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ON THE IDENTITY OF THE GENUS *LECANOPSIS* TARGIONI TOZZETTI.

ABSTRACT

ON THE IDENTITY OF THE GENUS *LECANOPSIS* TARGIONI TOZZETTI.

The genus *Lecanopsis* Targioni Tozzetti was generally accepted by coccidologists until 1994. In that year, on the basis that the exact facies of the genus was not known and that there was no type material, it was proposed that all the species previously included in *Lecanopsis* be transferred to the genus *Paralecanopsis* (synonymised with *Lecanopsis* in 1980) and that only the type species, *L. rhyzophila* Targioni Tozzetti, be retained in *Lecanopsis*, thus allowing a proper diagnosis of this group. In order to clarify the identity of the genus *Lecanopsis*, we have carefully checked the original descriptions of the genus and of its type species by Targioni Tozzetti and by Signoret. This work has highlighted some small mistakes in the translation of the original description from Italian or Latin to French and also some omissions, and these could have led to the conclusion that the real facies of this genus was not known and that the type species, *L. rhyzophila*, could not be congeneric with the other species currently included in *Lecanopsis*. However, some original drawings of *Lecanopsis* by Targioni Tozzetti, which he sent to Signoret in 1872, have been discovered in the Museum Nationale d'Histoire Naturelle, Paris. On the basis of this new information, and with the support of the authoritative opinion of two members of the International Commission of Zoological Nomenclature, we consider that (i) the genus *Lecanopsis* is a valid genus and propose (ii) that the species of *Lecanopsis* recently transferred to the genus *Paralecanopsis* Bodenheimer be re-assigned to the genus *Lecanopsis* Targioni Tozzetti.

Key words: host plants, *Asperula*, *Rhizobium*, *Rhyzobium*, *Agropyrum*, *Aclerda subterranea*, *Paralecanopsis turcica*, *Lecanopsis formicarum*, history, illustrations, behaviour.

INTRODUCTION

Prior to 1994, the identity of the genus *Lecanopsis* Targioni Tozzetti (Coccidae) (Targioni Tozzetti, 1868) was generally accepted by all coccidologists (Borchsenius, 1957; Danzig, 1980; Tereznikova, 1981; Martin Mateo, 1984; Kosztarab & Kozár, 1988; Tang, 1991; Ben-Dov, 1993). Up to that time, no coccidologists had doubted the identity of the genus even though some authors had indicated that the genus was in need of revision, mainly because of the poor description of several species and of insufficient knowledge of the nymphal stages (Danzig, 1980; Kosztarab & Kozár, 1988; Longo *et al.*, 1994).

In 1994, Hodgson, during his valuable redescription of the type species of the genera in the Family Coccidae, pointed out the difficulty of clearly

identifying the facies of the genus *Lecanopsis* and of its type species, *L. rhyzophila* Targioni Tozzetti. He proposed transferring all the species previously included in *Lecanopsis* (with the exception of the type species) to the genus *Paralecanopsis* Bodenheimer (synonymised with *Lecanopsis* by Ben-Dov, 1980) in order to allow a proper diagnosis of this group. The main arguments to support this proposal were the following:

1) That the meagre description given by Targioni Tozzetti (1867) together with the short description by Signoret (1874) did not allow for the clear identification of either the genus *Lecanopsis* or the species, *L. rhyzophila*. Because the original material had quite likely been lost, the real identity of the type species could never be clarified.

2) Signoret's statement that the type species of the genus, *Lecanopsis rhyzophila*, had been collected "off the roots of its host *Asperula* (Fam. Rubiaceae)". It is known that all other species currently placed in the genus *Lecanopsis* live on the underground parts of Gramineae.

3) The oldest known slides labelled "*Lecanopsis*" refer in fact to *Aclerda subterranea* Signoret (Fam. Aclerdidae).

For the above mentioned reasons, it was hypothesised that the species currently placed in the genus *Lecanopsis* could not be congeneric with *L. rhyzophila* and so it was suggested that all the species currently placed in *Lecanopsis*, apart from *L. rhyzophila*, should be transferred to the genus *Paralecanopsis* Bodenheimer, so that a proper diagnosis of the former group could be attempted. As previously reported, the genus *Paralecanopsis* was synonymised with *Lecanopsis* (Ben-Dov, 1980) and the type series of *P. turcica* (the type species) is preserved in the Department of Agriculture, Rehovot, Israel.

In 1995, we started a revision of the genus *Lecanopsis*, at that time consisting of 18 species (including *Paralecanopsis turcica* Bodenheimer), mainly distributed in the Palearctic region. The first question to be answered was to establish the identity of the type species of the genus. A thorough investigation and comparison with the original descriptions by Targioni Tozzetti and Signoret, and those of other authors who have dealt with this genus, has been carried out. The Targioni Tozzetti material preserved in Florence has been checked and, thanks to the help of Evelina Danzig and Daniele Matile-Ferrero, the Signoret collection in the Natural History Museum in Vienna has also been checked for type material but none was found. Moreover, we had the opportunity of seeing an original unpublished drawing by Targioni Tozzetti of the genus *Lecanopsis*, discovered by Daniele Matile-Ferrero in the library of the Société Entomologique de France in Paris. In

addition, the availability of living specimens of *Lecanopsis* collected in different Italian localities allowed a comparison of these with the drawings published by Signoret and by Targioni Tozzetti in his unpublished paper. Evelina Danzig, a well-known coccidologist, and two members of the International Commission of Zoological Nomenclature, were asked for their opinions on the conclusions of this study and completely agreed with them.

HISTORY OF GENUS AND DISCUSSION

1. In 1867, Targioni Tozzetti mentioned a *Rhizobium* sp., briefly described the pores of the derm and also provided a figure with a caption of the derm of this genus. In a footnote to his paper, he wrote: “to this genus belongs a large species that I found **near** the roots of an *Asperula*”. In 1868, he made *Rhizobium* (amended to *Rhyzobium*) a synonym of the new genus *Lecanopsis* and assigned *Lecanopsis rhyzophila* n. sp. to it. In 1874, Signoret, on the basis of notes sent to him by Targioni Tozzetti, published the first formal description of the genus *Lecanopsis* and of the species *L. rhyzophila*. He included the Latin description of the genus sent to him by Targioni Tozzetti and then briefly described the species *L. rhyzophila*. In the same paper, Signoret also provided drawings of an adult female and the antenna of *L. rhyzophila*. Since Signoret states in his description that he had never seen this species, we wondered how Signoret could have drawn a species he had never seen. This question was solved with the help of Daniele Matile-Ferrero, who discovered among the drawings of Signoret, a page with the drawings of *Lecanopsis* which Signoret had been sent in 1872 by Targioni Tozzetti. The two drawings of *Lecanopsis* (adult living female and antenna) published by Signoret in 1874 are identical. Two other drawings, of an adult female from the venter and an anterior leg, are still unpublished.

The illustrations by Targioni Tozzetti (published and unpublished) and the short descriptions provided in 1867 and 1874 allow for the identification of the genus: if we compare the drawings by Targioni Tozzetti with some features of a living adult female *Lecanopsis*, we can see that they are surprisingly similar. For instance, the drawing of the derm with pores provided in 1867 agrees with the dorsal derm with preopercular pores present in all *Lecanopsis* species.

The second species to be included in the genus *Lecanopsis* was *L. formicarum* (Newstead, 1893). In assigning his new species to the genus *Lecanopsis*, on the basis of the description presented by Signoret, Newstead wrote “I have not the least hesitation in placing it in this genus”. Actually *L. formicarum* is one of the most common and best known species in the genus *Lecanopsis*.

2. One of the main objections to the fact that the species described by Targioni Tozzetti could not belong to the genus *Lecanopsis* is that it was collected on the roots of a species of *Asperula* (Rubiaceae), whereas it is well known that the species currently assigned to *Lecanopsis* live on the underground parts of Gramineae. In reality, Targioni Tozzetti (1867) clearly wrote that the species was collected **near** the roots of an *Asperula* plant. In translating Targioni's notes from Italian to French, Signoret made a mistake and reported that the species was found **on** the roots of an *Asperula*. From the biology of the genus *Lecanopsis*, we know that the adult females have no connection with the host plant, because, just after emergence, they leave the host plant (a Gramineae) and wander on the ground, stopping and laying eggs near different plants which are not the host plant of the species. This behaviour was observed by Boratynski *et al.* (1983) with *L. formicarum* Newstead and by us with *L. clodiensis* (Pellizzari) (see Pellizzari & Fontana, this volume). So, the fact that an adult female *Lecanopsis* has been collected near the roots of an *Asperula* does not mean it is the host plant but does fit the wandering habit of this genus.

3. The oldest known slides labelled "*Lecanopsis*" refer in fact to *Aclerda subterranea* Signoret. These slides were sent to Comstock by Signoret, arriving in 1882 (Hodgson, 1994) and were deposited in the United States National Museum, Washington. In 1872, Signoret told the members of the Société Entomologique de France about the scale insects that he had collected during a trip to Southern France and Italy. In his lecture, published in the "Séances de l'Année 1872" (Annales de la Société Entomologique de France, p. XXXVI), he reported that he had collected many specimens of *Lecanopsis rhyzophila* on *Agropyrum* (Gramineae). In the same year, he received from Targioni Tozzetti the page with the drawings of *Lecanopsis rhyzophila*. Two years later (1874), Signoret published the descriptions of both *Lecanopsis rhyzophila* Targioni Tozzetti and *Aclerda subterranea* Signoret. It is important to note that Signoret himself, in his description of the genus *Aclerda*, reported that he had thought that this species was a *Lecanopsis* at first but, when describing *A. subterranea* two pages later, he indicates that he had been wrong when he had thought he had found *L. rhyzophila* in 1872. Therefore, it appears that, after having received the description and the drawings of *Lecanopsis* from Targioni Tozzetti in 1872, Signoret was able to discriminate between the two species and consequently described *Aclerda subterranea* as a new species.

The slides labelled "*Lecanopsis*", pertinent to *Aclerda subterranea*, preserved in the USNM may refer to the first error in identification of the

species reported in 1872 and admitted by Signoret himself in 1874. No confusion between the two species can be credited to Signoret after 1874.

CONCLUSIONS

1. Although the original description of *Lecanopsis* is brief, it does fulfil the requirements of the ICZN to validate a generic name.

2. The description and the drawings by Targioni Tozzetti (both those published by Signoret and the unpublished ones) allow for the identification of the genus *Lecanopsis* and, therefore, it can be concluded that it is a valid genus. Moreover, the name *Lecanopsis* has been uniformly accepted and widely used by all specialists and should be conserved.

3. The type species, *Lecanopsis rhyzophila*, has definitely been lost. Attempts to locate the original material of Targioni Tozzetti, both in Florence and in the Signoret collection in Vienna, were unsuccessful. Attempts to find specimens of *Lecanopsis* in the type locality (Monte Morello, Florence) in order to designate a topotype have also failed to-date. Currently, *Lecanopsis rhyzophila* is an unrecognisable species or a *species inquirenda*.

4. The authors propose that the species of *Lecanopsis*, recently transferred to the genus *Paralecanopsis* Bodenheimer, be re-assigned to the genus *Lecanopsis* Targioni Tozzetti.

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REFERENCES

- BEN-DOV, Y., 1980 - Observations on scale insects (Homoptera: Coccoidea) of the Middle East. *Bulletin of Entomological Research*, 70: 261-271.
- BEN-DOV, Y., 1993 - A Systematic Catalogue of the Soft Scale Insects of the World. Flora & Fauna Handbook no. 9. Sandhill Crane Press, Inc., Gainesville. 536pp.
- BORATYNSKI, K., PANCER-KOTEJA, E., KOTEJA, J., 1982 - The life history of *Lecanopsis formicarum* Newstead (Homoptera, Coccinea). *Annales Zoologici. Warszawa*, 36(27): 517-537.
- BORCHSENIUS, N.S., 1957 - Subtribe mealybugs and scale (Coccoidea). Soft scale insects Coccidae. Vol IX. *Fauna SSSR, Zoologicheskii Institut Akademii Nauk SSSR N.S.*, 66: 1-493.

- DANZIG, E.M., 1980 - Coccids of the Far-Eastern USSR (Homoptera, Coccinea). Phylogenetic Analysis of Coccids in the World Fauna. Nauka Publishers, Leningrad. 366pp.
- HODGSON, C., 1994 - The Scale Insect Family Coccidae. An Identification Manual to Genera. CAB International, Wallingford, UK. 639pp.
- KOSZTARAB, M., KOZÁR, F., 1988 - Scale Insects of Central Europe. Series Entomologica 41, Junk Publishers. 456pp.
- LONGO, S., MAROTTA, S., PELLIZZARI, G., RUSSO, A., TRANFAGLIA, A., 1995 - An annotated list of the scale insects (Homoptera: Coccoidea) of Italy - *Israel Journal of Entomology*, 29: 113-130.
- MARTIN MATEO, M.P., 1984 - Inventario preliminar de los Coccidos de Espana. II Asterolecaniidae, Kermococcidae, Coccidae y Aclerididae. *Graellsia, Revista de Entomologos Ibericos. Madrid*, 40: 63-79.
- NEWSTEAD, R., 1893 - Observations on British Coccidae (No. 6) - *Entomologist's Monthly Magazine*, 29: 205-210.
- PELLIZZARI, G., 1995 - A new species of *Paralecanopsis* (Homoptera: Coccoidea: Coccidae) from Italy. *Bollettino di Zoologia agraria e di Bachicoltura, Milano, Ser. II*, 27(1): 35-44.
- SIGNORET, V., 1872 - Séances de l'année 1872. *Annales de la Société Entomologique de France (Ser. 5)*, 2: XXXVI.
- SIGNORET, V., 1874 - Essai sur les Cochenilles ou Gallinsectes (Homoptères - Coccides), 12^e partie (1). *Annales de la Société Entomologique de France*, 4: 279-298.
- TANG, F.T., 1991 - The Coccidae of China. Shanxi United University Press, Shanxi. 377pp.
- TARGIONI TOZZETTI, A., 1867 - Studi sulle Cocciniglie - *Memorie della Società Italiana di Scienze Naturali*, 3(3): 1-87.
- TARGIONI TOZZETTI, A., 1868 - Introduzione alla seconda Memoria per gli studi sulle Cocciniglie, e Catalogo dei generi e delle specie della famiglia dei Coccidi, rivista e ordinata da Adolfo Targioni-Tozzetti. *Atti della Società Italiana di Scienze Naturali*, 11: 694-738.
- TEREZNIKOVA, E.M., 1981 - Scale insects. Eriococcidae, Kermesidae and Coccidae. *Fauna Ukraini. Akademiya Nauk Ukrainskoi RSR. Institut Zoologii, Kiev*, 20: 1-215.