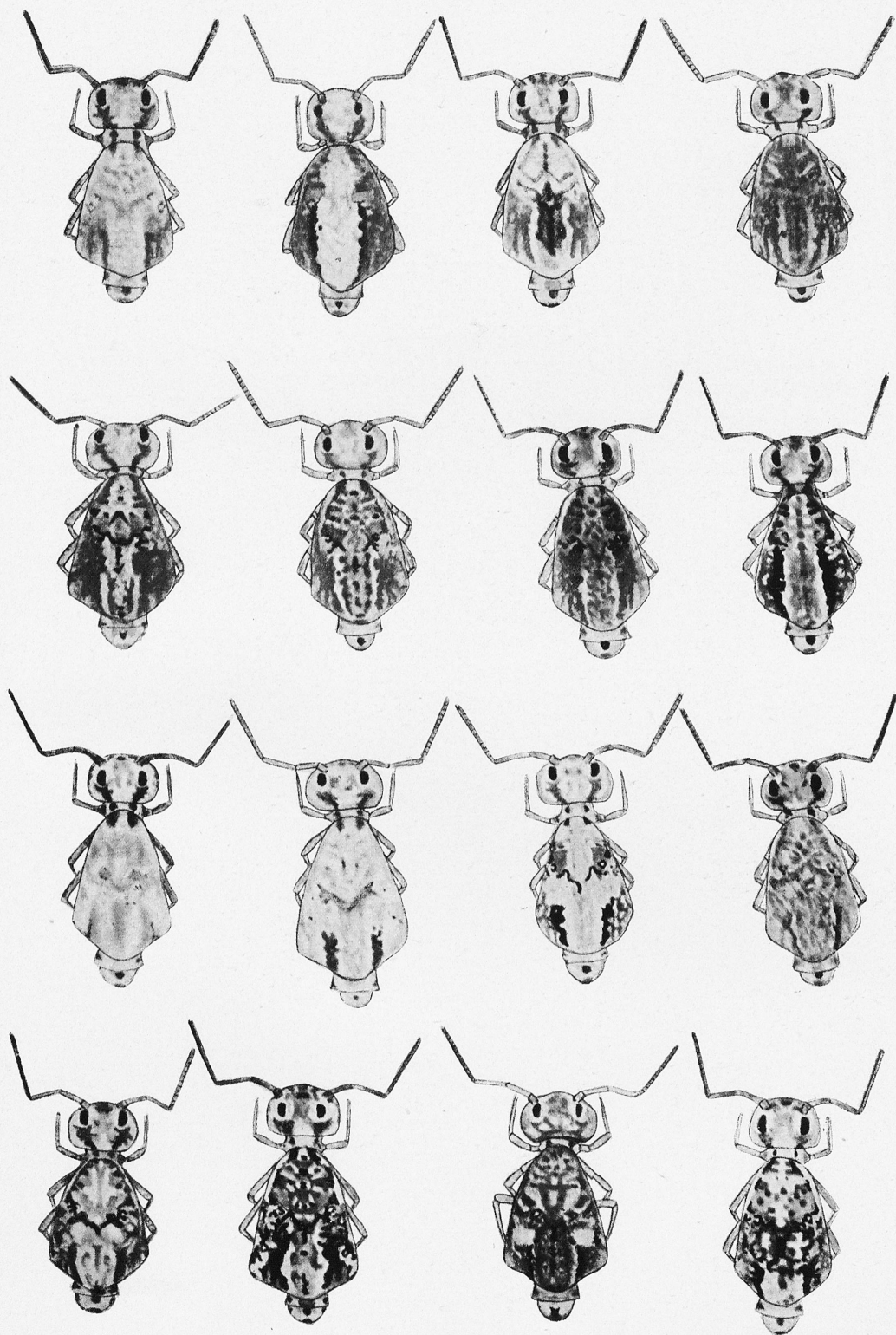


Plate XXXV

*Sminthurus gattoi* sp. n.

- Fig. 1. Frontal aspect of a specimen.
- Fig. 2. Labrum.
- Fig. 3. Terminal part of foreleg.
- Fig. 4. Terminal part of the posterior pair of legs.
- Fig. 5. Appendices anales.
- Fig. 6. Muero.



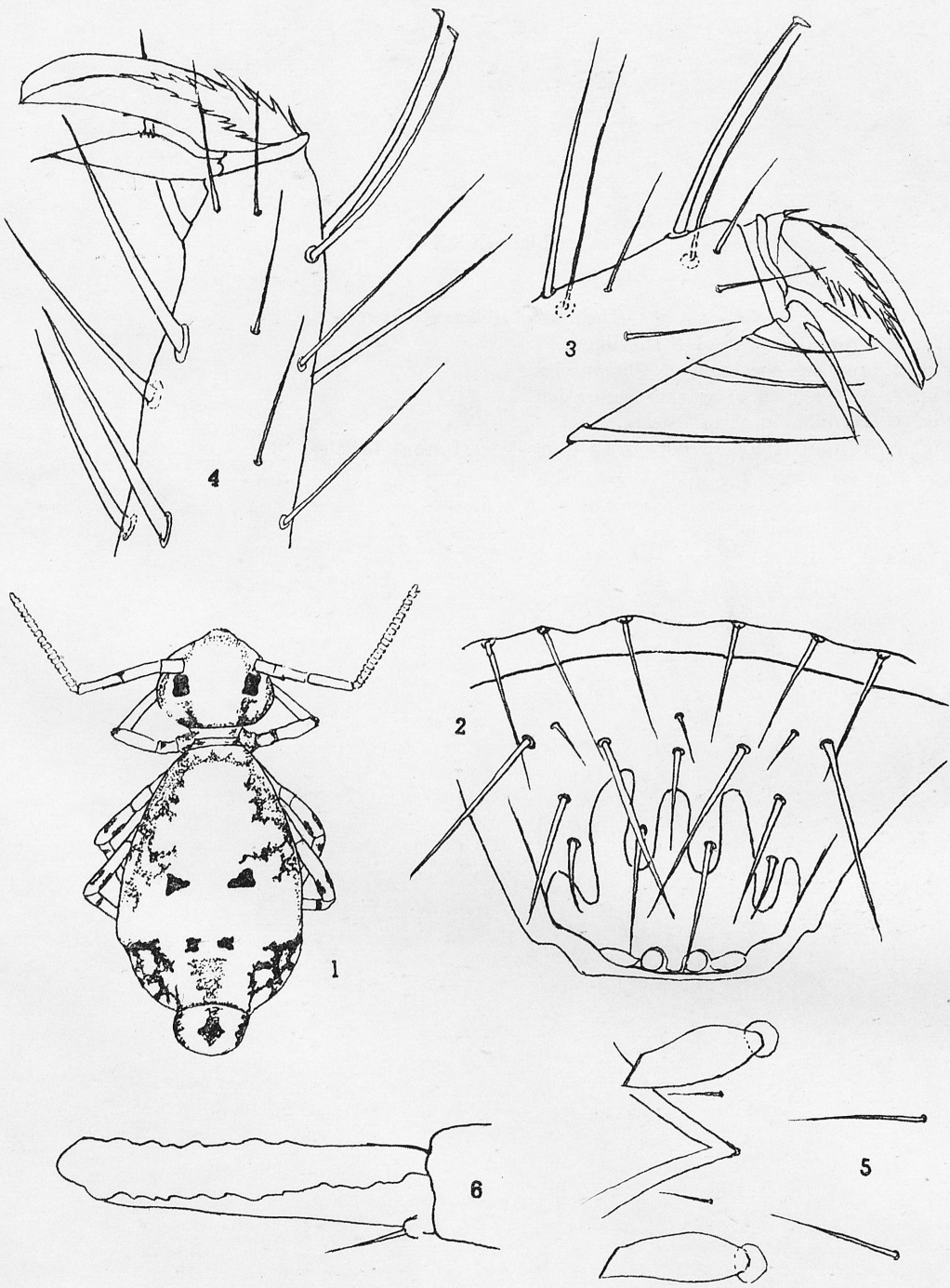
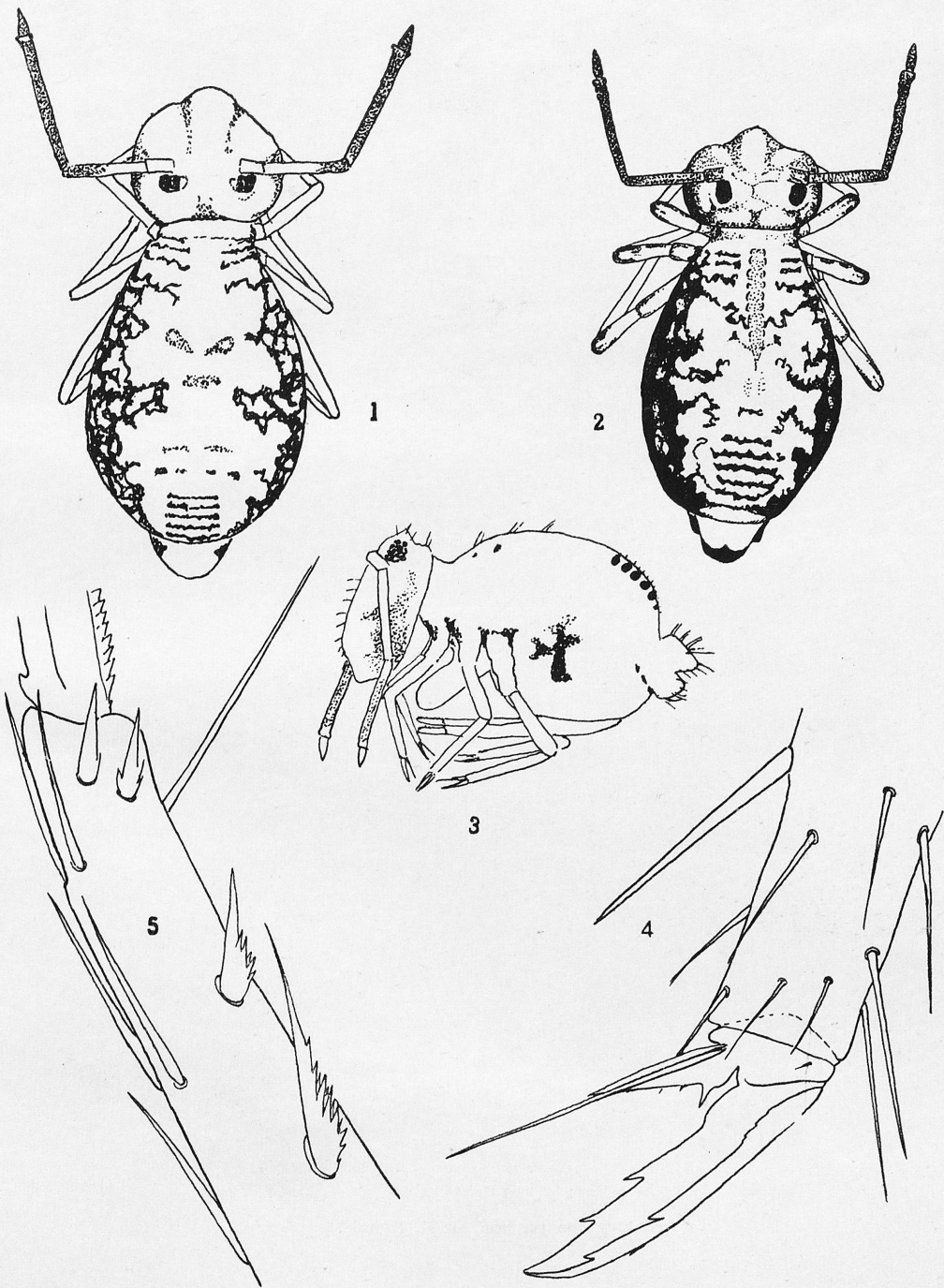


Plate XXXVI

*Dicyrtoma melitensis* STACH

- Fig. 1. Frontal aspect of a specimen.
- Fig. 2. Another specimen of this species.
- Fig. 3. A specimen of weaker coloration.
- Fig. 4. Terminal part of foreleg.
- Fig. 5. Terminal part of dens with dorso-lateral stout bristles.





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