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| Abh. Ber. Naturkundemus. Görlitz | Band 70 Heft 1 | S. 21-27 | 1998 |
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ISSN 0373-7586

Trombidiidae (Acari, Actinedida, Trombidioidea) of the Neiße Valley and vicinity (Saxony, SE Germany)

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Abstract

The mites of the family Trombidiidae of Neiße Valley and the recultivated coal mining dumps of Berzdorf and Tauchritz were studied. Eleven species belonging to that family were recorded, five of which (*Trombidium meyeri*, *T. susteri*, *Allothrombium pergrande*, *Podothrombium strandi*, *P. kordulae*) are new to the fauna of Germany.

1. Introduction

The aim of the present study was a faunistic investigation of the family Trombidiidae on the territory of the Neiße Valley and its vicinity (SE Germany). No species representing this family has been recorded so far from the studied area. The samples were collected throughout 1961/1962, 1988/1989 and in 1992 with different collecting methods. The author would like to express her gratitude to the members of the staff of the Staatliches Museum für Naturkunde Görlitz for making the studies possible.

2. Materials and methods

The material comes from the collection of the Staatliches Museum für Naturkunde Görlitz (samples collected in 1961/1962, 1988/1989) and from the author's collection (samples collected in 1992). The following methods of collecting were used: traps, extraction of mites from soil samples (both sifted and unsifted) and direct collecting in the field.

A total of ca. 1500 of samples were examined, of which 69 contained mites of the family Trombidiidae. Alcohol-preserved material, following preliminary preparation and maceration in Nesbitt's fluid, was preserved on microscope slides in Faure's fluid.

3. List of localities

I. Neiße Valley near Ostritz, ca. 16 km to the south of Görlitz

1. »Teufelsnase«. Spruce forest (in 1962 ca. 60 years old; trees up to 20 cm in diameter) within valley bottom, ca. 4 m above the river; a cover of raw humus, nearly devoid of vegetation. Up till 1989 developed into a deciduous forest (VOIGTLÄNDER & DUNGER 1992).

2. »Saupantsche«. Natural deciduous forest (humus gorge forest, Arunco-Aceretum, close to natural), on valley bottom, directly at »Saupantsche-Graben«, with *Acer pseudoplatanus*, *Carpinus betulus*, *Mercurialis perennis*, *Mnium undulatum* and *Carex brizoides*.

3. Slope at »Wolfsweg«, 20 m above the valley bottom and »Saupantsche«, a drier variety of Arunco-Aceretum with *Picea abies*, *Acer pseudoplatanus*, *Ulmus scabra*, *Carpinus betulus*, *Mercurialis perennis*, *Galium silvaticum*, *Aegopodium podagraria*, *Mnium undulatum*, *Mnium hornum*.

4. Narrow belt of riverine forest between the Neiße River and the bank road at »Teufelsnase«.

5. Riverine forest on valley bottom, N of entrance to »Saupantsche-Graben«; lush vegetation.

6. High-grass meadow, on the bank of the Neiße River (opposite to localities 2 and 3).

Further information about the study area Neiße Valley and the characteristics of particular microhabitats is provided by DUNGER et al. (1972) and VOIGTLÄNDER & DUNGER (1992).

II. Recultivated mining dumps near Berzdorf, ca. 8 km south of Görlitz

Deciduous forest with *Alnus glutinosa*, *Populus sp.*, *Robinia pseudoacacia*; yellow, clayey-sandy soil.

Further information about the study area Berzdorf and the characteristics of habitats is contained in DUNGER (1968) and DUNGER & VOIGTLÄNDER (1990).

III. Old mining dump near Tauchritz, ca. 6 km south of Görlitz

1. *Alnus glutinosa* and *Tussilago farfara* (Tussilago-Alnetum).

2. Deciduous forest with *Alnus glutinosa* and *Populus sp.*

3. Deciduous forest with *Alnus glutinosa*, *Populus sp.* and *Robinia pseudoacacia*.

4. List of species

For the each species the name of locality as well as the number of specimens representing different sex and life stage (males, females, deutonymphs (N), larvae (LV)) and the year of collecting is listed.

Trombidium Fabricius, 1775

Trombidium holosericeum (L., 1758)

Localities: Neiße valley: I.1: 1 ♀, 3 ♂♂ (1988/89); I.2: 2 ♂♂, 1 N (1988/89); I.3: 1 ♂ (1988); I.4: 5 ♀♀, ca. 101 LV (1992); Tauchritz: III.2: 1 N (1961).

Total: 14 specimens representing postlarval stages: 6 ♀♀, 6 ♂♂, 2N and ca. 101 LV (obtained by experimental rearing).

Distribution: Palaearctic.

Remarks: Euryoecious, synanthropic. Hitherto known from postlarval stages.

Trombidium kneissli (Krausse, 1915)

Localities: Tauchritz: III.1: 1 N (1960).

Total: 1 specimen: 1N.

Distribution: Europe (Germany, Bosnia, Austria, Poland, France).

Remarks: Synanthropic. Known only from postlarval stages.

Trombidium meyeri (Krausse, 1916)

Localities: Neiße valley: I.1: 1 ♀ (1961).

Total: 1 specimen: 1 ♀.

Distribution: Europe (Italy, Bosnia, Austria, France, Poland).

Remarks: Euryoecious. Known only from postlarval stages. Information on the parasitism of larvae of *T. meyeri* on *Neobisium* (Pseudoscorpiones) (ROBAUX 1974) has not been supported by characteristics of the larval stage. At the same time there are no reports on obtaining larvae or other stages of the species in laboratory culture.

Trombidium susteri Feider, 1956

Localities: Neiße valley: I.1: 2 N (1988); I.3: 1 N (1988).

Total: 3 specimens: 3N.

Distribution: Europe (Romania).

Remarks: Known from larval and nymphal stages. FEIDER (1956) gives the information on the parasitism of larvae on *Phyllotreta atra* (Fabricius, 1775), *Phyllotreta nemorum* (L., 1758).

Allothrombium Berlese, 1903*Allothrombium fuliginosum* (Hermann, 1804)

Localities: Neiße valley: I.1: 3 ♀♀ (1989).

Total: 3 specimens: 3 ♀♀.

Distribution: Palaearctic.

Remarks: Synanthropic. Associated with open areas. Known from all developmental stages. Larvae are parasites of various aphid species.

Allothrombium pergrande Berlese, 1903

Localities: Neiße valley: I.1: 1 ♀ (1988), 1 ♂ (1989).

Total: 2 specimens: 1 ♀, 1 ♂.

Distribution: Palearctic (Italy, Egypt, Switzerland).

Remarks: Euryoecious. Known only from postlarval stages.

Podothrombium Berlese, 1910

Podothrombium bicolor (Hermann, 1804)

Localities: Neißة valley: I.1: 1 ♀, 1 ♂ (1977); 1 ♀, 2 ♂♂ (1989); I.3: 4 ♀♀, 2 ♂♂ (1989); Tauchritz: III.2: 2 ♀♀ (1961); III.3: 1 ♀ (1961).

Total: 14 specimens: 9 ♀♀, 5 ♂♂.

Distribution: Europe (Germany, Great Britain, France, Switzerland, Finland, Italy, Romania, Austria, Poland).

Remarks: Associated with humid habitats. Known only from postlarval stages.

Podothrombium filipes (Koch, 1837)

Localities: Neißة valley: I.1: 3 ♂♂ (1989); I.3: 2 ♂♂ (1989); Berzdorf: II.1: 4 ♂♂ (1961); II.2: 1 ♂ (1961); II.3: 2 ♂♂ (1961).

Total: 12 specimens: 12 ♂♂.

Distribution: Europe (Norway, Germany, Switzerland, Austria, Czech Republic, France).

Remarks: Known only from postlarval stages.

Podothrombium magnum Berlese, 1910

Localities: Neißة valley: I.1: 6 ♀♀ (1989), 2 N, (1989); I.2: 6 ♀♀ (1989); I.3: 2 ♀♀ (1988), 7 ♀♀, 3 N (1989); Berzdorf: II.1: 7 ♀♀ (1961); II.3: 3 ♀♀, 3 N (1961).

Total: 39 specimens: 31 ♀♀, 8N.

Distribution: Europe (Germany, Norway, Great Britain).

Remarks: Known only from postlarval stages. Status uncertain. The species is a possible synonym of *P. filipes*.

Podothrombium strandi Berlese, 1910

Localities: Neißة valley: I.2: 2 N (1989); I.5: 4 ♀♀, 2 ♂♂ (1992); I.6: 5 ♀♀, 1 ♂ (1992).

Total: 14 specimens: 9 ♀♀, 3 ♂♂, 2N.

Distribution: Europe (Norway, Switzerland, Romania, France).

Remarks: Known only from postlarval stages.

Podothrombium kordulae Haitlinger, 1995

Localities: Neißة valley: I.5: 2 LV (1992); I.6: 21 LV (1992).

Total: 23 specimens.

Distribution: Poland.

Remarks: Known only from larval stage. There are no earlier reports on hosts. Because of the co-occurrence (temporal and spatial) with adult *P. strandi*, there is a high probability that particular stages represent the same species (*P. strandi*). Laboratory culture is needed to confirm this supposition.

5. Concluding remarks

According to the most recent systematic divisions and descriptions (WELBOURN 1991, ZHANG 1995, ZHANG & NORBAKHS 1995), the family Trombidiidae comprises 3 subfamilies and 14 genera. Six of them have been recorded from Europe (*Trombidium*, *Paratrombium*, *Dolichothrombium*, *Caenothrombium*, *Allothrombium* and *Podothrombium*). The occurrence of the mites of the family Trombidiidae in Germany is described in an array of taxonomic and faunistic papers. The list of nominal species based on these papers is the following: *Trombidium holosericeum* (L.), *T. pygiacum* C. L. Koch, 1837, *T. latum* C. L. Koch, 1837, *T. rimosum* C. L. Koch, 1837, *T. breei* Southcott, 1986, *T. brevimanum* (Berlese, 1910), *T. kneissli* (Krausse, 1915), *T. poriceps* (Oudemans, 1904), *Atomus* (= *Trombidium*) *rhopalicus* Vercammen-Grandjean & Popp, 1967, *Paratrombium purpureum* (C. L. Koch, 1837), *P. klugkisti* (Oudemans, 1917), *Allothrombium fuliginosum* (Hermann, 1804), *A. molliculum* C. L. Koch, 1837, *Podothrombium filipes* C. L. Koch, 1837, *P. bicolor* (Hermann, 1804), *P. macrocarpum teutonicum* (Berlese, 1910), *P. magnum* Berlese, 1910, *P. montanum* Berlese, 1910, *P. piriformis* Robaux & Schiess, 1982 (BERLESE 1910, HAITLINGER 1995, KOCH 1837, KRAUSSE 1915, OUDEMANS 1909, 1917, ROBAUX & SCHIESS 1982, SOUTHCOTT 1986, VERCAMMEN-GRANDJEAN & POPP 1967, WILLMANN 1955). THOR & WILLMANN (1947) report from Germany three more species of the genus *Allothrombium*: *A. fuligineum* Oudemans, 1905, *A. adustum* Oudemans, 1905 and *A. incarnatum* Oudemans, 1905. The above species were described from the Netherlands and, in the papers referred to by the authors as well as in other publications, there are no data confirming the occurrence of these species in Germany.

Totally, 19 species representing four genera of the family Trombidiidae have been recorded so far from the present territory of Germany. Because of the lack of type material and the laconic descriptions, the taxonomic status of many species, especially those from Hermann's and Koch's collections, requires explanation. The difficulties when making taxonomic decisions result partly from the double systematics widespread in the group, which imply independent systems for larvae and postlarval stages, outcoming in overestimation of the number of species.

Eleven species of the family Trombidiidae have been recorded in the course of present studies from the area of Neiße Valley and the recultivated coal mining dumps of Berzdorf and Tauchritz. Five species (*Trombidium meyeri*, *T. susteri*, *Allothrombium pergrande*, *Podothrombium strandi*, *P. kordulae*) are new to the fauna of Germany.

The mite fauna of the family Trombidiidae in the studied area shows similar diversity in comparison with other investigated regions (GABRYŚ & MAKOL 1991, 1994, 1996). However, abundant occurrence of members of the genus *Podothrombium*, especially in the Neiße Valley, is noteworthy. Previous analysis of the distribution and habitat preferences indicates a boreal-montane character of the species included in this genus, which confirms observations on the specific microclimate in the Neiße Valley. The reasons for the narrow range of species and developmental stages can be sought not only in limited heterogeneity of sampling places, but also in the methods of collecting. Larvae that parasitise on various arthropods were accidental in the studied material, as they require specific methods of collecting which are primarily adjusted to their hosts (e. g. net sweeping). The postlarval forms of Trombidiidae are relatively large and soft, therefore a too small mesh used for sifting can prevent bigger specimens from penetrating the sieve. Similarly, collecting the Trombidiidae in traps does not produce as good results as sampling without sifting or direct collecting (unpublished data).

Further conclusions concerning the investigated fauna will be possible after some additional studies of ecologically similar areas and also after solving the nomenclature problems which are especially considerable within the genus *Trombidium* (MAŁKOL 1996).

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Accepted: 26 February 1997

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Aus der Arbeit der Naturforschenden Gesellschaft der Oberlausitz e. V. - Die Bodentierwelt der Oberlausitz

Tiere, die im Inneren oder unmittelbar an der Oberfläche von Böden leben, stehen heute im Mittelpunkt des Interesses der Ökologie. Dieser bis zur Mitte des 20. Jahrhunderts gänzlich vernachlässigte Teil der Tierwelt gibt Auskunft über Zustand und Entwicklung eines der höchsten Güter der heimatlichen Natur - der Böden. Zoologen des Staatlichen Museums für Naturkunde Görlitz und der Naturforschenden Gesellschaft der Oberlausitz haben sich seit 1960 diesem Forschungsgebiet verschrieben.

Das Studium des Lebens im Boden ist dort besonders wichtig, wo menschliche Aktivität nicht nur zu Veränderungen, wie in der Land- und Forstwirtschaft, sondern zu schweren Belastungen oder gar Devastierungen der Böden geführt haben. Hierzu zählen auch in der Oberlausitz Flugaschen, die heute stillgelegte Kohlekraftwerke auf die Böden niederregnen ließen. Die Hänge des Neißetales nördlich Hirschfelde sind noch immer bis zu 20 cm hoch hiermit bedeckt. Noch problembelasteter sind Halden, die im Osten und Norden der Oberlausitz von Braunkohlentagebauten als zunächst sterile, jahrmillionenalte geologische Massen hinterlassen wurden. Nach solchen Eingriffen in die Natur haben die Bodenzooologen zu klären: Überleben die natürlichen Bodenbewohner eine Bedeckung mit Flugasche? Welche Tiere besiedeln die Schüttmassen auf Halden zuerst, welche später? Und welche Faktoren steuern dieses Geschehen?

In der Oberlausitz vermuten wir 2 - 4000 Arten der Bodenfauna - also eine größere Vielfalt, als die Gesamtheit der einheimischen Blütenpflanzen aufweist. Ein erstaunlich hoher Anteil hiervon ist der Wissenschaft sogar noch völlig unbekannt - eine ungewöhnliche Herausforderung für die Bearbeiter. Die Görlitzer Arbeitsgruppe Bodenzologie vereint Spezialisten für die wesentlichen Gruppen der Bodentierwelt. Von der Mikrofauna (0,01 bis 1 mm große Bodentiere) werden vor allem beschaltete Amöben und Nematoden bearbeitet, von der Mesofauna (millimeterlange Bodentiere) Spinnenverwandte wie Raubmilben und Moos- oder Panzermilben und Urinsekten wie Springschwänze und Beintaster. Aus der Makrofauna (zentimeterlange Bodentiere) interessieren Krebstiere (Landasseln), urtümliche Tracheentiere wie Hundert- und Tausendfüßer und vor allem die wichtigen Regenwürmer sowie schließlich bodenbewohnende Säugetiere.

Die mühevollen, im internationalen Austausch betriebene Kleinarbeit an dieser vielfältigen »Unterwelt des Tierreiches« hat inzwischen bewirkt, daß die Oberlausitz ein international bekanntes Forschungsgebiet für die Bodenzologie, insbesondere für die Tierwelt der Bergbaufolgelandschaft, geworden ist. Am Beispiel der Halden des Braunkohlenreviers Berzdorf wurde und wird auch weiterhin beschrieben, wie die rekultivierten Flächen von Tieren besiedelt werden: Zunächst mit Arten der Bodenmikrofauna passiv durch die Luft, später durch zunehmend größere Tiere auch über eine aktive Einwanderung. Wir verstehen zunehmend, was Tiere brauchen, um sich ansiedeln und vermehren zu können. Aus dieser Kenntnis ist ableitbar und das ist besonders wichtig, welche Bedingungen die technischen Maßnahmen zur Melioration und Rekultivierung schaffen müssen, um die Belebung der Schüttmassen zu erleichtern und damit ihren Weg zur Bildung dauerhaft fruchtbarer Böden zu beschleunigen.

Wolfram Dunger