

Redescription of *Entomobrya schoetti* (Collembola, Entomobryidae, Entomobryinae), third record to the world fauna

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Se da una redescipción de *Entomobrya schoetti* Stach, 1922. Esta especie ha sido encontrada asociada a una plaga de *Sminthurus viridis* L. sobre alfalfa en Vergalijo (Navarra, España) en el otoño de 1997. Se capturaron 55.430 ejemplares en cinco minutos, pasando 25 veces una bandeja blanca de plástico sobre la parte superior de las plantas de alfalfa. El color de la especie es muy variable y sólo los ejemplares muy pigmentados pueden utilizarse para caracterizar la especie. Se adjunta una tabla con las medias de las medidas más importantes, tomadas de 22 ejemplares adultos. Se ha realizado el dibujo de la distribución dorsal de las macroquetas, así como los dibujos de los patrones de coloración. Se ha realizado la descripción fotográfica a microscopía electrónica de barrido de algunos caracteres. Del análisis del contenido intestinal se deduce que esta especie se alimenta de hongos y podría contribuir a la dispersión de los hongos en los campos de cultivo.

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Palabras clave: *Entomobrya schoetti* Stach, redescipción, *Sminthurus viridis* L., plaga, España.

INTRODUCTION

Entomobrya schoetti Stach, 1922, was described from three specimens; two from Léva (Slovakia) in 1915 and one from the environs of Krakow (Poland) in 1921 collected by Stach himself. All specimens were females, and from them two forms were described: *principalis* and *pigmentata*. The main features of the Stach description referred to specimen coloration, which is characterised by transversal dark violet stripes. Such transverse bands appear on the anterior and posterior margin of the second thoracic tergite and the anterior margin of third thoracic and first to third abdominal tergites. Such pigment distribution seems very characteristic and especially significant in dark specimens.

The drawings from the original description (STACH, 1922) in table IV, 6, 7 and 8 and the step in the key published in 1963 (STACH, 1963) are definitive in characterising the species. The morphological description in both papers is useless, as it would match that of a great number of species of this genus. Some useful features are:

- Antennae shorter than half of the body length, measured with the head.
- Labrum with three transverse rows of setae and at the front with four small trapezium-like papillae, each provided apically with two minute conical tubercles.
- Body proportions of head, thoracic segment II-III, Abdominal segments I-VI: 14: 7: 5: 4: 6: 5: 14.5: 3: 2.

MATERIAL AND METHODS

Using a white tray passed 25 times over the upper part of the lucerne plants a 30 ml flask was filled with two species of Collembola: *Sminthurus viridis* (L.) and *Entomobrya schoetti* Stach. The number of specimens collected of each species was 19750 and 55430 respectively. Some specimens were mounted in Hoyer medium for identification and drawing of the chaetotaxys. In order to take measurements, 70 adult specimens were separated. The size of each segment was measured in 22, as is shown in Table I.

Some specimens were dried with CO₂ critical point, coated with 16 nm of gold and photographed with a Scanning Electron Microscope.

Table I. - Range, mean value and S.D. for head and segments of thorax, abdomen, furcula and antenna of *Entomobrya schoetti*. Variation coefficients are given. Measurements in μm

| | Range | Mean \pm S.D. | var. coef. |
|------------------|-----------|-----------------|------------|
| Head. | 325-625 | 424 \pm 61. | 0.14 |
| Th. II | 200-325 | 257 \pm 35 | 0.13 |
| Th. III | 125-250 | 169 \pm 34 | 0.20 |
| Abd. I | 75-200 | 120 \pm 37 | 0.31 |
| Abd. II | 100-275 | 176 \pm 46 | 0.26 |
| Abd. III | 125-225 | 165 \pm 33 | 0.20 |
| Abd. IV | 375-625 | 522 \pm 58 | 0.11 |
| Abd. V | 62.5-150 | 111 \pm 23 | 0.20 |
| Abd. VI | 37.50-100 | 76 \pm 17 | 0.23 |
| Body (with head) | 1675-2625 | 2018 \pm 249 | 0.12 |
| Body (Th.+Abd.) | 1300-2000 | 1594 \pm 209 | 0.13 |
| Manubrium | 275-450 | 344 \pm 40 | 0.12 |
| Dens | 375-550 | 453 \pm 48 | 0.11 |
| Furcula | 650-925 | 798 \pm 79 | 0.10 |
| Man./Dens | 0.7-0.9 | 0.8 \pm 0.1 | 0.10 |
| Ant. 1 | 75-200 | 153 \pm 31 | 0.20 |
| Ant. 2 | 200-325 | 268 \pm 32 | 0.12 |
| Ant. 3 | 200-300 | 248 \pm 26 | 0.11 |
| Ant. 4 | 250-375 | 312 \pm 32 | 0.10 |
| Antenna | 750-1188 | 982 \pm 97 | 0.10 |
| Ant/Body | 0.4-0.6 | 0.5 \pm 0.05 | 0.10 |

Material examined

Entomobrya schoetti: a specimen (designed as lectotype) from Polska Akademia Nauk, Instytut Systematyki i Ewolucji Zwierzat, Krakow «*Entomobrya schoetti* Stach Stokaeja 3.^{er} calja» labelled. It is var. *principalis* (Fig. 13a left).

A specimen (designed as paralectotype) from Polska Akademia Nauk, Instytut Systematyki i Ewolucji Zwierzat, Krakow. «*Entomobrya schoetti* ab. *pygmentata* Berek. Slovaca Stach 1915» labelled (Fig. 14a left).

70 specimens selected among 55430, Vergalijo, Navarra, Spain, 1/XII/1997, from lucerne field.

RESULTS AND DISCUSSION

Family ENTOMOBRYIDAE.

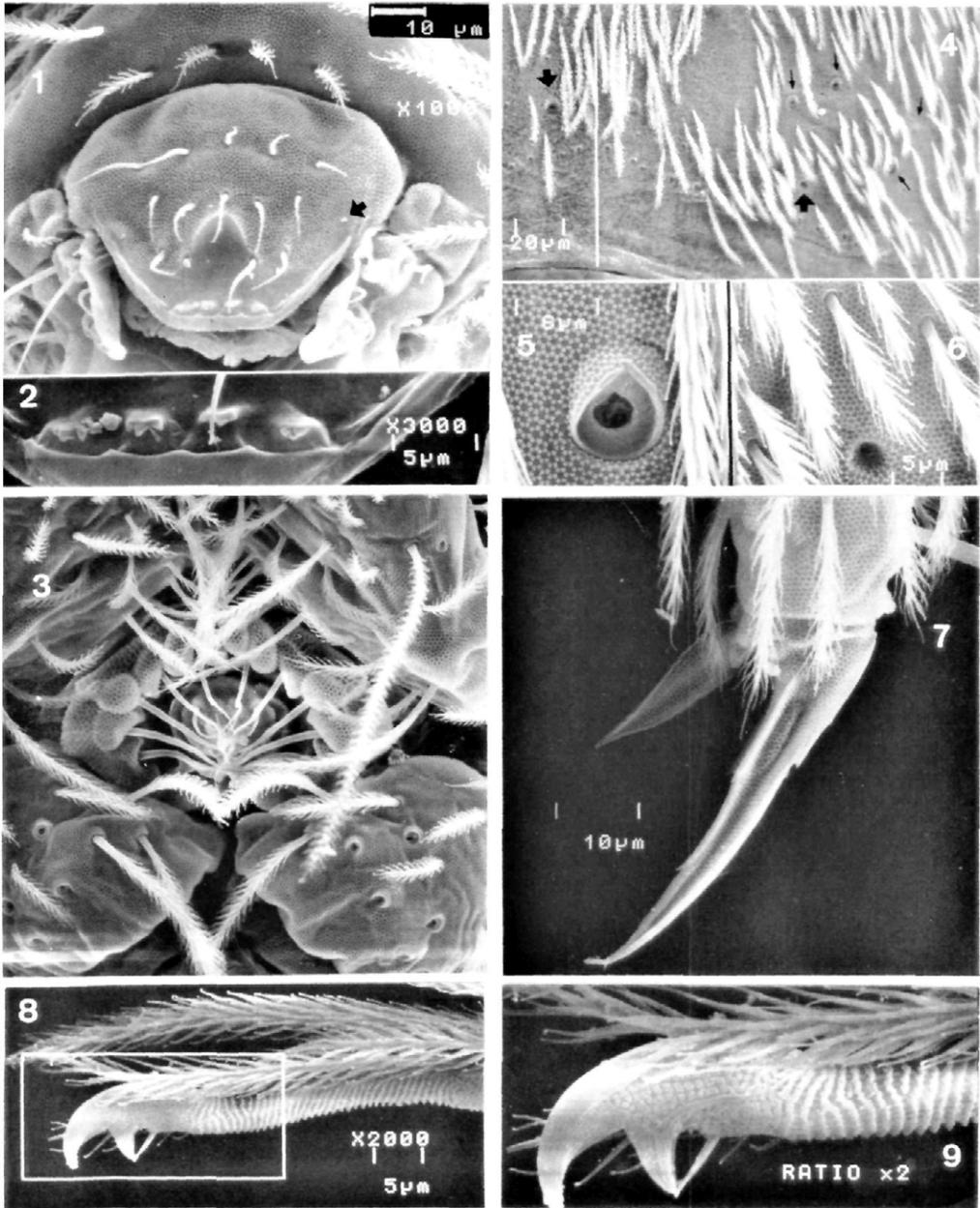
Genus *Entomobrya* Rondani, 1861.

Entomobrya schoetti Stach, 1922 (Figs. 1-14).
Entomobrya schoetti Stach, 1922: 41-43, Taf. IV, Fig. 6-8.

Description

In Table I the mean, S.D. maximum and minimum values of different measurements and ratios from 22 specimens are given. The body length is the sum of the values of each body segment. The variation coefficient was calculated for all values and was significant for 22 specimens. The body length without head was measured in 70 adult specimens (mean = 1501 μm) and the variation coefficient was found to be very similar to Table I. The value of body length of the 22 specimens was biased as in order to make the description, the larger specimens were chosen.

It is noteworthy that the ratios between the size of the head and the rest of the body segments are similar to those established by Stach (Table II). In contrast, the ratios between the antennal segments are very dissimilar to Stach's ratio as a result of the wide variation of each segment (Table I).



Figs. 1-9. - *Entomobrya schoetti*. 1. Labrum; 2. Labrum tubercles; 3. Male genital area; 4. Chaetotaxy of central part of the third abdominal tergite. Vertical line is situated along body axis, on both sides there is a macrochaeta alveolus. Four of the five macrochaetae of this segment are indicated by thin arrows; 5. Detail of the macrochaeta indicated in Fig. 4; 6. Detail of trichobotrium alveoli indicated in Fig. 4 by an arrow; 7. Claw and empodium; 8-9. Mucro.

Table II.- Ratio for body segment of *Entomobrya schoetti* following Stach 1922. Measurements in μm .

| | Stach, 1922 | This paper |
|-------------|-------------|------------|
| Head | 14 | 14,00 |
| Thorax II | 7 | 8,6 |
| Thorax III | 5 | 5,6 |
| Abdomen I | 4 | 4,0 |
| Abdomen II | 6 | 5,8 |
| Abdomen III | 5 | 5,5 |
| Abdomen IV | 14.5 | 17,4 |
| Abdomen V | 3 | 3,7 |
| Abdomen VI | 2 | 2,5 |

Species morphology is like a slightly compressed Entomobrya. All the body with ciliated setae (Figs. 3, 4, 7 and 8). Macrochaetae formula on abdominal segments II-IV: 2 + 3, 1 + 4 and 52222. This formula is explained in figure 10 with the macrochaetae distribution.

Antennae shorter than half of the body length, head included (Table I). Labrum (Fig.

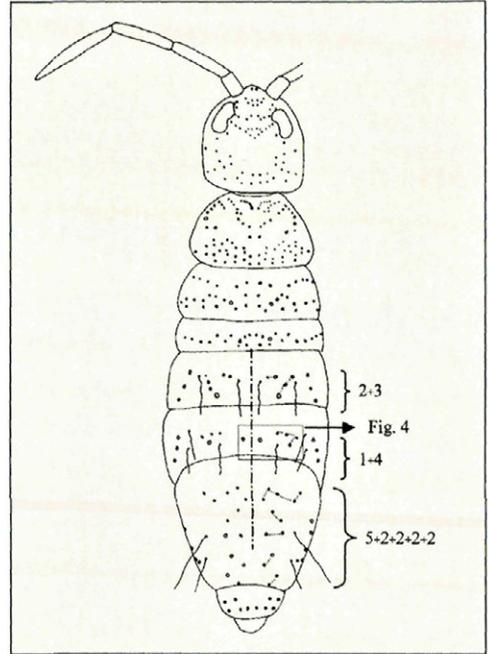


Fig. 10. - *Entomobrya schoetti*; Macrochaetae chaetotaxy.



Fig. 11. - *Entomobrya schoetti*; Pale grey specimens.



Fig. 12-13.
Entomobrya schoetti;
12. Dark specimens;
13. Left:
Microphotograph
of var. *principalis*
(lectotype).
Right:
Microphotograph
of a specimen from
Navarra.

1) with three rows of smooth setae, five basal, five medial and four distal. Medial row with a microseta on each end as is indicated by the arrow in the figure. At the end of the quitinized labrum shield there are four papillae, each with two or three small tubercles (Figs. 1, 2); this feature matches Stach's description very well.

Tibiotarsal tenent hair with spatulated end and striated. Narrow claw with two minute lateral teeth and three inner teeth (Fig. 7). Empodium half as long as inner edge of the claw and with an outer serrated edge. Mucro typical of the genus as in Figs. 8-9. In Fig. 3 for the first time, the male genital area is shown with 12 papillae: ten with a long and



Fig. 14. - *Entomobrya schoetti*; Left: Microphotograph of var. *pigmentata* (paralectotype). Right: microphotograph of a specimen from Navarra.

smooth seta, two nearer anal valves bearing a spatulated seta.

Colour is very variable as is shown in figs. 11-14. The pigmented specimens, with dark violet coloration (Figs. 12) are very similar to those described by Stach as var. *pigmentata* (STACH, 1922) (Fig. 14 left), but the majority of specimens have a colour range between grey pale to dark green or dark blue. Pigment

distribution is the same in all specimens, except in the pale ones (Fig. 11) which are abundant and frequent among the juveniles.

Two specimens from Polska Akademia Nauk, Instytut Systematyki i Ewolucji Zwierząt (Krakow) has been designed as lectotype and paralectotype. Those two specimens are very old and they are preserved in alcohol. The type chaetotaxy has not been studied because, in order to avoid colour loosing, the specimens have been not mounted.

Biology

The species has been found associated with a severe pest of *Sminthurus viridis*, feeding on the fungi that grow in the injuries produced by the pest. Gut contents of all specimens studied is of fungus digested hyphae and spores. This points to its role in fungus dissemination.

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ABSTRACT

JORDANA, R. & BAQUERO, E. 1999: Redescription of *Entomobrya schoetti* (Collembola, *Entomobryidae*, *Entomobryinae*), third record to the world fauna. *Bol. San. Veg. Plagas*, **25** (1): 99-105.

The description of *Entomobrya schoetti* Stach, 1922 is given for the second time. This species was found associated with a pest of *Sminthurus viridis* (lucerne flea) on lucerne in Vergalijo (Navarra, Spain) in the autumn of 1997. 55430 specimens were captured, in five minutes, by passing a white plastic tray 25 times over lucerne plants. The colour is very variable and only the dark pigmented specimens can be used to characterise the species. A table with the means of the most important measurements from 22 adult specimens is given. Drawings with the distribution of the dorsal macrochaetae, comparative coloration patterns with those from first description and nine SEM electron microphotographs with principal characters are provided. From the gut contents it is possible to deduce that this is a fungus feeder species and could thus contribute to fungus dissemination in fields.

Keywords: *Entomobrya schoetti* Stach, redescription, *Sminthurus viridis* L., pest association, Spain.

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