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# Type material of *Leucaspis pusilla* Löw, 1883 (Insecta: Hemiptera: Diaspididae) recovered in the Natural History Museum Vienna

A. Kahrer* & H. Zettel*

**Abstract**

In the course of cataloguing the collection of scale insects in the Natural History Museum Vienna type material of *Leucaspis pusilla* Löw, 1883 (Diaspididae) was recovered. It consists of two twigs of Scots pine (*Pinus sylvestris*) bearing masses of dry diaspidid scales, four mica slides containing 14 males, and a small glass container keeping 24 males. The twigs and the mica slides are labelled with "Mödling Austria inferior", "Auf Pinus silvestris L.", and "*pusilla* det. Löw"; the container with "Schönbrunn Austria inferior", "Auf Pinus silvestris L.", and "*pusilla* det. Löw". This suits entirely to the type data according to the description by Löw. Twelve dry female specimens were prepared and mounted on microscopic slides. The identity of each individually mounted female was confirmed as being *Leucaspis pusilla* according to current taxonomy. One mounted female of this series was designated as the lectotype. The males remain unstudied.

**Key words:** *Leucaspis pusilla*, Diaspididae, type material, recovery, lectotype designation.

**Zusammenfassung**

Während Arbeiten in der Schildläuse-Sammlung des Naturhistorischen Museums in Wien wurde das Typenmaterial von *Leucaspis pusilla* Löw, 1883 (Diaspididae) erkannt. Es besteht aus zwei kleinen Zweigen der Rotföhre (*Pinus sylvestris*) mit Massenansammlungen trockener Schildläuse, vier Glimmerpräparaten mit 14 Männchen und einem kleinen Glasbehältnis mit 24 Männchen. Die beiden Zweige und die vier Glimmerpräparate sind mit "Mödling Austria inferior", "Auf Pinus silvestris L." und "*pusilla* det. Löw" etikettiert; das Glasgefäß ist mit "Schönbrunn Austria inferior", "Auf Pinus silvestris L." und "*pusilla* det. Löw" beschriftet. Dies entspricht völlig den Angaben in der Beschreibung durch Löw. Zwölf getrocknete Weibchen wurden präpariert und als mikroskopische Präparate fixiert. Ihre Identität entspricht *Leucaspis pusilla* nach der derzeit geltenden Taxonomie. Ein präpariertes Weibchen wurde als der Lectotypus designiert. Die Männchen wurden nicht näher untersucht.

## Introduction

The Austrian physician and entomologist Dr. Franz Löw (1829–1889) worked as a volunteer at the former "Kaiserlich-Königliches Naturhistorisches Hofmuseum" on entomological questions. In addition to the description of a number of psyllids he also described three new species of scale insects: *Leucaspis pusilla* (Diaspididae), *Xylococcus filiferus* (Xylococcidae), and *Boisduvalia* (=*Phenacoccus*) *piceae* (Pseudococcidae).

In his description of *Leucaspis pusilla*, Löw (1883) treated males and females. At that early time the association between species descriptions and deposited type material was not so close as it is nowadays and often type material was not designated clearly.

* Andreas Kahrer & Herbert Zettel, Natural History Museum Vienna, 2nd Zoological Department, Burgring 7, 1010 Vienna, Austria. – andreas.kahrer@nhm-wien.ac.at; herbert.zettel@nhm-wien.ac.at

Therefore, it has been stated that type material of *L. pusilla* has an unknown status (García Morales et al. 2016).

In the following article we describe the recovery of the type material associated with *Leucaspis pusilla* in the Natural History Museum Vienna, and the designation of a lectotype of this species.

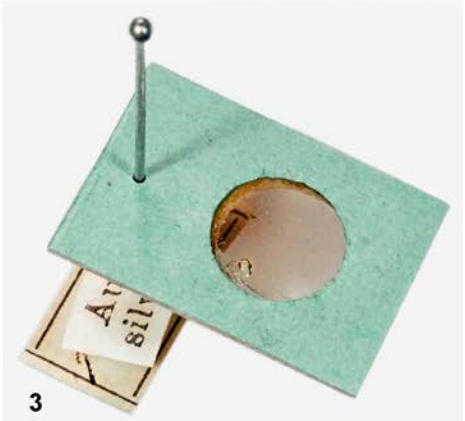
## Materials and methods

Type data information for *Leucaspis pusilla* was taken from the original species description (Löw 1883). These data included morphological description, type locality, host plant, and the author of the determination. Collection cases preserved in the Natural History Museum Vienna were regarded as potential location where type material might be stored irrespective of its taxonomic position. If the species description would contain characters which needed the help of a microscope for its detection, microscopic slides must have been used at the time of its description. According to the technical possibilities at that time, small biological objects were embedded in Canada balsam and mounted on sheets of mica (muscovite) for their study (cf. Fig. 3). During the search for type material such historical mica sheets were primarily expected. It was suspected that type material might not be especially indicated. Doubtful unmounted or prepared material would be accepted as type material if all labels (type locality, host plant and author of determination) were identical with the species description and these specimens belong to the described species (cf. Ben Dov & Matile-Ferrero 1995). Preparation of material was carried out according to the method of Wilkey (1962) modified by Kosztarab & Kozár (1988). For extraction of females from the enclosing pupillarium the top of the pupillarium was cut off with a small blade after the procedure of staining. After this step the female was pulled out with the help of minute needles. Mounted specimens were identified with the help of identification keys of Schmutterer (1959), Balachowsky (1953), and Kosztarab & Kozár (1988). The microscopic slides were transferred to the slide collection of the Natural History Museum Vienna (in the following abbreviated as NHM).

## Results

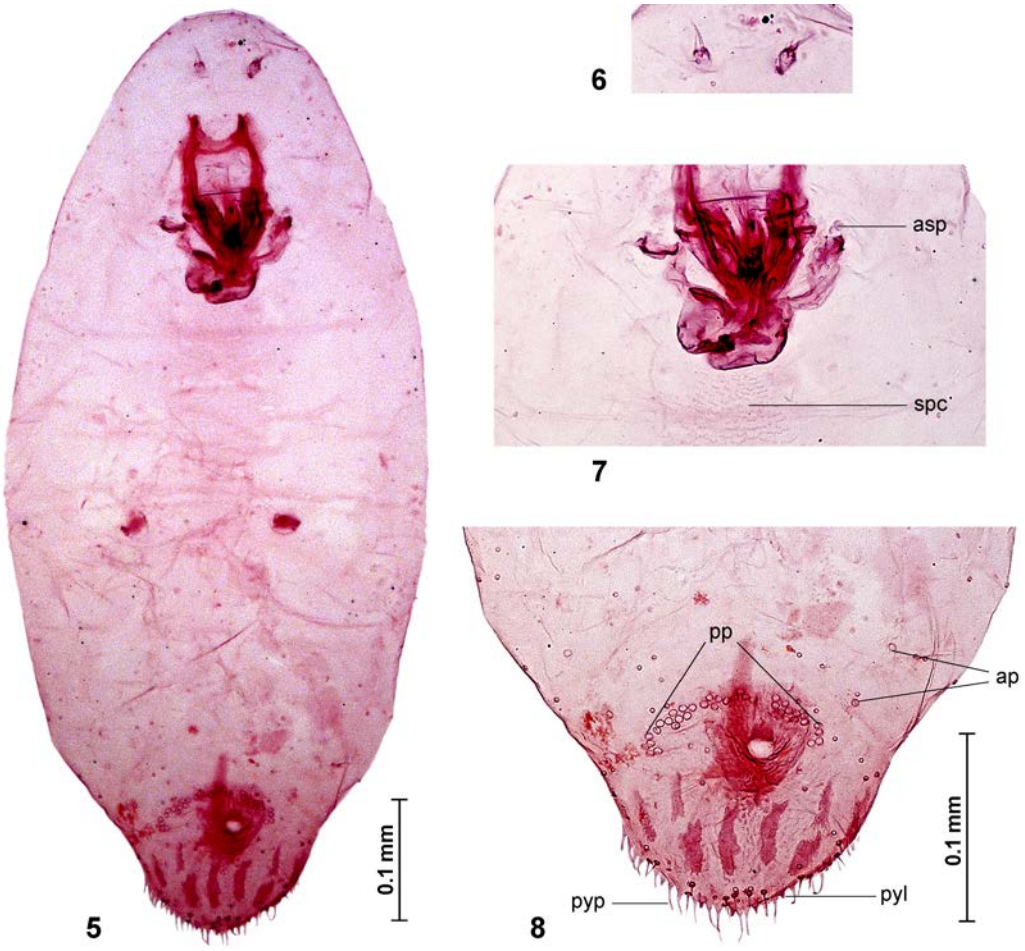
**Females:** No mica sheets referring to females of *Leucaspis pusilla* were found in any part of the collection of scale insects in the NHMW. Yet two sprigs of *Pinus sylvestris* being infested with more than 100 white armoured scales (Fig. 1) were found in a collection case (number 2/4) containing *Leucaspis pusilla* amongst other species of the genus *Leucaspis*. Both sprigs were labelled with "*pusilla* det. Löw", "Mödling Austria inferior", and "Auf Pinus silvestris" (Fig. 2). There was no chronological information available, nor information on the type status of these objects. Yet the information on the labels coincides entirely with the type data from the original species description (Löw 1883), suggesting that they are syntypes. From the "first" sprig, now marked with "AK0012", twelve females were mounted on microscopical slides identified by numbers AK0012/1, AK0012/3–6, AK0012/22, AK0012/25, AK0012/28–29, AK0012/31–33. AK0012/22 was selected as the lectotype.







Figs 1–4: (1) Sprig of *Pinus sylvestris* marked with "AK0012" bearing type material of *Leucaspis pusilla*. It is infested with lots of armoured scales (white shields) on the needles (some indicated by lines); (2) Historical labels marking the same Scots pine sprig; (3) Historical mica-sheet containing males of *Leucaspis pusilla* embedded in Canada balsam between two fine layers of muscovite; (4) Microscopic slide containing the lectotype of *Leucaspis pusilla*. (Photos: NHMW / Bruckner)




Figs 5–8: Microscopical view of the lectotype of *Leucaspis pusilla* (female). (5) overview of the elongate shape; (6) stubby antennae each bearing three proximal setae; (7) anterior stigmata surrounded by four stigmatic pores (asp) at left, and three pores (asp) at right side; medium ventral cuticle of thorax segments with series of transverse fine spiculae (spc). (8) pygidium with six small pygidial lobes (pyl) and 21 long pygidial plates appearing fimbriate (pyp); eight sclerotized rugose areas covering ventral side of the pygidium; 36 perivulvar disc pores (pp) arranged in a semicircle; two accessory disc pores (ap) at each side of the body situated submarginally on prepygidial segments. (Photo: NHMW/ Bruckner)

The following characters of the mounted females were observed (cf. Figs 5–8): (1) Elongate shape of the body. (2) Pupillarial development of females. (3) Ventral thorax segments with transverse series of fine spiculae. (4) Six pygidial lobes much smaller than the pygidial plates. (5) Pygidial plates mostly parallel sided and bearing small fringes at their distal end; number of fringes ranging from 10 to 23. (6) Perivulvar disc pores numbering 34 to 41, arranged in a semicircle. (7) Vulva (at the ventral side of the pygidium) posteriorly of the anus (dorsal side of the pygidium). (8) Anterior stigma with usually

three associated pores (seldom 2, 4 or 5). (9) Antenna stubby with three setae. Thus, the mounted females fully agree with the present taxonomic interpretation of *Leucaspis pusilla*.

Contrasting to this, the second sprig now marked with "AK0082" contains a small number of females of *Leucaspis lowi* COLVÉE, 1882.

**Males:** Collection case number 2/4 also contains 14 males embedded in Canada balsam enclosed in mica slides labelled with "Mödling Austria inferior", "Auf Pinus silvestris", and "*pusilla* det. Löw", and a small vial labelled with "Schönbrunn Austria inferior", "Auf Pinus silvestris", and "*pusilla* det. Löw", containing 24 males. These are undoubtedly the males used by Löw in the original description. They remain unstudied.

## Discussion

Modern taxonomy of scale insects is based on females (e. g., GARCÍA MORALES et al. 2016). In the description of the female of *Leucaspis pusilla*, LÖW (1883) lists characters like number and arrangement of perivulvar disc pores which need inevitably the preparation and mounting of this insect to microscopic slides. However, in the collection of the NHM no mica slides (cf. Fig. 4) – being in widespread use in that early times – could be detected for females. It seems possible that Löw prepared his material only for temporary use and discarded it afterwards. Yet we found raw material for his description in the form of two sprigs of Scots pine (*Pinus sylvestris*) infested with masses of white armoured scales. Their labels assign them explicitly to the author (*pusilla* det. Löw) and also the reported host plant and the type locality coincide with that of his species description. From one of the sprigs (collection number AK0012) twelve females were prepared and mounted permanently to microscopic slides. Their morphological characters fully agree with the current interpretation of *Leucaspis pusilla*. After confirmation of their identity there is no doubt that they had been used by Löw for his species description. Out of this series one specimen was designated as the lectotype. This is necessary to fix the species' identity, because the second sprig contains mix material of two scale insect species. Additional to these females a reserve of unmounted dry type material still exists.

A small number of females from the second sprig (collection number AK0082) belong to *Leucaspis lowi* which is clearly separated from *L. pusilla* by lacking fringed plates on their pygidium. Yet Löw's species description refers undoubtedly to the first mentioned species.

Löw's description of *Leucaspis pusilla* (females) includes also some paragraphs relating to males. Corresponding mica sheets (Fig. 3) and unmounted material exists and seem to have persisted from 1883 until now. As Löw's description of males consists mostly in characters like dimensions or colours of the body and appendages it is not adequate for contemporary identification studies. Yet the material still exists and may be used for further studies about males of *Leucaspis pusilla*.

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