

A C T A Z O O L O G I C A
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On some *Collembola* of North Vietnam

[Pls. XXVII—XXXVIII]

Skoczogonki (*Collembola*) z Północnego Wietnamu

Ногохвостики (*Collembola*) из Северного Вьетнама

The present paper presents the results of an examination of the *Collembola* collected in North Vietnam by Dr. A. BARTKE during his stay in that country in 1960—1961 as a member of the Polish Expedition organized under the scheme of the Third International Geophysical Year. The insects were caught mainly in the environs of the Expedition-camp at Cha-Pa (at an altitude of 1500 m), 40 km south-west from Lao-Kai. They were found in various places e. g. under stones and pieces of timber lying on the ground, in moss growing on trees and rocks, in samples of rotten wood and on soil. The material collected is pretty abundant and contains ten species new to science and 20 new to the fauna of North Vietnam.

The author would like to express his heartiest thanks to Dr. A. BARTKE for collecting the *Collembola* specimens for him.

So far the *Collembola* fauna of North Vietnam has not been explored very well. However some species of this country have already been recorded. In 1948 DELAMARE-DEBOUTTEVILLE described *Dicranocentroides coomani* DELM. and mentioned *Salina fasciata* HAND. and an unidentified species of *Lepidocyrtinus* taken in Tonkin, and in the same year in his important work on *Collembola* of Indochina DENIS enumerated 17 species collected by DAVIDOFF in some localities (Phu-Ho, Darlac, Dalat) of the present North Vietnam.

The following species have been identified in the material collected by Dr. A. BARTKE:

- Lobella perfusionides* sp. nov.
Xenylla terricola sp. nov.
Friesea sublimis MACNAMARA
Coloburella manubrialis sp. nov.
Folsomides exiguus FOLS.
Folsomia diplophthalma (AXELS.)
Isotomodes pseudoproductus sp. nov.
Proisotoma muscicola sp. nov.
Pseudisotoma sensibilis (TULLB.)
Isotoma viridis BOURL.
Entomobrya lindbergi STACH
Sinella monoculata DEN.
Sinella curviseta BROOK
Sinella höfti SCHÄFF.
Sinella pseudostraminea sp. nov.
Homidia sauteri f. *sinensis* DEN.
Homidia subcingula DEN.
Homidia socia DEN.
Willowsia platani f. *nigromaculata* (LUBB.)
Willowsia pseudosocia sp. nov.
Willowsia bartkei sp. nov.
Lepidocyrtus lanuginosus (GMELIN)
Salina vietnamensis sp. nov.
Callyntrura lineata (PARONA)
Tomocerus ocreatus DEN.
Sminthurinus suborientalis sp. nov.
Sminthurinus trinotatus (AXELS.) f. *incompleta* f. nov.
Bourletiella hortensis (FITCH)
Ptenothrix vittata (FOLS.)
Papirioides aequituberculatus sp. nov.

Zoogeographically, the Collembolan fauna of North Vietnam represents a mixture of subtropical elements with a group of cosmopolites and species widely distributed in the Holarctic such as *Folsomia diplophthalma* (AXELS.), *Pseudisotoma sensibilis* (TULLB.), *Sinella curviseta* BROOK, *Isotoma viridis* BOURL., *Bourletiella hortensis* (FITCH) and others. Most species of these groups were probably transferred on various cultivated plants introduced by man.

***Lobella perfusionides* sp. nov.**

Plate XXVII, figs. 1—4

Only young specimens 0,8 mm in length. White barring the black ocelli. Antennae shorter than the diameter of the head. All antennal joints distinctly delimited. Sensory organ of third antennal joint with two minute rods

situated in a small elliptical groove, either guarded laterally by a short olfactory hair. Ant. IV with small bulbs at the tip and subapically with a pair of moderately thick and long olfactory hairs curved towards each other.

Three ocelli on either side of the head, two of which almost touching each other, lying obliquely immediately in front of each eye-tubercle, and the third one situated laterally on the tubercle. The postantennal organ is wanting. Tubercles on the head normal in number and arrangement, but only indistinctly marked, not elevated.

The arrangement of body tubercles is shown in pl. XXVII fig. 1. Most of them, especially the dorso-internal and external ones are only marked by setae and somewhat larger granules surrounding the bases of the setae. Thor. I — each with one bristle in the place of undeveloped dorso-external, dorso-lateral and lateral tubercles; dorso-internal tubercles are entirely wanting. Thor. II — Abd. V on an either side with dorso-internal tubercle provided anteriorly with one pretty long seta and posteriorly with a strong bristle. Each dorso-external tubercle furnished with two long setae on thoracic tergites II and III, and with one strong, long bristle on Abd. I—V. Moreover, the tubercles on Thor. III — Abd. IV are provided each with one very fine seta sensuais situated laterally, on Thor. III on the inner side and on Abd. I—IV on the outer side of the tubercle. The dorso-lateral and lateral tubercles on the thoracic and abdominal tergites are better developed and provided with two strong bristles each. On Abd. V appears each at inner edge of the here large and ankylosed dorso-lateral with lateral tubercle a long seta sensuais. Here, it is not situated on a separate tubercle, as it is in the true members of the genus *Lobella* BÖRN. Most setae are smooth, sharply pointed; some long stout bristles on abdominal tergites V and VI are provided with minute thorns laterally and wing-like flattened terminally.

Unguis armed with minute, but distinct inner tooth.

Locality: Cha-Pa, in moss growing on a tree, 6. II. 1960, 3 specimens and 3. III. 1961, 1 specimen.

The specimens described here do not agree accurately in all their body details with the characteristics of the genus *Lobella* BÖRN., perhaps because they were young individuals. They come nearest to *Lobella perfusa* DEN., 1934.

Xenylla terricola sp. nov.

This is a species of the group *Xenylla* TULLB., furnished with the mucro distinctly separated from the dens.

Body clothed sparsely with moderately short setae arranged mostly in two cross rows on abdominal tergites. A thin but remarkably long hair appears dorso-laterally and laterally on either side of Abd. V. A similar long hair is also on Abd. VI, each laterally close to anal spines.

Antennae somewhat shorter (8.5:10) than the diameter of the head. Sensory organ of third antennal joint consists of two small sensillae, globular

at their tips and guarded in the front by a high integumentary fold. On either side of this fold is a short fine sensory hair. Fourth antennal joint with a simple, globular, finely granulated, retractile sensory papilla subapically. Olfactory hairs few in number, and relatively thin.

Postantennal organ absent. Five ocelli on either side of the head, equally large, arranged on a common black-pigmented patch.

Unguis long, narrow, untoothed. Empodial appendage absent. Dorsally, on each leg are two distinctly clavate tenent hairs, longer than the unguis.

Tenaculum with 3+3 barbs and no seta on corpus.

Furcula somewhat shorter than antennae. Manubrium broad, with two parallel cross rows of setae dorsally, the anterior of which of 3+3 setae, the posterior of 2+2. Dens equally long or somewhat longer than manubrium, furnished with only two setae, one basal and one near to mucro. Mucro always distinctly separated from dens, straight, 1.7—2.5 times shorter than dens. Along inner side of the mucro runs a distinct narrow straight long lamella without reaching the apex of the mucro. Mucro slightly hook-like and turned up at the tip, ventrally entirely smooth without tooth-like incision near its base.

Anal spines small, situated on pretty broad papillae, not touching each other basally.

Body in blue colour. Length of animals examined 1.2 mm.

Locality: Cha-Pa, common in moss-polstern growing on rocks, 1961, numerous specimens.

This new species is similar in some characters of body to widely distributed *Xenylla humicola* (FABR.) TULLB., differs, however from that in the want of the tooth-like incision on the ventral edge of the mucro, in its untoothed unguis and some other less important body details.

Friesea sublimis MAC NAMARA, 1921

Plate XXIX, figs. 3 and 4

The specimens of *Friesea* D. T. from Vietnam agree in essential body characteristics with those described by MACNAMARA from Canada, as they have the same number of ocelli (8+8), well developed furcula in all its joints, three anal spines and distinctly globularly capitate hairs on the posterior abdominal tergites. Some differences in body details are taxonomically not significant.

The specimens of Vietnam have the body clothed sparsely with setae arranged on the tergites in two cross rows, the anterior row composed of short setae and the posterior of long ones. Beginning from the third abdominal tergite the long outstanding setae are globularly capitate and on the sixth tergite as long as the anal spines, or in young individuals twice as long as these. They are arranged here somewhat differently from those in Canadian specimens — judging by figure 7 given by MACNAMARA.

Antennae conical, about 1.6 times shorter than the diameter of the head. First antennal joint basally about twice as thick as long, only dorsally furnished with one row of long stiff setae. Second joint thicker than long with one row of setae arranged around the joint. The sense organ of the third joint consists of two strongly curved hook-like sensory rods situated in a common small, relatively deep groove. At a distance from this groove is inserted a pretty long plump sensory hair. Fourth joint with relatively large simple retractile sensory papilla at tip, and indistinct subapical pit housing a minute papilla and guarded by a pair of long, thick, curved olfactory hairs below the tip. Four other hairs of this kind are on the outer side of the joint.

Unguis moderately broad, untoothed. Each leg dorsally with three and ventrally with two weakly clavate tenent hairs, somewhat longer than inner lamella of the unguis.

Furcula short, but only somewhat shorter than tibiotarsus of third leg measured together with unguis. All joints of furcula well developed. Dens broad at the base, but longer than wide, furnished dorsally with three short setae. Mucro about 4 times shorter than dens, provided with a strong hook-like apical tooth, a broad lamella and a prominent hill-like median shaft.

In adult individuals three slightly curved anal spines are about as long as the unguis, in younger specimens they are shorter.

Colour of animals dark blue. Length about 1 mm.

Locality: Cha-Pa, under pieces of wood and in moss, II. 1961, 7 specimens.

The Vietnamese individuals of *Friezea sublimis* differ from the Canadian ones — judging by the figures given by MACNAMARA 1921 — in the chaetotaxy of the sixth abdominal tergite, the shape of mucro and in the only weakly capitate tibiotarsal tenent hairs.

The species seems to be very widely distributed, as it is recorded from Canada (Arnprior, Ontario), North Vietnam and according to GISIN (1960) it occurs in Switzerland and Austria.

Coloburella manubrialis sp. nov.

Plate XXVIII, figs. 6—9

Body covered with coarse granulated integument and pretty densely with short curved setae. On the last abdominal segment the setae are somewhat longer, but even here they are short and not outstanding. All the body segments are distinctly separated.

Antennae with short setae, themselves always somewhat longer than the diameter of the head (about 8.4 : 7.2). Sensory organ of third antennal joint composed of two fine sensory rods situated parallel together each in a shallow small deepening of integument. Ant. IV with some indistinctly differentiated thin olfactory hairs and without retractile sensory papilla at tip.

Six ocelli on either side of the head, subequal and arranged in two parallel longitudinal rows on a black patch. Postantennal organ elliptical, somewhat longer than the diameter of one ocellus.

Legs clothed scarcely with setae which on their ventral and lateral sides are moderately long and normal in shape, on the dorsal edge of the tibiotarsi, however, fine, longer and distinctly globularly capitate. On the first and second pair of legs such capitate setae are arranged three in a cross row near the base of the unguis, as tenent hairs, and somewhat higher there appears another hair, long and capitate. On the third pair of legs, besides the three capitate hairs near the base of the unguis, such hairs, four in number, are arranged along the dorsal edge of the legs at a distance one behind another. A pair of such globular capitate hairs appears also dorsally on the terminal part of the femur and a third such hair is somewhat higher. Unguis slender, untoothed, shorter than the capitate hairs. Empodial appendage about half as long as unguis, provided with a pretty broad inner lamella.

Furcula strongly reduced. In fact, there is only a broad manubrium, densely setaceous and almost entirely pressed to the body. The manubrium ends in front with a pair of low globular dentes provided each with three short setae and a very indistinct hill-like tubercle. In front of the furcula is a rudimentary tenaculum composed of a small corpus pressed to the body, and some short reduced rami not reaching to the dentes.

Body colour black-blue, but some small irregular uncoloured spots appear here and there on the tergites.

Length: 0.8 mm.

Locality: Cha-Pa, in a sample of soil, XI. 1960, 4 specimens.

In some body details the new species agrees with *Coloburella vandeli* CASS. of southern France, but differs from it in the distinctly greater reduction of the furcula, of which only manubrium has remained in fact, also reduced in the tenaculum, in the legs furnished dorsally on the tibiotarsi with long, distinctly globularly capitate hairs.

Folsomides exiguus FOLSOM, 1932

Body characteristic of the genus, nearly cylindrical, elongated, posteriorly slightly bowed downwards. It is covered with moderately long straight setae arranged in 2—4 irregular cross rows on the tergites.

Antennae distinctly shorter than the diameter of the head. The sensory organ of the third antennal joint consists of two short straight sensory rods.

Postantennal organ narrow elliptical, distinctly bent, longer than the base of the first antennal joint. Two ocelli on either side of the head, at a distance one behind the other, covered densely by grains of black pigment. The anterior ocellus is always about twice as large as the posterior one. The first differs also in having a distinct cornea, which in the posterior one is wanting.

Unguis untoothed. Empodial appendage short, about $\frac{1}{4}$ — $\frac{1}{3}$ as long as the ventral lamella of the unguis. Tenent hairs absent.

Furcula short. The length ratio of manubrium to mucrodens is on the average as 5 : 4. Manubrium ventrally unsetaceous, dorsally with three pairs of setae arranged one after another in terminal part, 3—3 setae near the base of the manubrium. Dens ventrally without setae, dorsally with three ones: the basal, the longest and straight, the second, situated dorsolaterally somewhat below and the third, about in the half length of the mucrodens. Mucro entirely ankylosed with dens, provided with two nearly equally large teeth.

Tenaculum with 3—3 barbs on rami and no seta on corpus.

White except ocelli. Body length of the largest specimen examined — 0.9 mm.

Locality: Cha-Pa, in litter of a small wood, II. 1961, many young and adult specimens.

Folsomides exiguus, described by FOLSOM in 1932 from Hawaii and recorded by WOMERSLEY from Australia in 1935, in 1948 was identified by DENIS as *Folsomides americanus*, the species from Costa Rica erected by him in 1931. The last has only one ocellus on either side of the head, but DENIS considers this body detail to be a specifically less important characteristic of the species *Folsomides americanus* and writes (p. 213): „L'espèce *F. americanus* est en pleine régression en ce qui concerne les yeux. Le caractère, nombre des yeux, n'est pas un caractère spécifique". Basing on these considerations DENIS determined specimens of *Folsomides* having 2—2 eyes, found in Cândia (South Annam), as *Folsomides americanus* DEN., and recorded them as the forms of the same species *Folsomides parvus* FOLSOM, 1934, with 2—2 equally large ocelli, from Poland and the U.S. (Iowa, Colorado), further *Folsomides exiguus* FOLSOM, 1932, with 2—2 unequally large ocelli, from the Hawaii, Australia, and *Folsomides americanus* DENIS, 1931 with 1—1 ocellus pigmented or unpigmented, from Costa Rica and Indochina.

Folsomia diplophthalma (AXELSON, 1902)

Plate XXVIII, figs. 4 and 5

The specimens from Vietnam agree in all body characteristics with those of *Folsomia diplophthalma* (AXELS.) from the East Carpathian mountains examined by me in 1947.

They have one distinct black-coloured ocellus on either side of the head, immediately behind the medially lying end of the postantennal organ. Postantennal organ narrow, 1.5 times longer than the base of the first antennal joint.

Body setae moderately short, arranged in four cross rows on the first abdominal tergites. Moreover, on each tergite there are six outstanding bristles which on the following tergites become gradually longer and on the terminal part of the body form a cluster of about 20, 1.5 times longer than the dens of furcula.

Unguis untoothed. Tenent hairs wanting.

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

Furcula somewhat shorter than antennae, ventrally with only one pair of setae. Dorsally on the dens is a long, straight basal bristle, somewhat below it a short curved seta and immediately in front of 4—5 fine median notches there appears a pair of very fine setulae. A longitudinal row of 1, 2, 2, 1 short, stout setae occurs ventrally on the dens.

Body length 1.3 mm. White, with black pigment dispersed dorsally on the head and on the last ankylosed segments and laterally on the thoracic tergites in the form of many fine irregular lines and spots.

Locality: Cha-Pa, in moss, mould and under pieces of wood lying on the ground, III. 1961, in large numbers.

Folsomia diplophthalma (AXELS.) is a species very widely distributed in the Holarctic from the Scandinavian territory, through Svalbard, Novaya Zemlya, Greenland to the U.S., and generally regarded as an element of the arctic fauna. It is, however, recorded from some countries of Central Europe (Germany, Poland, Czechoslovakia, Hungary) and from high European mountains (Alps, Carpathians); but in all these localities it occurs singly as a rare animal. In North Vietnam it was found in large numbers mostly in company with *Isotomodes pseudoproductus* sp. nov., *Folsomides exiguus* FOLS. and *Xenylla terricola* sp. nov.

Isotomodes pseudoproductus sp. nov.

Plate XXIX, figs. 1 and 2

Body typical of the members of the genus *Isotomodes* AXELS., elongated, terminally turned steeply downwards. Both last abdominal segments ankylosed together dorsally without a trace of a suture and tergites covered with moderately short setae and some longer bristles.

The arrangement of stiff long bristles on ankylosed Abd. V and VI is characteristic of the species. On Abd. V a pair of strong long bristles is situated medianly and in the proximity of their base there are six minute setulae. The second group of setae, composed of two long stiff bristles and some minute ones, is arranged in both lateral corners of this segment. Below this last group is situated on Abd. VI each laterally a group of three long stiff bristles and beyond ones at posterior margin of this segment each a pair of such bristles. All these stiff stout bristles are subequal in length, about as long as the dentes, but the median pair of those situated on Abd. V is about twice as thick as the others. Besides these groups of long bristles on ankylosed Abds. V and VI there are no other spines or spine-like setae.

Antennae 1.5—2 times longer than the diameter of the head. The sensory organ of the third antennal joint, typical of this genus, consists of two terminally globular sensillae, situated closely together, each in a separate deep pit and

both covered almost completely by a high integumentary fold of the front. Ant. IV with some weakly blunt olfactory hairs and near to tip with a sub-apical pit.

Postantennal organ large, broadly elliptical, only a little shorter than the diameter of the first antennal joint, guarded at its posterior margin by some (7—9) short and long setae.

Claw without inner or lateral teeth. Empodial appendage about half as long as the ventral side of the unguis. Clavate tibiotarsal hairs absent. Sub-coxae of the first pair of legs provided with two setae.

Tenaculum with 4 barbs on each ramus and no setae on the corpus.

Furcula short, about half as long as antennae. Manubrium thick, dorsally with some (about 14) short setae, ventrally unsetaceous. Dentes somewhat shorter than manubrium; medially at the base, each dens with a pair of strongly developed hooks, dorsally not crenulated. Each dens dorsally near to its base with one strong, outstanding bristle about half as long as the dens, and with a fine curved seta. Ventrally the dens has six moderately short setae arranged in a row 1, 2, 2, 1. Mucro bidentate, distinctly separated from the dens, about 4 times shorter than dens.

Body colour: white. Length: 1.1 mm.

Locality: Cha-Pa, in samples of soil, 1960 and 1961, in abundance.

The new species resembles *Isotomodes productus* (AXELS.) in some details, e. g. in having a pair of strong long bristles medially on Abd. V and no spines or spine-like setae on Abd. VI, but differs from it in the remarkable thickness and length of these bristles, small number of setulae arranged at their base, and in the dens provided ventrally with 6 setae.

In the last body detail it agree with *Isotomodes trisetosus* (DENIS, 1923), but the dentes in the latter are crenulated and the setae situated ventrally on the dens are differently arranged, i. e. in the pattern 1, 2, 3.

***Proisotoma muscicola* sp. nov.**

Plate XXVIII, figs. 2 and 3

Body of small length, clothed sparsely with short, smooth setae, only slightly longer on last abdominal tergites. Sutures of all abdominal segments distinctly marked.

Antennae somewhat shorter than the diameter of the head. Antennal organ of third joint with two small sensory rods, each situated in a shallow integumentary depression, guarded by some setae. Ant. IV rounded at the tip, subapically with small cross groove housing a minute sensory papilla. Some olfactory hairs very weakly and indistinctly thickened.

Postantennal organ broadly elliptical, relatively long ($\frac{2}{3}$ of the whole length of the eye-patch), with a weak inclination to divide into halves. Six black ocelli

on either side of the head, almost equally large, arranged in pairs on the bluish-coloured eye-patch.

Unguis untoothed. Empodial appendage somewhat longer than half the length of the inner side of the unguis, provided with a moderately wide rounded inner lamella. No tibiotarsal tenent hairs.

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

Furcula well developed but short, as long as antennae. Manubrium dorsally with about 12 fine setae, ventrally unsetaceous. Dentes shorter than manubrium, narrowing gradually towards the end, dorsally slightly crenulated, only with four broad notches, and provided with four dorsal, one lateral, and one ventral setae. Mucro 4 times shorter than dens, with well developed, nearly equal, large apical and anteapical teeth, minute inner proximal tooth, distinct lateral lamellae and low median shaft.

Animal white in colour, barring black ocelli and weakly blue pigmented eye-spots. Length 0.6 mm.

Locality: Cha-Pa, under moss growing on a tree, XI. 1960, 1 specimen.

The new species agrees in some body characteristics with *Proisotoma minima* (ABSOLON, 1907), but differs from it in the number of ocelli, the lack of setae on the ventral side of the manubrium, and the presence of only one seta on the ventral side of the dens.

Pseudisotoma sensibilis (TULLBERG, 1876)

The specimens of North Vietnam agree exactly with the European ones and with those examined by me from other territories.

They are about 1.7 mm long, more or less dark blue in colour with a cross stripe at the posterior margin of each tergite of Abds. I—IV; Abd. V ankylosed with Abd. VI; postantennal organ broadly elliptical, about as long as the diameter of one ocellus, unguis with small lateral teeth and one inner tooth; empodial appendage with minute corner-tooth, tenaculum with 4—4 barbs and some setae on corpus, furcula long, mucro tridentate.

They differ only in the number of tenent hairs, which appear one on the foreleg, two, rarely one on the second leg, and 2—3 on the third leg, instead of 2, 3, 3, as in the principal form of this species.

The ventral setae of the manubrium are arranged in a triangle the inside of which is unsetaceous. At the base of this triangle are (2) 3, 3—3, 3 (2) setae, of which the lateral setae are long and the medial ones short, straight and fine. A row of short setae runs from the base of the triangle along its sides towards the vertex, and they are arranged in three pairs one above another near the base and higher they occurs two or three unpaired setae. In young individuals the base of the triangle is formed of 2, 2—2, 2 setae and either of sides of 3 or 4 odd ones.

Locality: Cha-Pa, in rotten wood and under pieces of timber lying on the ground, XII. 1960 and III. 1961, many specimens.

Pseudisotoma sensibilis (TULLB.) is a very widely distributed animal, common in Europe, recorded from Asia and North America. It lives in territories of very different climatic conditions, in cold ones (Lapland, Ural, Jan Mayen, Novaya Zemlya, Greenland) as well as in those with high temperatures (Crimea, Caucasus, East India).

Isotoma viridis BOURLET, 1839

Plate XXX, figs. 1—11

The specimens of this common and very widely distributed species show such typical morphological characteristics, as the small postantennal organ, the unguis with two minute inner teeth, the tridentate mucro and others.

The labrum of animals from North Vietnam is dorsally with 5, 5, 2—2 setae and at the front it has four rounded smooth papillae, two medial of which are distinctly smaller than the lateral ones. Ventrally the labrum is provided at the front with a transverse row of many, densely arranged, curved teeth the acuminate of which protruds sometimes beyond the edge of the labrum.

Manubrium abundantly setaceous; besides the common setae it has two to three pairs of outstanding stiff long bristles dorsally and ventrally near the base of each dens a transverse chitinated unidentate listel and a group of 3—7 pointed strong spines.

Mucro stout with three rather variably arranged teeth and sometimes with a minute tooth-like process at the ventral edge of the apical tooth.

Tergites covered densely with setae of various lengths and some stout outstanding bristles, which on Abd. I—VI are remarkably long, serrated, arranged in a transverse row of 6—8 bristles. The trichobothria are wanting.

Body colour mostly pale yellowish or green. Black-violet pigment usually appears laterally on the tergites in small patches and spots. A pair of dark patches situated laterally on Abd. VI is very characteristic of the specimens of North Vietnam. The dorsal part of each antennal joint is also pigmented black. Specimens with a more or less regular broad cross band on each tergite are common as well.

Length of animals examined was up to 3.5 mm.

Locality: Cha-Pa, in 1960 and 1961, large numbers, especially under tree-trunks lying on the ground near the station.

Sinella monoculata DENIS, 1929

This species was erected by DENIS in 1929 on the basis of one specimen from China (Yi Leang, Yunnanfu), found afterwards also by this author (1948) in the material collected in central Annam (Bana, near Tourane). It is characterized by only one ocellus on either side of the head, the empodial appendage

provided with a distinct outer tooth and the bidentate mucro with a long basal spine.

Stout bristles arranged in a double row on the ventral edge of the tibiotarsus, which in *Sinella curviseta* BROOK, the genotype of *Sinella* BROOK, are almost entirely smooth, in *Sinella monoculata* DEN. are distinctly finely ciliated.

The members of the subgenus *Coecobrya* YOSH, 1956, have also ciliate tibiotarsal stout bristles and toothed empodial appendage, but they differ from *Sinella monoculata* DEN. in their falcate mucro and the absence of ocelli.

All specimens examined by me from North Vietnam have the tibiotarsal tenent hair sharply pointed and 5—5 stout bristles in the middle part of the fourth abdominal tergite.

Locality: Cha-Pa, under stones near a house, 6. IV. 1961, 2 specimens and under stones, 27. IV. 1961, 6 specimens.

Sinella monoculata DEN. is so far known from China and North Vietnam.

Sinella höfti (SCHÄFFER, 1896)

The North Vietnam specimens of this species, all caught outside caves, agree in the shape of the unguis with those described by DENIS in 1924 (figs. 5—7). Namely they have the inner tooth in the basal pair distinctly larger, wing-like, pointed and the tibiotarsal tenent hair finely sharply pointed. The arrangement of stout „flexed“ bristles on the tergites is in my specimens the same as given by YOSH (1956) for *Sinella curviseta* BROOK.

Sinella höfti SCHÄFF. is considered by many authors to be identical with *Sinella coeca* (SCHÖTT), but the teeth in the basal pair in the North American type of the last species are equally large and the tibiotarsal tenent hair apically distinctly flattened. The basal teeth of the unguis and the tenent hair analogically shaped occur — according to GOTO, 1953 — in the South African specimens of *Sinella coeca* (SCHÖTT, 1896).

Locality: Cha-Pa, near the station under a tree-trunk and stones, IV. 1961, many specimens.

Sinella curviseta BROOK, 1882

Plate XXXIII, figs. 8 and 9

The genotype of the genus *Sinella* BROOK, widely distributed, recorded from many localities and well described by various authors.

The specimens of North Vietnam examined by me do not differ from those living in other countries. They have two ocelli on either side of the head, arranged one below the other at a distance, the empodial appendage without an outer tooth and the bidentate mucro with a long basal spine.

Stout bristles arranged in a double row on the ventral edge of the tibiotarsus seems to be entirely plain (at a microscopic magnification of 300) and the higher situated macrochaeta is finely ciliated and apically obliquely truncated.

The unguis is provided with a short basal tooth, a pair of higher situated lateral teeth and three inner teeth. The basal pair of inner teeth is usually unequal in size, the inner tooth is larger and somewhat wing-like. Tenent hair fine, sharply pointed, somewhat shorter than the ventral lamella of the unguis.

In chaetotaxy the specimens from Vietnam agree accurately with Japanese specimens described by YOSII in 1956.

Locality: Cha-Pa, in various places under stones, tree-trunks and in litter of woods, I. 1961, many specimens.

Besides Europe *Sinella curviseta* BROOK has been recorded from India, Japan, North America and Costa Rica. In North Vietnam it is the commonest member of the genus *Sinella* BROOK.

***Sinella pseudostraminea* sp. nov.**

Plate XXXIII, figs. 1—7

The body is clothed with many distinctly ciliated unequal setae and strong, stiff bristles of „flexed“ type. The last are grouped abundantly dorsally on the head, tergites of Thor. II and III, and form a mane here. On the abdominal tergites they become less numerous, but replace, even on Abd. IV, the remarkably long macrochaetae. The arrangement of these stout bristles on the abdominal tergites is shown in fig. 1. Trichobothria in normal numbers, as in other species of *Sinella* BROOK. They are long, fine, smooth and near their bases surrounded by some short, abundantly ciliated setae.

Antennae about half as long as the body measured together with the head, and twice as long as the diameter of the head. All antennal joints relatively long and setaceous. Moreover Ant. I provided dorsally with some bristles of the „flexed“ type, but shorter than those on the head, whereas Ant. II and III have some stout ciliated bristles dorsally and ventrally. Ant. III with sensory organ composed of two short curved rods situated in a small narrow groove.

Three eyes on either side of the head; two anterior of them lie somewhat obliquely touching each other, the third at a distance behind them. In one individual this position of ocelli on one side of the head was normal, on the other, however, all ocelli were arranged one after another in one longitudinal line.

Legs covered with many moderately long, ciliate setae; in addition they are provided on all joints dorsally and ventrally with some long bristles. Stout, straight bristles arranged ventrally in a double row on the tibiotarsi of all legs are smooth (observed using a magnification of 500 diameters). The trochanteral organ is composed of about 23 fine stiff spines arranged similarly to those in many species of *Entomobrya* ROND., namely along the arms of an angle: 7 spines on the ventral arm, 7 on the anterior one and about 9—10 in the area outside these arms. Unguis slender, with a pair of indistinct lateral teeth and three well-developed inner teeth. The teeth of the basal pair are situated at the same height, but the inner one is somewhat larger than the outer. Empodial appendage straight, lancetlike with a pretty broad lamella,

but without the outer tooth. Tibiotarsal tenent hair weak, not bent, finely pointed, somewhat shorter than the ventral lamella of the unguis.

Furcula well developed, somewhat shorter than antennae. Length ratio of manubrium to dens is as 4 : 6. Mucro bidentate with a long basal spine. The not crenulate terminal part of the dens is equal to the mucro in length.

Body length, measured together with the head, 2.3 mm.

Locality: Cha-Pa, sifted from a sample of soil, 12. IV. 1961, 3 specimens.

At first sight the new species seems similar to *Sinella straminea* DEN. from Japan and China in the number of ocelli, but differs from it in the shape of the empodial appendage, which in the last one is provided with an outer tooth.

The Mexican *Sinella sexoculata* SCHÖTT has a bidentate mucro, empodial appendage without an outer tooth and three ocelli on either side of the head, but their arrangement is different.

Homidia sauteri (BÖRN.) f. *sinensis* DENIS, 1929

Syn.: *Homidia nipponica* YOSH, 1942.

Plate XXXI, fig. 1

This is a species widely distributed over East Asia and described accurately by various authors.

In 1929 DENIS found that the specimens of this species examined by him from China (Fukien), differ from the Japanese ones described by BÖRNER (1909) in having one dark transverse band on the tergite of Thor. III and he called them *Homidia sauteri* f. *sinensis* DEN.

Some individuals, slightly differing in body colour were found in Japan (Kioto) by YOSH in 1942, who erected a new species *Homidia nipponica* for them. In 1956 YOSH synonymized, however, this form with *Homidia sauteri* f. *sinensis* DEN.

Besides the principal form, two other forms with a modified pattern, „var. *albospila*” BÖRN. and „var. *depicta*” BÖRN. appear in Japan. Among many specimens collected in various localities in North Vietnam I have not observed specimens with different patterns. All of them, not excepting young individuals, show the same pattern characteristic of f. *sinensis* DEN.

Locality: Cha-Pa, under tree-trunks, stones and in forest litter, XI. 1960—IV. 1961, in large numbers.

Homidia subcingula DENIS, 1948

Plate XXXI, figs. 2—7

Body covered dorsally with many finely ciliated brownish setae, longer and stouter at the posterior margin of each tergite. On the head and on the tergites it is, moreover, furnished with numerous long stiff „flexed” bristles

of the shape characteristic of the *Entomobryidae*. The arrangement of these stout bristles on the tergites of Abd. II—IV is shown in fig. 6. This arrangement is rather constant, but not always strictly the same.

Antennae always somewhat longer than half the length of the body measured together with the head, and 2.7—3 times longer than the diameter of the head. All antennal joints covered abundantly with setae of various length. Besides, Ant. I dorsally with some (about 10) flexed bristles somewhat shorter and finer than those on the head, and Ant. II dorsally with three stout bristles half the length of this joint. The sensory organ of the third antennal joint is composed of two strongly curved short rods, situated in a small oblique groove. Ant. IV with a pretty distinct inclination to annulation.

Legs of normal length clothed densely with setae and, besides, with some outstanding stiff long bristles on the dorsal and ventral sides of all joints. Trochanteral organ composed of about 40 stiff fine spines of various length grouped in a quadrangular area. Unguis slender with a short outer tooth, a pair of small lateral teeth and three inner ones. Fourth, subapical, tooth is wanting. Empodial appendage about $\frac{2}{3}$ of inner lamella of unguis, dagger-like, with a narrow lamella. Tibiotarsal tenent hair moderately stout, not turned, flattened apically as long as inner lamella of unguis.

Abd. IV about 4 times longer than Abd. III.

Furcula shorter than antennae, abundantly setaceous. Ratio of lengths, manubrium to dens, is as 7 : 8—9. Dens dorsointernally basally with a stout smooth bristle, and along the edge up to its half length with an irregular double row of 15—40 uncoloured spines. Mucro with a small, weakly curved apical tooth, a larger vertical anteapical one and a long basal spine.

The ground colour of animals is orange-yellow. Black-violet pigment forms a broad transverse band on the tergites of Abd. II and III, colours the rear part of the fourth abdominal tergite, and the lateral edge of Thor. II on both its sides. Antennae and legs grayish blue.

Length of adult animals, 2.5—3.2 mm.

Locality: Cha-Pa, under trunks and moss near house, also under stones and in litter in a small wood, during II—IV. 1961, a large number of young and adult specimens.

Homidia subcingula was described by DENIS in 1948 on the basis of animals from Dalat (Annam). The specimens from North Vietnam differ only in some insignificant body details.

Homidia socia DENIS, 1929

Plate XXXII, figs. 1—6

Body clothed dorsally with many moderately short fine ciliate, pretty dark brownish hairs, longer at the posterior margin of each tergite. On the head and the thoracic tergites there are numerous stiff flexed bristles, which are

for the most part obliquely truncated at the tip. On the abdominal tergites the number of such bristles becomes smaller. In the anterior part of Abd. IV they are arranged in a cross row composed of 16—20 bristles, and occur in pairs laterally on either side of this tergite. The arrangement of these large bristles on the body is shown in fig. 3. An examination of many specimens of the same population, however, showed that this arrangement of bristles is not always strictly identical, but it may be various. Trichobothria long, fine and smooth.

Antennae somewhat longer than half the body length, measured together with the head, and 3 times longer than the diameter of the head. All antennal joints are covered densely with many setae of various length and, in addition, on Ant. I some flexed bristles appear dorsally. They are shaped similarly to those on the head, but are shorter. Antennal organ of Ant. III composed of two small, strongly curved sensory rods situated in an oblique groove. Ant. IV with more or less distinct inclination to annulation, and at the tip with simple retractile sensory papilla.

Eight ocelli on either side of the head, two middle eyes of which are distinctly smaller than the remaining ocelli and have no corneae.

Legs of normal length covered with many ciliate setae and some stiff outstanding macrochaetae on the dorsal and ventral edges of all joints. Trochanteral organ composed of pretty long stiff fine spines forming a dense irregular group. Unguis slender, with one indistinct outer tooth, a pair of lateral teeth and very small inner ones. The subapical odd tooth is wanting. Empodial appendage lancet-like with pretty broad outer lamella. Tibiotarsal tenent hair relatively weak, not turned, flattened at the tip, as long as the inner lamella of the unguis.

Abd. IV 4.5 times longer than Abd. III.

Furcula somewhat shorter than antennae, abundantly setaceous. Dorsal internal edge of each dens provided proximally at one third of its length with a somewhat irregular row of about 10—12 spines. The spines are sharply pointed, uncoloured, the largest of them about as long as the mucro. The mucro with a small apical tooth, slightly curved upwards at the tip, a larger vertical ante-apical tooth, and a long basal spine.

The ground colour of animals is white. In most cases dark blue-black pigment forms an irregular narrow line running from anterior margin of Thor. II up to anterior margin of Abd. IV along the median line of the dorsum. A lateral band extending on either side of the body from the eye-patches usually up to the fourth abdominal tergite is darker and broader. Legs uncoloured. The last two antennal joints are grayish-blue. Sometimes, but rarely, the dark pigment is wanting, and the animals are entirely white, except the black eye-patches.

Length of animals examined was 2.2—2.8 mm.

Locality: Cha-Pa, under a stone near a wood, 6. IV. 1961, 1 specimen and under a tree-trunk near a house, 22. IV. 1961, 6 specimens.

Homidia socia was described shortly by DENIS (1929) from China (Fukien)

and by Yosii (1942) from Japan. The animals from Vietnam do not differ from those found in China and Japan, only that the specimens examined by DENIS had a very great number of dental spines, i. e., up to 30.

***Entomobrya lindbergi* STACH, 1960**

The only specimen of *Entomobrya lindbergi* found in the material collected in North Vietnam by Dr. A. BARTKE agrees with those described by me from Afghanistan.

Entomobrya lindbergi seems to be a species widely distributed over southern territories. So far it has been recorded from Egypt, Afghanistan and Vietnam.

***Willowsia platani* (NIC.) f. *nigromaculata* (LUBB.)**

Plate XXXIV, figs. 6—8

In the material from North Vietnam I have found only one specimen of this species, described accurately and figured by HANDSCHIN (1926) on the basis of European animals and by DENIS (1948) from specimens of South and Central Annam.

In pattern and some morphological body details this variety is similar to *Ptenura bimaculata* BÖRN. (1909) from Japan, differs, however in the shape of scales, which in the last species are „hellbraun, sehr schmal und spitz”.

Locality: Cha-Pa, under dead leaves, 15. IV. 1961, 1 specimen.

***Willowsia bartkei* sp. nov.**

Plate XXXV, figs. 1—6

Body somewhat dorso-ventrally compressed, covered densely with scales of various length and sparsely with setae. The scales are very abundant dorsally on the head and tergites. They are for the most part leaf-like, pointed, finely ciliated, pale brownish in colour, in length equal to the unguis or longer, reaching its double length. The longest scales are densely arranged along the posterior margin of the third abdominal tergite. The antennae, legs and furcula are not covered with scales. Sparse setae of various length, protrude above the layer of scales, the longest on the third and fourth abdominal tergites. Numerous, long stiff flexed bristles appear dorsally on the head and Thor. II. On the next tergites their number becomes smaller and on Abd. IV they are situated in 3—4 pairs laterally on either side of this tergite. The arrangement of these stout bristles on Thor. III — Abd. III is shown in fig. 2. Moreover, 1—2 remarkably long macrochaetae appear near to the posterior margin of

Abd. IV on either side laterally and fine ciliate, long trichobothria in normal numbers 2, 3, 2 on Abd. II—IV. Close to the basis of each trichobothrium are grouped some small modified accessory scales.

Antennae about half as long as the body measured together with the head, and about 2.4 times longer than the diameter of the head. Antennae covered densely with setae of various length. Antennal organ III composed of two small curved sensory rods, situated in a small oblique groove. Ant. IV at the tip with a small simple retractile sensory papilla.

Eight eyes on either side of the head; two middle eyes are distinctly smaller than the remaining and without corneae.

Four frontal labral papillae are very small and provided with a minute setula each.

Legs of normal length clothed densely with ciliate setae and some long outstanding bristles dorsally and ventrally on all joints. On the ventral surface of the tibiotarsus there are stout bristles, pretty thick at the base and abundantly setaceous. Trochanteral organ composed of about 30 fine, stiff spines of various lengths grouped densely together in a trapezium-like area. Unguis slender, provided with a pair of small lateral and three inner teeth. Empodial appendage lancet-like. Tibiotarsal tenent hair moderately stout, unturned, flattened at the tip, and as long as the ventral lamella of the unguis.

Abd. IV about 3.4—4 times longer than Abd. III.

Furcula somewhat shorter than antennae. Manubrium and dentes abundantly setaceous. The setae are long, fine, distinctly ciliate. They are remarkably long terminally on the manubrium and proximally on the inner margins of the dentes. Mucro bidentate with both teeth equally large and a moderately long basal spine.

Ground colour of animals white. Dark blue-black pigment colours the anterior margin and lateral edges of Thor. II, a small part of the lateral edges of Thor. III, the posterior margin of Abd. III and forms a wide quadrangular patch on the posterior part of Abd. IV and a pair of patches laterally on Abd. V. The head with a cross blue-black irregular patch in front of the eye-patches. Antennae grayish-blue, darker terminally. Legs with weakly pigmented femores and medial parts of tibiotarsi.

Length of the largest animal examined was 2.3 mm.

Locality: Cha-Pa, under stones and in moss, also under loose bark of trees and in litter in a forest, III. 1961, many young and adult animals.

In many body details the new species comes near to *Willowsia jacobsoni* (BÖRNER) and *Willowsia japonica* (FOLSOM) from Japan. As far as its pattern is concerned it differs from the first in the darkly coloured posterior part of Abd. I and the entirely black-blue second abdominal tergite and from the second in uncoloured Thor. III and the black-blue posterior part of Abd. I, as well as in the different shape of scales, which in *Willowsia japonica* (FOLS.) are narrow, sharply pointed at both ends, and in the arrangement of stout bristles on the tergites, as figured by YOSHI in 1956.

Willowsia pseudosocia sp. nov.

Plate XXXIV, figs. 1—5

Body covered dorsally very densely with brownish finely ciliated scales of various size but similar shape, sharply pointed at the tip, moderately widened in the middle, and narrowing basally to the minute tail. The largest scales, equal to the unguis in length, are arranged at the posterior margins of the abdominal tergites, the smallest appear in the proximity of the trichobothria. Legs and furcula are without scales. Sparsely fine straight short smooth hairs protrude amid the group of scales. Numerous long stiff flexed bristles are situated dorsally on the head, Thor. II and III. On the next tergites they appear in a small number. The arrangement of the stout bristles on the tergites is shown in fig. 2. It differs from that in *Willowsia bartkei* STACH and *Willowsia platani* (NIC.) f. *nigromaculata* LUBB. given by YOSH (1956). Abd. II—IV with fine smooth trichobothria normal in number and arrangement.

Antennae were damaged in both specimens examined, and only two basal joints are preserved, the length of which is equal to the diameter of the head. The antennae were thus probably shorter than half the length of the body and about 2—2.5 times longer than the diameter of the head. The preserved joints are covered densely with many indistinctly ciliated setae of various length and, moreover, they are provided with a row of small brownish scales along the ventral edge.

Eight ocelli on either side of the head, two anterior of which are the largest and two middle ocelli distinctly smaller than the remained ones. The corneae of all the ocelli are, however, distinctly marked on the integument.

Legs of normal length, clothed densely with ciliate setae and furnished with some long, outstanding bristles dorsally and ventrally on all joints. The stout bristles arranged in a double row along the ventral edge of the tibiotarsus are rather long, straight, but very indistinctly ciliated. The trochanteral organ is composed of about 50 stiff spines of various length, grouped densely to form triangle. Unguis slender, provided with a small outer tooth near its basis, a pair of small lateral teeth, somewhat higher as well as some small inner ones. The subapical odd inner tooth is very minute and indistinct. Empodial appendage slender with short outer and inner lamellae. Tibiotarsal tenent hair moderately stout, unturned, flattened at the tip, longer than the unguis.

Ventral tube covered anteriorly with fine, rather long hairs and above the vesicles with 3—3 stout, long, ciliate macrochaetae, posteriorly only with long hairs.

Abd. IV about 4—5 times longer than Abd. III.

Furcula long. Manubrium only somewhat shorter than dens (about 7 : 8), densely setaceous. Dens dorsally with many notches, which end just at the base of the mucro, and with remarkably long fine hairs along the inner edge. Mucro bidentate and with distinct basal spine, about 3 times shorter than the empodial appendage.

Ground colour of animals white. Dark blue-black pigment appears only in an irregular longitudinal band behind each eye-patch and runs farther along the lateral corners of Thor. II — Abd. I. A pair of small patches appears also laterally on Abd. V. Legs, furcula and both the antennal joints preserved are uncoloured.

Length of animals measured together with the head is 2.6—3 mm.

Locality: Cha-Pa, under a piece of bark lying on the ground, 20. IV. 1961, 2 female specimens.

The new species is at first sight very similar in its colour pattern to *Homidia socia* DEN., but differs distinctly in its morphological characteristics such as the body covered with scales and the spineless dentes.

Lepidocyrtus cfr. *lanuginosus* (GMELIN, 1786)

In many body characteristics similar to widely distributed *Lepidocyrtus lanuginosus* (GMELIN).

Small body size, Thor. II not prolonged towards the head, antennae short, about 4 times shorter than the body and 1.35 times longer than the diameter of the head, not covered with scales; eight ocelli on either side of the head, legs of normal length, tibiotarsi without scales, empodial appendage narrow lancet-like, manubrium ventrally scaled, dentes without dental lobes at base, mucro bidentate with a basal spine, trichobothria on Abd. IV behind the mid-length of tergite, body uncoloured except eye-patches, length 1.3 mm.

Locality: Cha-Pa, under a stone, I. 1961, 2 specimens.

Tomocerus ocreatus DENIS, 1948

Plate XXVIII, fig. 1

Specimens of this species from North Vietnam agree in essential body characters with those examined by me from China (Hangchow).

Body covered densely with many dark brown scales and sparsely with simple setae of various length. Denuded of scales it is brownish, not coloured blue laterally on the tergites.

Antennae distinctly violet, mostly as long as the body measured together with the head.

Unguis slender, provided basally with a pair of moderately long pseudonychium-like lateral teeth, and on inner lamella, with sharply pointed distinct basal spine and 3—4 very minute indistinctly visible teeth. Empodial appendage untoothed, about $\frac{2}{3}$ as long as the inner lamella of the unguis. Tibiotarsal tenent hair strong, longer than the ventral lamella of the unguis.

Manubrium with many setae and, dorsally, with two pairs of stout vertical bristles longer than the whole unguis. Dentes basally without a pair of scales characteristic of the *Pogonognathellus*-group. Dorsally, in front of the spines each

dens is provided with one long stout vertical bristle similar to those on the manubrium, and farther with a longitudinal row of 4, rarely 3, nearly equally long, large spines. On the distal subsegment of the dens are arranged in a row 5 small tridentate spines and two large simple among the last ones appears a very small accessory spine. All the spines are covered with many minute brown scale-like serrations in their basal half. Mucro on average 4.5 times shorter than the dens, densely setaceous, provided, dorsally at the base, with a pair of strong, differently shaped spines, apically with two large teeth and intermediate with 7—9 small ones.

Body length of the largest specimen measured together with the head was 5—6 mm.

Locality: Cha-Pa, under stones and tree-trunks, IV. 1961, 14 specimens.

Tomocerus ocreatus described by DENIS in 1948 from Indochina is probably widely distributed in East Asia, recorded from Annam, China and identified as *Tomocerus minor* (LUBB.) from Japan.

***Salina vietnamensis* sp. nov.**

Plate XXXVI, figs. 1—8

Body covered densely with many finely, indistinctly ciliated, rather long hairs and on the tergites with some larger bristles the arrangement of which is shown in fig. 2. Tergites of Abd. II—IV with fine trichobothria.

Antennae longer than the body measured together with the head, and 5.5 times longer than the diameter of the head. Length ratio of Ant. I to head is as 7 : 4. The antennae in the specimen examined are well preserved, but composed only of three joints. Ant. I is distinctly enlarged of base and Ant. IV exhibits a slight inclination to annulation.

Eight eyes on either side of the head, subequal, arranged in two parallel longitudinal rows.

Legs relatively long, covered densely with rather long setae and furnished at dorsal and ventral edges of all joints with some long outstanding macrochaetae. Unguis armed basally with a short outer tooth, a pair of small lateral teeth, and three inner ones. Empodial appendage, $\frac{2}{3}$ as long as the unguis, relatively broad, provided with a small inner tooth and obliquely truncated. Tibiotarsal tenent hair situated subdorsally on the inner side of the tarsal joint, strong, turned, flattened at the end, and longer than the unguis.

Fourth abdominal tergite remarkably long; measured along the midline of body, about 25 times longer than the third one.

Furcula about half the length of the body measured together with the head. Length ratio of manubrium : dens : mucro is as 10 : 12 : 0.6. Mucro somewhat shorter than the unguis, broad, terminally with three teeth and a well developed dorsal dental swelling close to basis.

Ground colour yellowish. Black-blue pigment forms an irregular, interrupted band laterally on either side of the body, and it extends from the base of each

antennal base up to the posterior margin of the fourth abdominal tergite. A similar, but irregular, longitudinal band, consisting of patches and dashes runs on either side of the body dorso-laterally from the head up to Abd. V. Antennae dark blue on the first and second joints ventrally, the third joint entirely blue. The legs except the coxae are also blue.

Length measured together with the head, 3.8 mm.

Locality: Cha-Pa, under a tree trunk, 7. IV. 1961, 1 specimen.

New species, agrees in pattern with *Salina striata* (HANDSCHIN, 1928) from India.

***Callyntrura lineata* (PARONA, 1892)**

Syn.: *Entomobrya lineata* PARONA, 1892;

Paronella lineata SCHÖTT, 1903;

Paronella japonica KINOSHITO, 1917;

Microphysa lineata HANDSCHIN, 1925;

Callyntrura lineata YOSHII, 1961.

Plate XXXVII, figs. 1—6

The animals found in the material from Vietnam are very similar to those from Java and Sumatra identified by HANDSCHIN in 1925 as *Microphysa lineata* (PAR.). Judging from the figures given by HANDSCHIN the specimens from Vietnam differ only in insignificant body details as well as in pattern. The pattern is, however, in the members of the *Callyntrura*-group often very variable, even in individuals caught in the same locality. Besides, of the two specimens examined by me from Vietnam, one (female) figured in the plate, has the areas lying in front of the posterior margins of Thor. II — Abd. III uncoloured, the second (male), has all these areas pigmented dark blue-black and the anterior parts of the tergites pale yellow. In both, however, at the mid-length of the fourth abdominal tergite there are an irregular dark blue-black transverse band and about ten pale bluish-gray longitudinal stripes running parallel from the anterior margin of this tergite up to the median transverse band, similar to those in *Callyntrura florensis* (OUDEM.) or *Callyntrura sumatrana* (OUDEM.).

Also some other body characters such as the length of antennae, the arrangement of ocelli, the shape of unguis and mucro, are similar to those in HANDSCHIN'S Malaian specimens of *Callyntrura lineata* (PAR.).

The specimens from Vietnam show some differences in the unguis with its distinct outer and lateral teeth, in fine serration at the outer lamella of the empodial appendage of the forelegs and the bladder-like swelling ventrally on the tibiotarsus below the empodial appendage of this leg. The lateral setae at the base of the mucro on the dens are unciliated, usually with their surface rough.

The shape of the ventral tube provided terminally at the base of the sacs with a pair accessory appendage is distinctly different.

The body characteristic not mentioned by HANDSCHIN is the shape of the

trochanteral organ, which is composed of about 60 stiff, pretty long spines, grouped densely in a quadrangular area. The arrangement of large setae on the tergites is shown in fig. 2.

Body length of animals examined was 4 mm.

Locality: Cha-Pa, under a stone, 6. IV. 1961, 1 ♀; near Station, under a tree-trunk lying on the ground, 10. IV. 1961, 1 ♂ and 27. IV. 1 ♀.

If the identity of the specimens described by HANDSCHIN (1925) as *Callyntrura lineata* (PARONA) is doubtless, so is this species very widely distributed in East Asia, being recorded from Burma, known from Java and Sumatra as well as from Japan.

***Sminthurinus trinotatus* (AXELS.) f. *incompleta* f. n.**

Plate XXIX, fig. 5

This species with a very characteristic pattern, a pair of large rounded light patches placed dorso-laterally on the bluish-black abdomen, appears also in the fauna of North Vietnam. In Vietnamese specimens the greater part of the body is uncoloured and the light rounded patches are surrounded by a black line on their circumference. In other body details, such as the shape of the unguis and the mucro distinctly serrated on both lamellae, the specimens of Vietnam agree with those recorded from Europe.

In Europe (Finland, England, Poland) as well as in Japan *Sminthurinus trinotatus* (AXELS.) was found only in human dwellings and in greenhouses on flowerpots.

Locality: Cha-Pa, in rotten wood and under pieces of wood lying on the ground. II. 1961, a few specimens.

The specimens of the variety *incompleta* are identical in colour pattern with the specimens of Afghanistan, identified by YOSII (1963) as *Sminthurinus aureus* (LUBB.) f. *ornata* KRAUSE., but in *Sminthurinus aureus* the mucro is denticulated only on one, inner, lamella.

***Sminthurinus suborientalis* sp. nov.**

Plate XXIX, figs. 6—9

Body globular, fifth abdominal segment delimited distinctly, especially so in males, from the fourth and from Abd. VI. Skin finely granulated, clothed very sparsely with curved smooth short fine hairs, somewhat longer in males. Only common short fine setae occur also on the head in both sexes.

Antennae about 1.4 times longer than the diameter of the head. Third joint in basal part with a very distinct papilla subdivided into four parts, and in its terminal part with a sensory organ consisting of two short sensillae. Fourth joint about 1.3 times longer than the third one, without a trace of

inclination to annulation, and at the tip with a distinct small sensory papilla protected by some short straight hairs.

Eight ocelli on either side of the head.

Unguis, $\frac{3}{4}$ of the mucro in length, furnished with a minute indistinct inner tooth. Empodial appendage of all legs similarly shaped, slender, provided basally with a rounded inner lamella. On the forelegs the empodial appendage has a subapical needle reaching up about to the tip of the unguis, on the second and third pairs of legs this needle is very short or absent. Tenent hairs four on each leg, fine, weakly clavate, about half the length of the unguis and at a short distance behind them, dorsally one accessory clavate hair, somewhat longer than the other four tenent hairs.

Furcula well developed. Dens 2·3—2·5 times longer than mucro, furnished with setae, as shown in fig. 6; ventrally in apical whorl of setae five ones, somewhat higher one pair and near the basis of dens one odd seta. Mucro straight, narrowing gradually towards the end, with a smooth outer lamella and a very finely, densely serrated inner one. Mucronal seta absent.

Anal valves furnished with long, basally not wing-like broadened bristles. Subanal appendages strongly curved and branched terminally.

Ground colour of the body yellow, but black-brown pigment covers uniformly densely the whole dorsum, the lateral parts of the body, and the coxal parts of the legs. The head posteriorly, behind the eye-patches, brownish in colour. Antennae, terminal parts of legs, furcula, and ventral side of the body yellowish.

Length of females about 1 mm, that of males 0·7 mm.

Locality: Cha-Pa, under pieces of wood lying on the ground 1960—1961, a few specimens.

The new species comes near to *Sminthurinus orientalis* STACH, 1964 from China (Hangchow), differs, however, in the shape of empodial appendage, number of tibiotarsal tenent hairs and colour of body.

Bourletiella hortensis (FITCH, 1863)

This very widely distributed, probably cosmopolite species appears also in the fauna of North Vietnam. The specimen found in the material from Cha-Pa agrees entirely in its body characteristics with the European ones and those from Japan described by FOLSOM in 1899. Its body-colour is dark bluish-gray.

Ptenothrix vittata (FOLSOM, 1896)

Plate XXIX, fig. 10

The only specimen of this species found in the material from Vietnam agrees well with the Japanese specimens described and figured exactly by YOSH & CHANG-EAN in 1963.

Antennae with six annulations in terminal part of third joint, apically knobby. Unguis slender, without tunica. Modified seta on tibiotarsus of hind leg distinctly irregularly, sparsely ciliated. Equal as in Japanese specimens the number and arrangement of macrochaetae, and ciliated setae on ano-genital segment. Similar, densely serrated mucro. The body colouration of this species is also very characteristic: two black parallel cross bands on the head, three irregular net-like blackish-blue patches laterally on the trunk, and the tibiotarsus of each leg with four dark rings.

There is only a slight difference in the chaetotaxy of the posterior part of the dorsum in front of the ano-genital segment. In the specimen examined the integument is here distinctly notched over a small area. The notches are caused by minute tubercles arranged in parallel longitudinal rows, and each tubercle is armed with a sharply pointed minute spine at the tip.

Length of female specimen examined about 2 mm.

Locality: Cha-Pa, under a piece of wood lying on the ground, XI. 1960, 1 specimen.

Ptenothrix vittata (FOLS.) seems to be a widely distributed species recorded by FOLSOM (1896), as *Ptenothrix fasciata*, from western Australia (Perth) and by YOSHII (1963) from Japan (Osaka). So far all specimens of this species have been found only in greenhouses.

***Papirioides aequituberculata* sp. nov.**

Plate XXXVIII, figs. 1—7

Clothed with mostly stiff, more or less long, spine-like setae differently shaped, in various parts of body. On the head the short spinous setae are situated sparsely on the vertex and on the high conical elevation protruding on the inner side of each eye-group. On the facial part of the head some moderately long, stout, weakly curved setae are arranged in a longitudinal row showing the patterns 1, 1, 2, 2, 1, 1, 1. Dorsum along the midline furnished with three pairs of long, stout setae. A long fine smooth trichobothrium directed towards the head is situated on a small papilla behind the first pair of the setae. Two other long trichobothria appear laterally on either side of the abdominal part. Behind the third pair of the dorsal setae a relatively large high wart-like rounded tubercle protrudes vertically; its diameter is somewhat longer than the mucro (3 : 2.6), its height equal to the whole unguis, and its surface provided with about 20 short spines.

Antennae about twice as long as diameter of the head. The lengths of antennal joints are as 1.8 : 8 : 9 : 3. Third joint in basal half with somewhat irregular knotty edges, furnished with very fine short sensillae, in terminal half with six distinct annulations but not subdivided into secondary joints, and its apical part with four tubercles provided with a fine stiff sensory rod

each. The sensory organ of the third joint consists of two parallel slender sensory rods situated in a shallow deepening. Fourth cone-like antennal joint annulated, furnished with 7 whorls of outstanding setae.

Eight ocelli on either side of the head, the central of which is somewhat smaller than the remaining ones, and one short spinous seta situated near this ocellus.

Unguis slender, equally well armed on all legs with two well-developed inner teeth and very indistinct other ones. Empodial appendage also almost identical in shape on all legs, with small, basally semicircular inner lamella armed with a distinct spine and a long subapical, sharply pointed filament extending beyond the unguis. Tenent hairs absent. On the ventral and dorsal side of the legs are stout, sharply pointed, smooth bristles, among which there is one small knot with a fine setula on the outer edge of the tibiotarsi. The modified seta on the ventral side of the tibiotarsus of the third pair of legs is provided laterally with short chisel-like cilia.

Furcula well developed. Dens about 3 times longer than mucro. On the outer edge it is furnished with 10 bristles. Five of them situated terminally, are strongly serrated at their bases and long. The lengths of these bristles, beginning from that inserted close to the mucro are as: 1 : 2.8 : 4 : 3.8 : 4. The number and arrangement of setae is similar on the inner edge of the dens. Dorsally along the mid-line of the dens there are four smooth, vertical bristles longer than the mucro. Ventrally, near to the base of the mucro are arranged smooth bristles: 3 or (2), 2 or (1), 1, 1, and moreover, one short seta at a distance from the base of the dens. Mucro narrow, straight, trough-like, densely serrated on both edges.

The chaetotaxy of the ano-genital segment generally shows a pattern characteristic of all the members of the family *Dycyrtomidae* BÖRN., as it has been figured lately by YOSII (1963). The new species comes near to *Papirioides jacobsoni* FOLS., *Ptenothrix ciliata* STACH, 1957 or *Ptenothrix mongolica* YOSII in having one robust, cylindrical macrochaetae, pointed at the tip and situated medially on the suture of the upper anal valve, and each laterally a pair of similar macrochaetae (YOSII'S G and H), but differs in smooth anal bristles.

Penis apically covered abundantly with short setae.

Colour of body pale brownish. Dark brownish-violet pigment forms an irregular broad net laterally on the head and on the sides of the body. The dorsal part of the trunk remains uncoloured or only weakly irregularly spotted, in males distinctly white. Antennae and legs with broad black-blue rings, as shown in figures 1—3.

Length of adult females 2.3 mm, that of males 1.5 mm.

Locality: Cha-Pa, under a tree-trunk, lying on the ground near the station, 1960—1961, a few specimens.

I have referred the new species to the genus *Papirioides* FOLSOM basing on the existence of a distinct tubercle of various length on the dorsum in this genus. It embraces also *Ptenothrix dubia* FOLS. from Hawaii and *Ptenothrix*

mirabilis DEN. from China (Fukien), of which the last-named shows distinct secondary dimorphism, namely the absence of the dorsal tubercle in females.

Holotypes of all the new species described in this paper are preserved in the Institute of Systematic Zoology, Polish Academy of Sciences, Kraków, Poland.

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STRESZCZENIE

Autor opisuje skoczogonki (*Collembola*) zebrane w północnym Wietnamie przez dra A. BATKEGO. Wśród 30 gatunków znalazło się w tym zbiorze 10 nowych dla nauki i 20 dla fauny tego kraju. W skład fauny *Collembola* tego obszaru wchodzi oprócz gatunków subtropikalnych indomalajskich, sięgających w swym rozsieleniu do Japonii, pewna ilość gatunków kosmopolitycznych oraz znanych z Palearktyki (Europy). Przeniesione one zostały na te obszary, tak różne pod względem klimatycznym, przeważnie w drodze wymiany roślin uprawnych. U niektórych z tych gatunków wyłoniły się pewne zmiany w rozmaitych cechach ich ciała, nie tak jednak znaczne, by pozwalały na uznanie tych nieco zmienionych form na nowe gatunki.

РЕЗЮМЕ

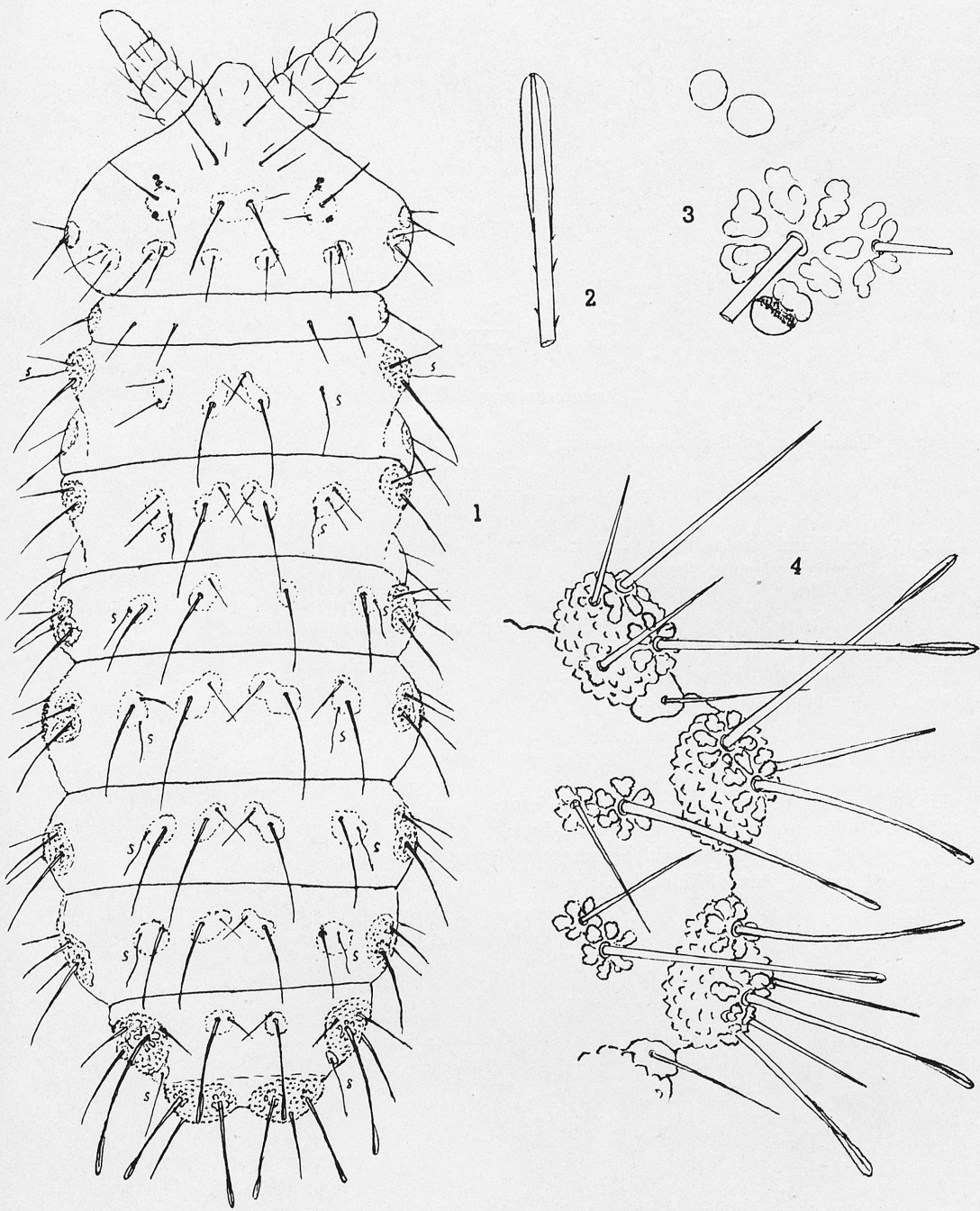
Автор дает описание ногохвостиков *Collembola*, собранных в Северном Вьетнаме доктором А. БАРТКЕ. Среди 30 видов нашлось в этой коллекции 10 совсем неизвестных науке и 20 новых для фауны этой страны. В состав фауны *Collembola* этого района входит, кроме субтропических индомалайских видов, расселенных по Японию, также некоторое число космополитических и таких, которые известны из палеарктики (Европы). В данный район, своим климатом так резко отличающийся от тех стран, они были перенесены главным образом благодаря обмену культурных растений. У некоторых из тех видов появились определенные изменения различных признаков их тела, но они не так резкие, чтобы эти несколько перименные формы считать новыми видами.

PLATES

Plate XXVII

Lobella perfusionides sp. nov.

- Fig. 1. Dorsal view of animal;
Fig. 2. Terminal part of a flattened macrochaetae ($\times 800$ approx.);
Fig. 3. Ocular tubercle and ocelli;
Fig. 4. A part of fifth and fourth abdominal tergites.



del. Stach

Plate XXVIII

Tomocerus ocreatus DEN.

Fig. 1. Basal part of dens with spines.

Proisoloma muscicola sp. nov.

Fig. 2. Ocelli and postantennal organ;

Fig. 3. Terminal part of furcula.

Folsomia diplophthalma (AXELS.)

Fig. 4. Postantennal organ and ocellus;

Fig. 5. Terminal part of furcula.

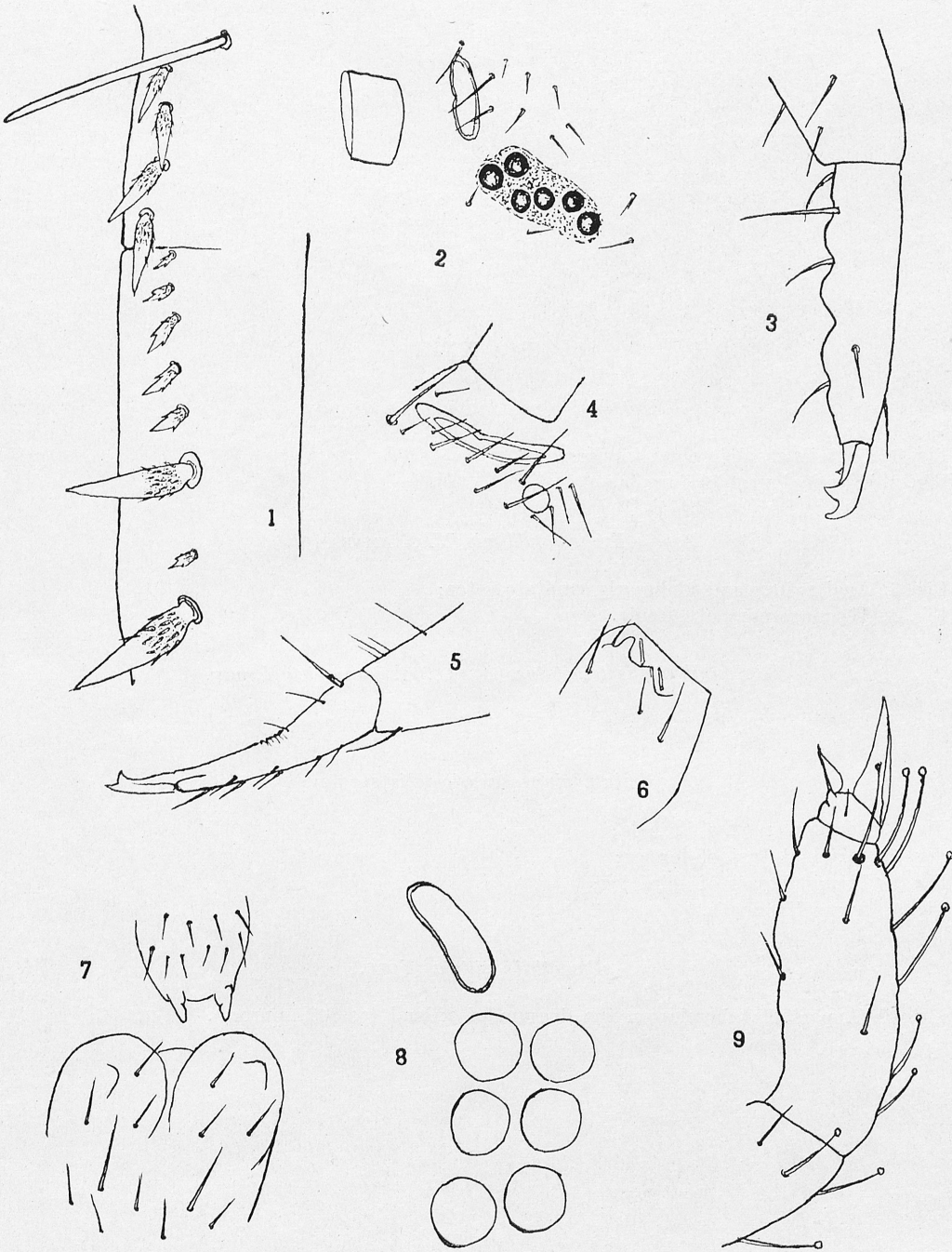
Coloburella manubrialis sp. nov.

Fig. 6. Sensory organ of third antennal joint;

Fig. 7. Rudimentary furcula and tenaculum;

Fig. 8. Ocelli and postantennal organ ($\times 800$ approx.);

Fig. 9. Terminal part of third leg.



del. Stach

Plate XXIX

Isotomodes pseudoproductus sp. nov.

Fig. 1. Last three abdominal tergites;

Fig. 2. Terminal part of furcula.

Friesea sublimis MACNAMARA

Fig. 3. Anal spines and globularly capitate setae;

Fig. 4. Terminal part of furcula.

Sminthurinus trinotatus (AXELS.) f. *incompleta* f. nov.

Fig. 5. Lateral view of animal.

Sminthurinus suborientalis sp. nov.

Fig. 6. Terminal part of furcula;

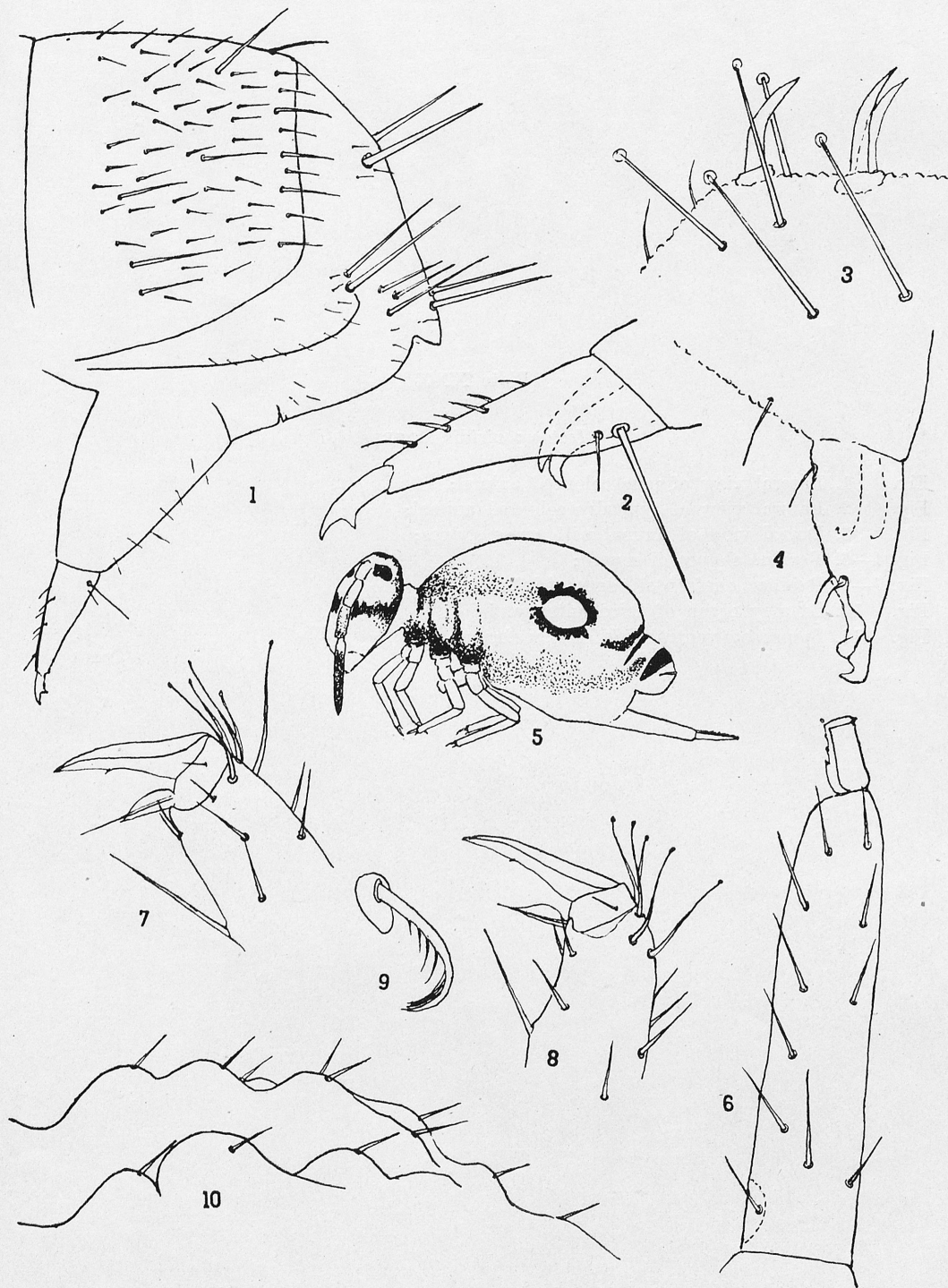
Fig. 7. Terminal part of foreleg;

Fig. 8. Terminal part of third leg;

Fig. 9. Appendix analis.

Ptenothrix vittata (FOLS.)

Fig. 10. A part of tubercles on the dorsum of animal ($\times 800$ approx.).



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Plate XXX

Isotoma viridis BOURL.

- Fig. 1. Lateral view of pale coloured animal;
- Fig. 2. Lateral view of typically coloured animal;
- Fig. 3. Dorsal view of animal with cross stripes;
- Fig. 4—6. Various shapes of mucro;
- Fig. 7—9. Papillae on frontal edges of labrum;
- Fig. 10. Sensory organ of third antennal joint;
- Fig. 11. Spines on ventral side of manubrium.

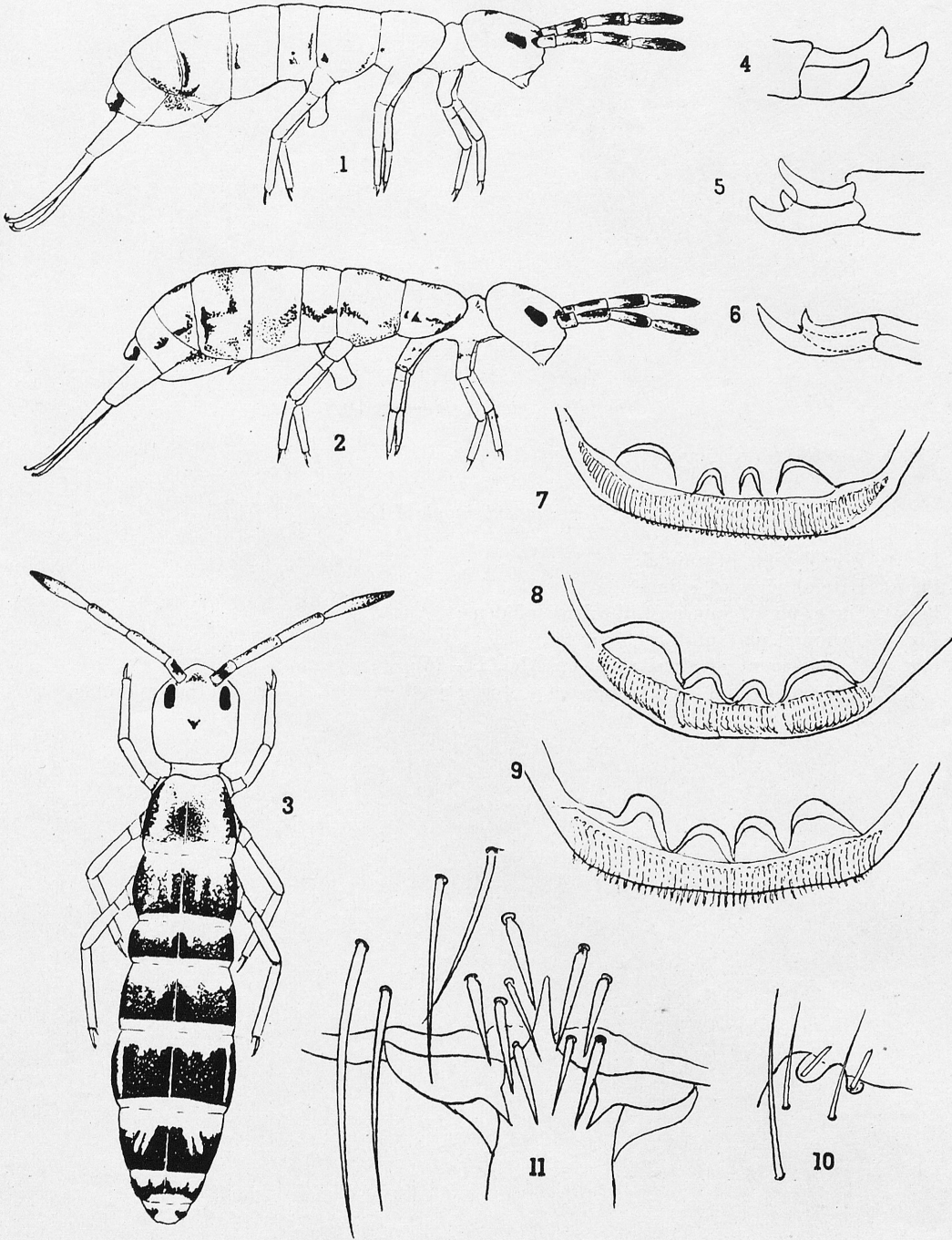


Plate XXXI

Homidia sauteri f. *sinensis* DEN.

Fig. 1. Lateral view of animal;

Homidia subcingula DEN.

Fig. 2. Dorsal view of animal;

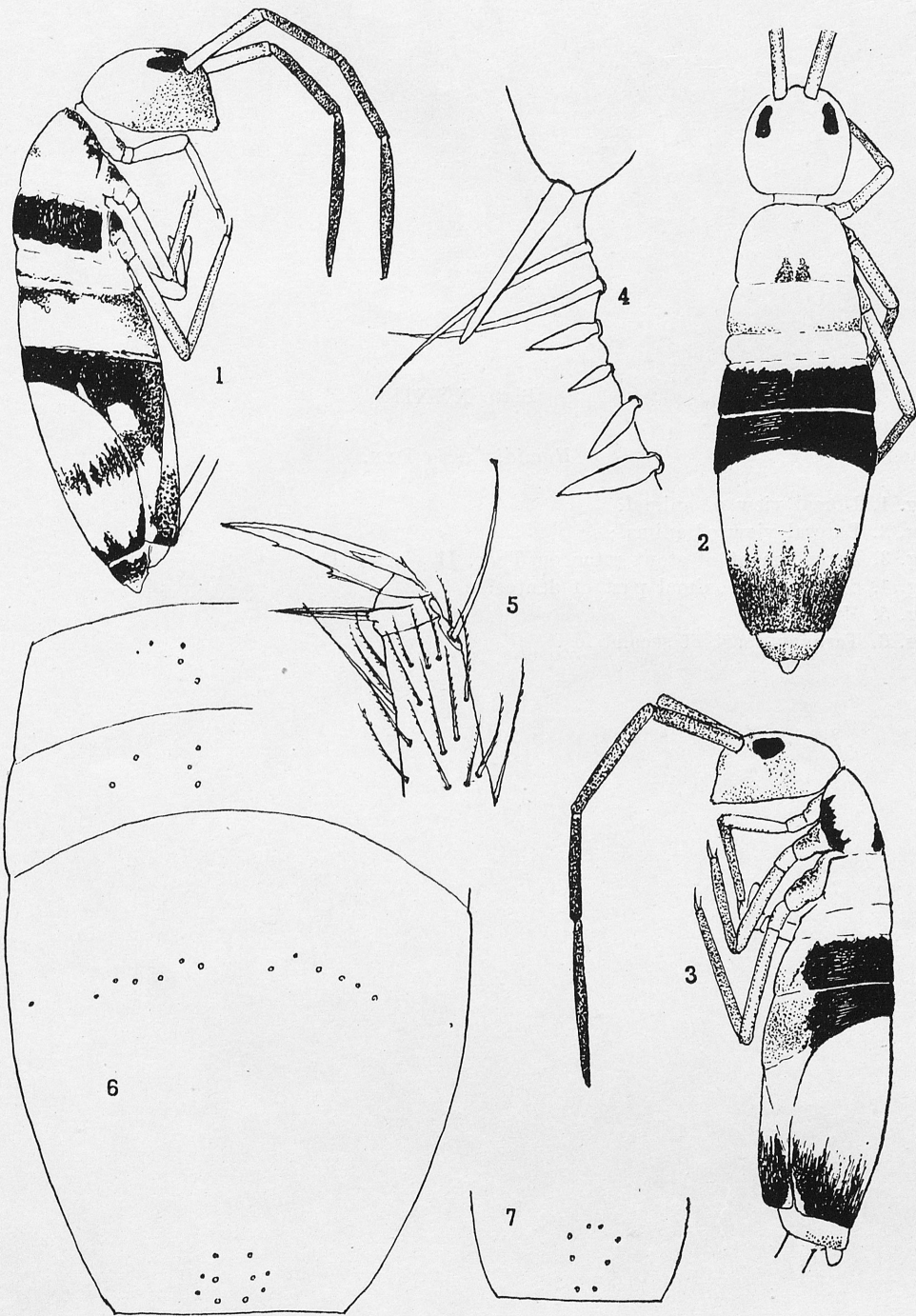
Fig. 3. Lateral view of animal;

Fig. 4. Some dental spines at the base of dens;

Fig. 5. Terminal part of third leg;

Fig. 6. Arrangement of stout setae on Abd. II—IV;

Fig. 7. Arrangement of stout setae on posterior part of Abd. IV in another specimen.

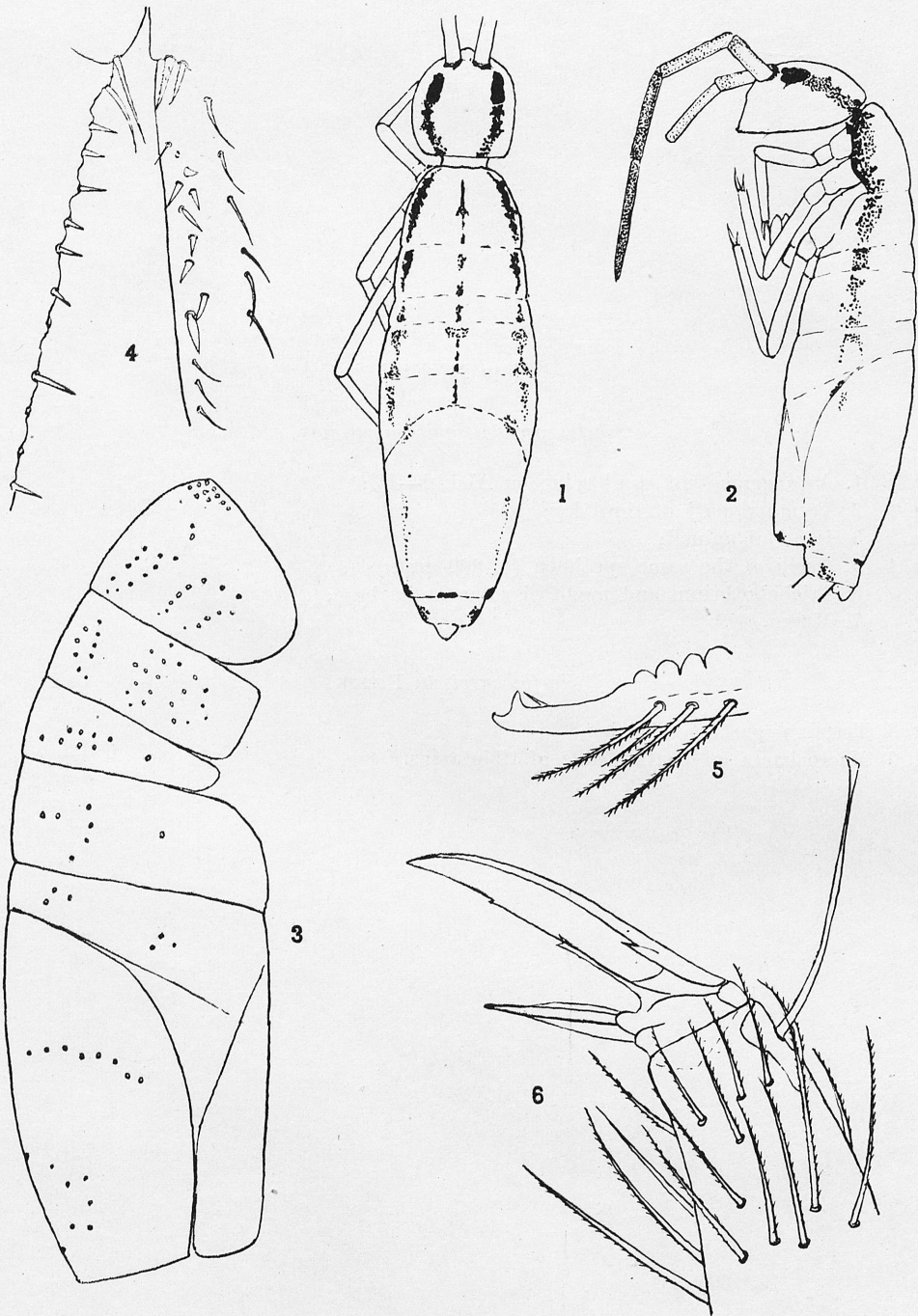


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Plate XXXII

Homidia socia DEN.

- Fig. 1. Dorsal view of animal;
- Fig. 2. Lateral view of animal;
- Fig. 3. Arrangement of stout setae on Thor. II — Abd. IV;
- Fig. 4. Spines on proximal part of dentes;
- Fig. 5. Muero;
- Fig. 6. Terminal part of second leg.



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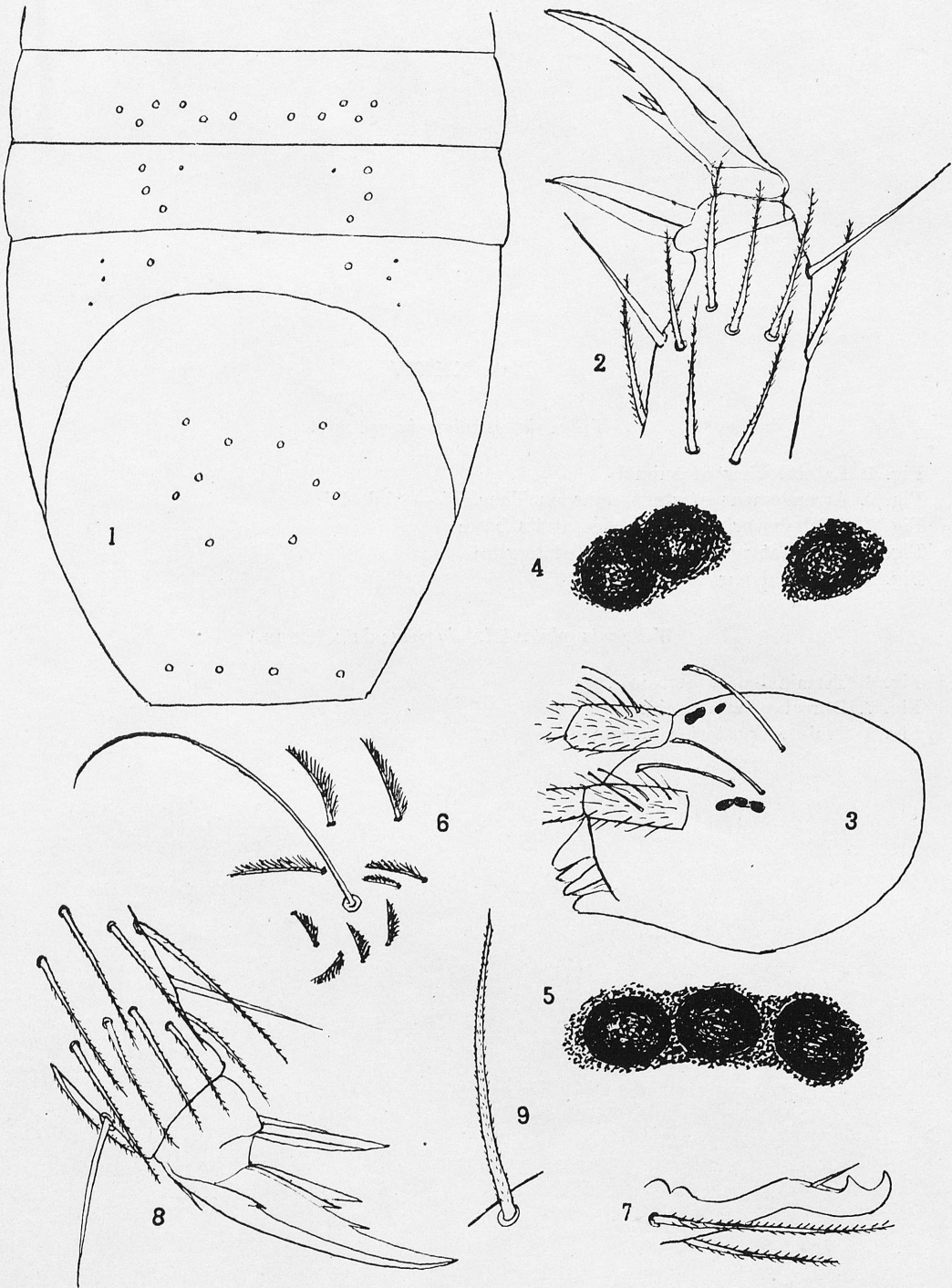
Plate XXXIII

Sinella pseudostraminea sp. nov.

- Fig. 1. Arrangement of stout setae on Abd. I—IV;
- Fig. 2. Terminal part of third leg;
- Fig. 3. Head of animal;
- Fig. 4—5. Ocelli of the same specimen ($\times 800$ approx.);
- Fig. 6. Trichobothrium and modified setae at its base;
- Fig. 7. Mucro.

Sinella curviseta BROOK

- Fig. 8. Terminal part of third leg;
- Fig. 9. Macrochaeta on ventral edge of tibiotarsus.



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Plate XXXIV

Willowsia pseudosocia sp. nov.

- Fig. 1. Lateral view of animal;
- Fig. 2. Arrangement of stout setae on Thor. II — Abd. IV;
- Fig. 3. Trichobothrium and scales at its base;
- Fig. 4. Scales at posterior margin of tergite;
- Fig. 5. Terminal part of third leg.

Willowsia platani f. *nigromaculata* (LUBB.)

- Fig. 6. Terminal part of third leg;
- Fig. 7. Dorsal view of animal;
- Fig. 8. Scale at posterior margin of tergite.

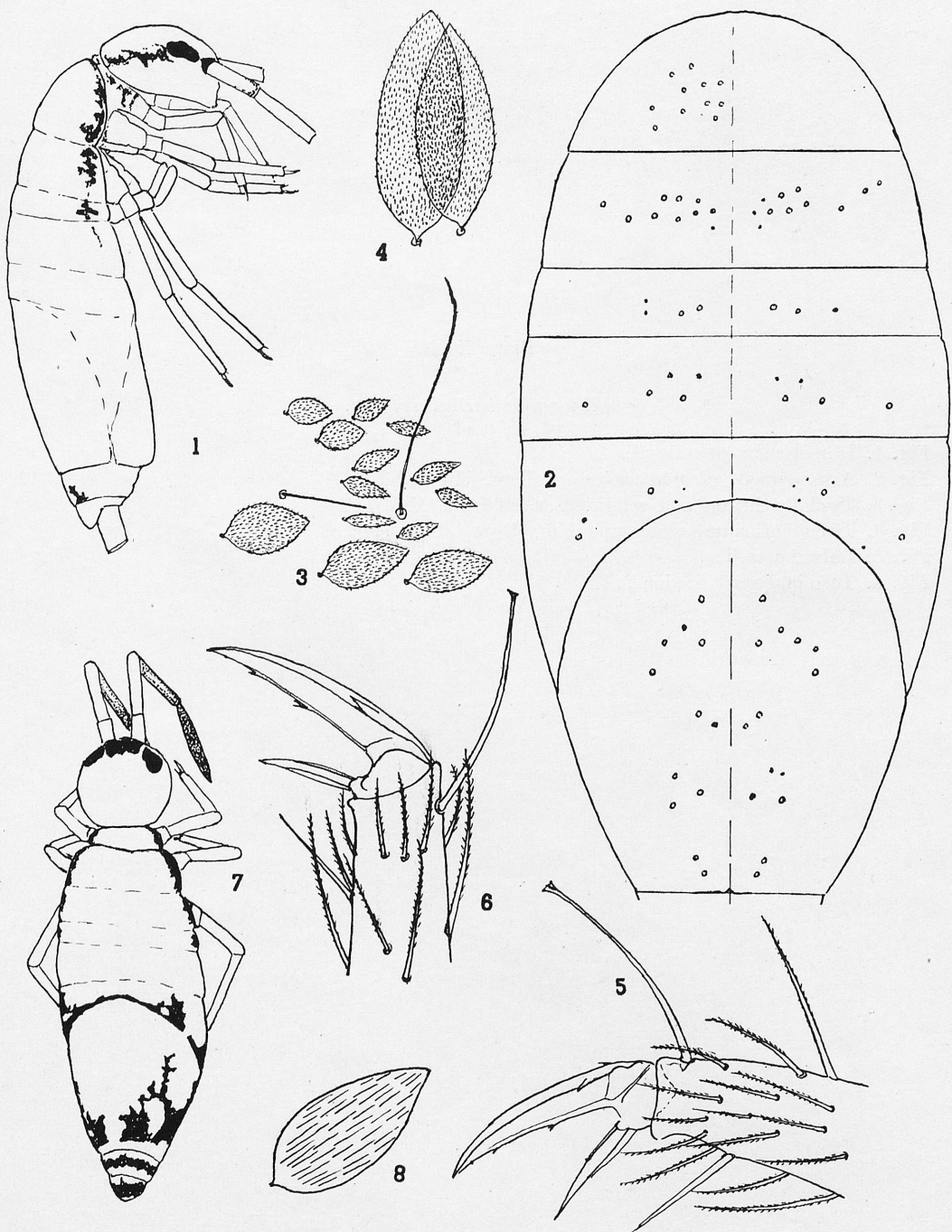
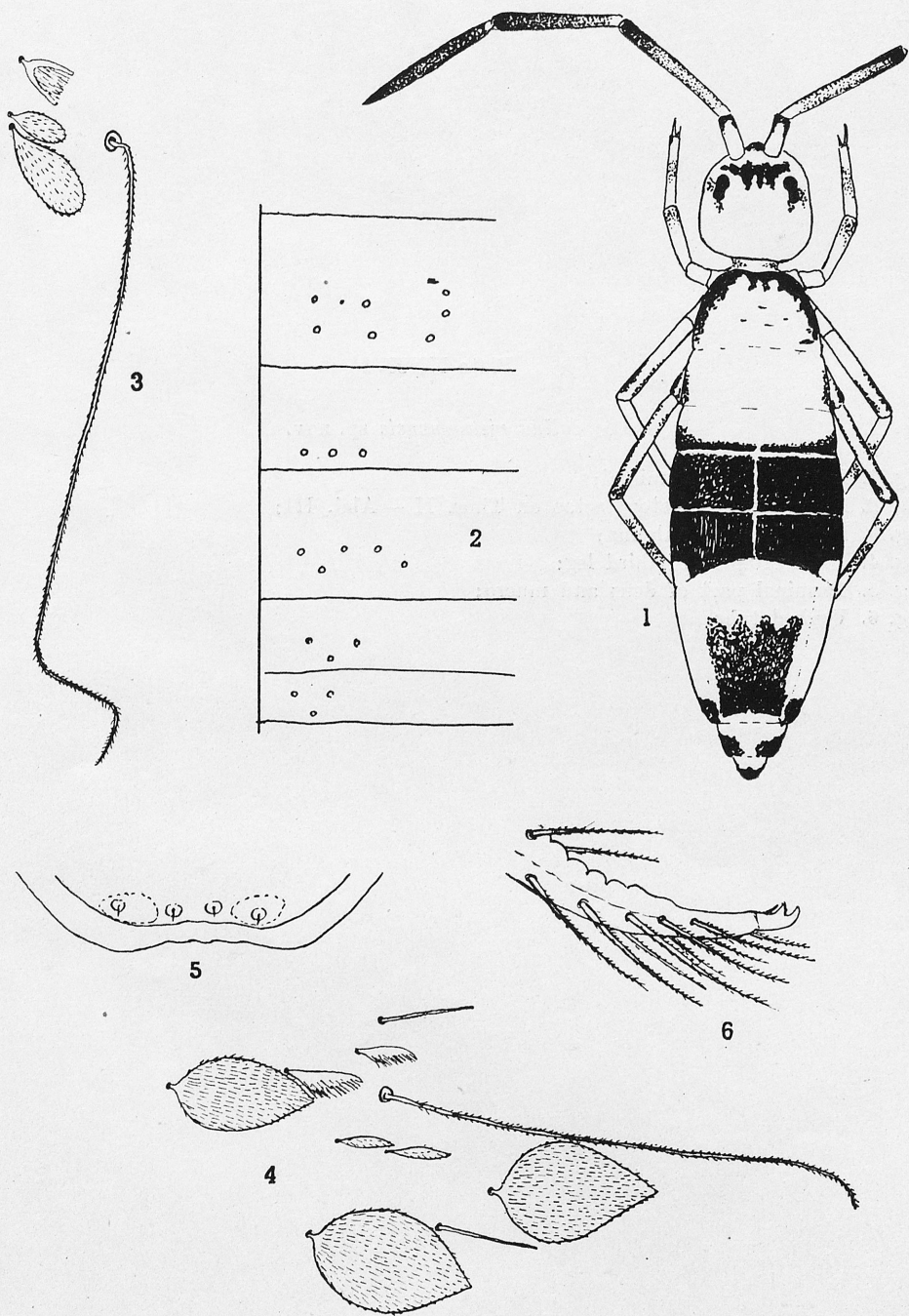


Plate XXXV

Willowsia bartkei sp. nov.

- Fig. 1. Dorsal view of animal;
- Fig. 2. Arrangement of stout setae on Thor. II — Abd. III;
- Fig. 3. Trichobothrium and modified scales from Abd. III;
- Fig. 4. Trichobothrium, scales and hairs from lateral side of Abd. III;
- Fig. 5. Labral papillae.
- Fig. 6. Terminal part of dens.

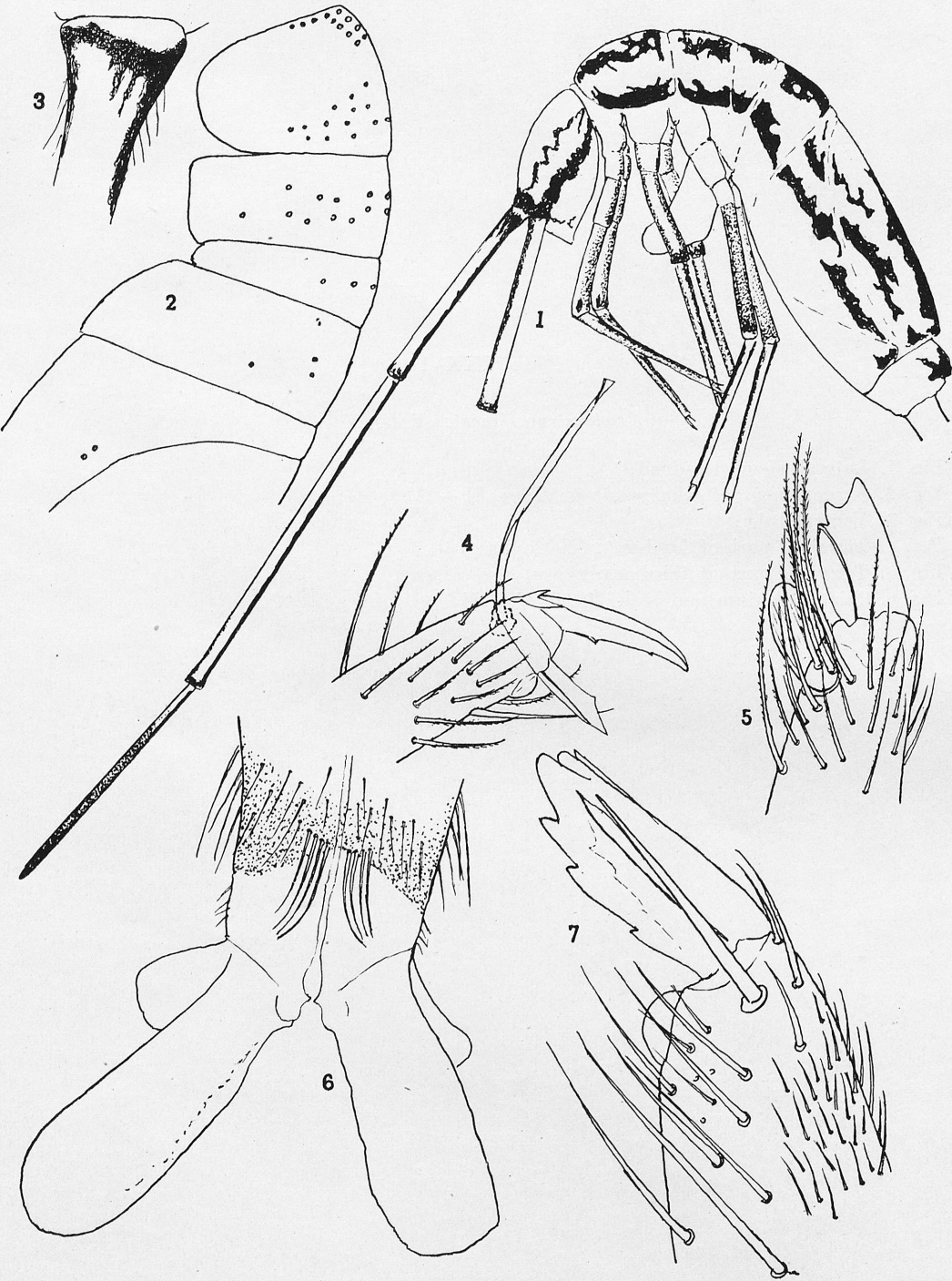


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Plate XXXVI

Salina vietnamensis sp. nov.

- Fig. 1. Lateral view of animal;
- Fig. 2. Arrangement of stout setae on Thor. II — Abd. III;
- Fig. 3. Basal joint of antenna;
- Fig. 4. Terminal part of third leg;
- Fig. 5. Terminal part of dens and mucro;
- Fig. 6. Ventral tube.

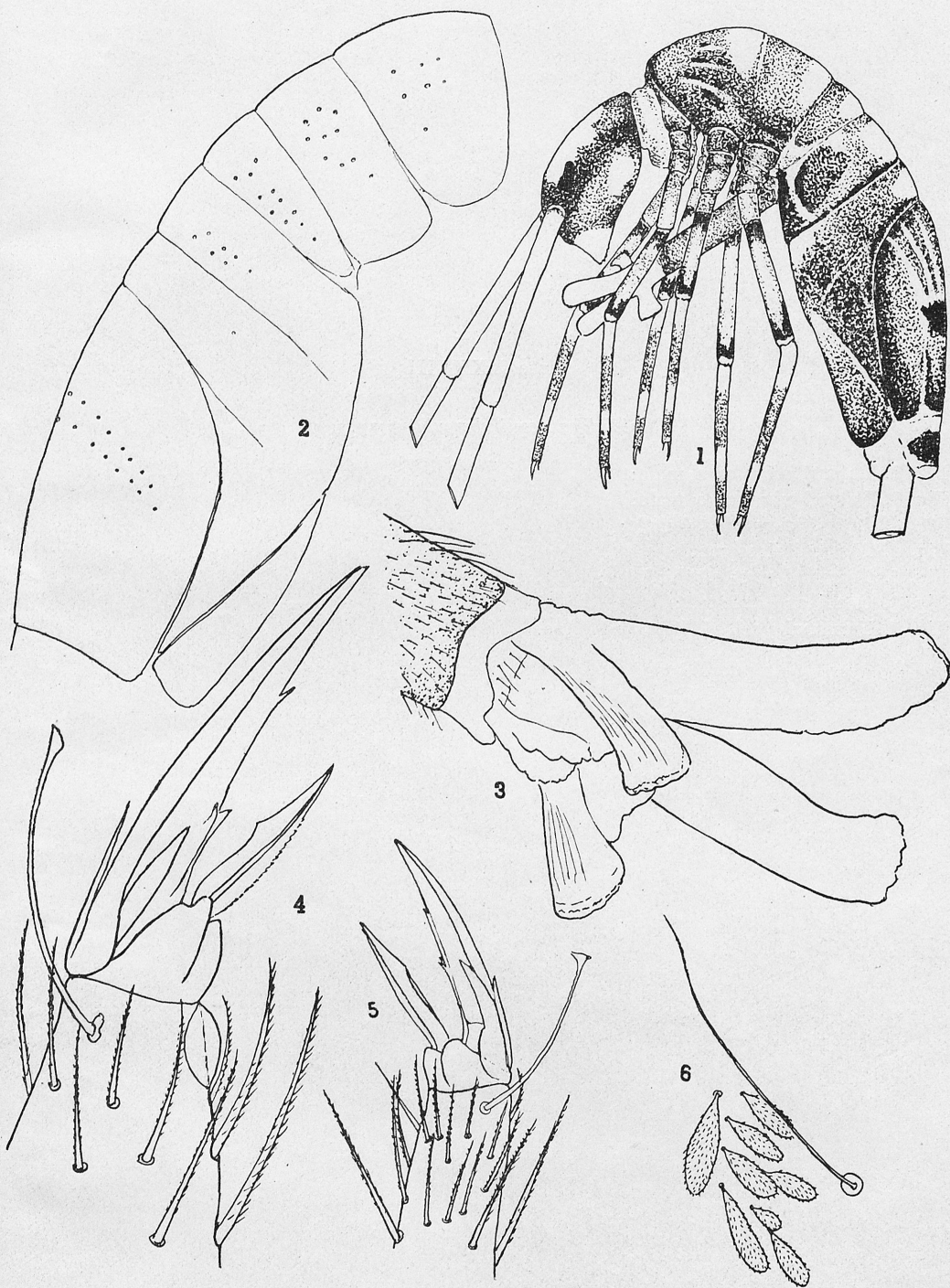


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Plate XXXVII

Callyntrura lineata (PARONA)

- Fig. 1. Lateral view of animal;
Fig. 2. Arrangement of stout setae on Thor. II — Abd. IV;
Fig. 3. Ventral tube;
Fig. 4. Terminal part of foreleg ($\times 800$ approx.);
Fig. 5. Terminal part of third leg;
Fig. 6. Trichobothrium and scales from Abd. II.

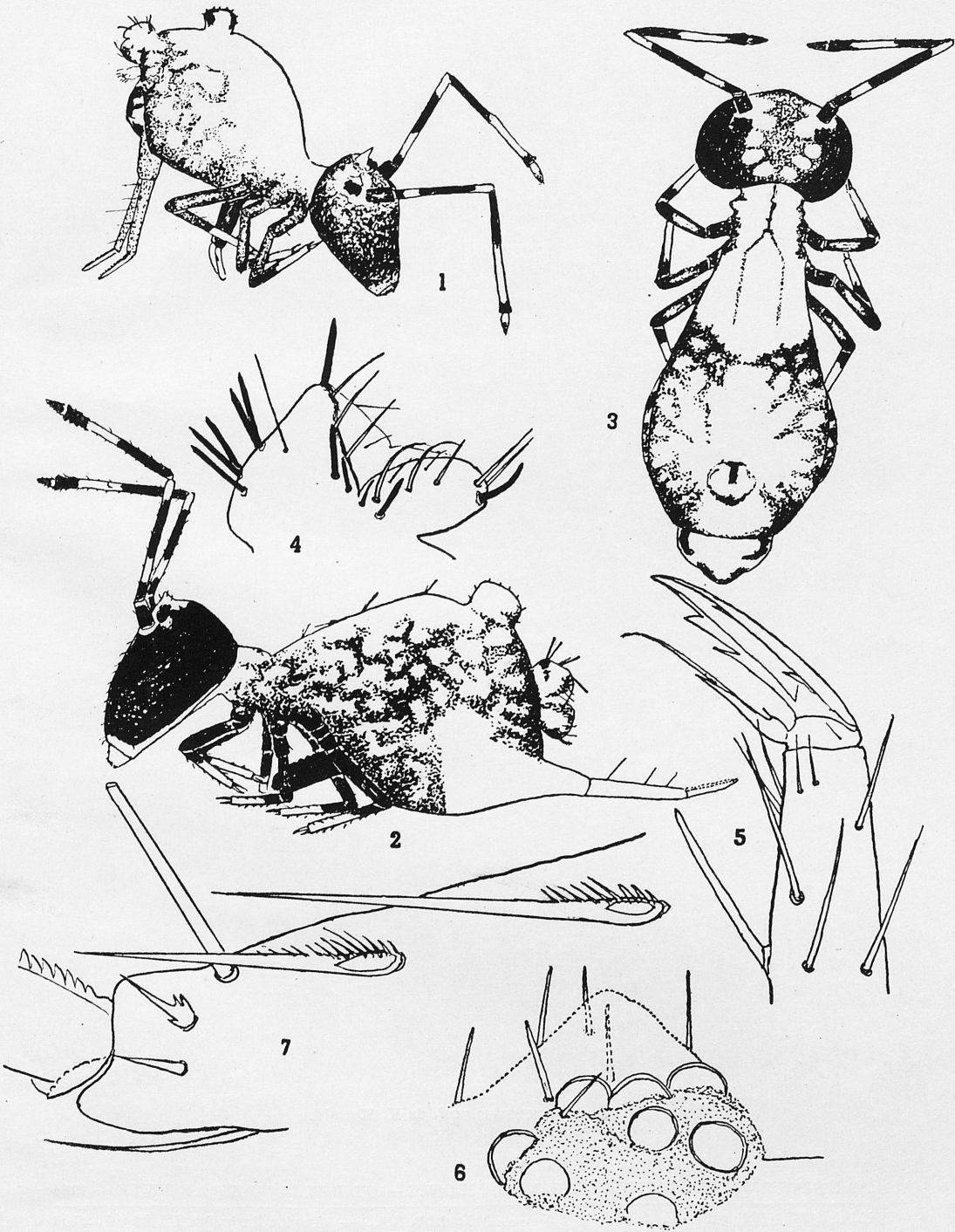


del. Stach

Plate XXXVIII

Papirioides aequituberculatus sp. nov.

- Fig. 1. Lateral view of a male;
- Fig. 2. Lateral view of a male;
- Fig. 3. Dorsal view of a female;
- Fig. 4. Anogenital segment;
- Fig. 5. Terminal part of third leg;
- Fig. 6. Ocelli and tubercle;
- Fig. 7. Terminal part of dens and setae.



Redaktor zeszytu: prof. dr K. Kowalski

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