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THE DISTRIBUTION AND ECOLOGY OF PSEUDOSCORPIONES IN POLAND

Introduction

The study of pseudoscorpions began in 19th century, thanks to the activities of Antoni Waga and Anton Menge. Waga collected rich material from various parts of Poland as well as from other Europeans and African countries. This material was preserved as dried specimens, and only a small part of it has survived up to now. Unfortunately, Waga never worked out his material, so we have only little information about it. In 1855 Menge published his first paper on Pseudoscorpiones, mainly from the Gdańsk district, but it contained information on many sites in Poland and some records of amber fauna. He mentioned 7 species of pseudoscorpions. 20 years later Nowicki and Kulczyński published several papers about arachnids from Galicia with new data on the distribution and ecology of Pseudoscorpiones. Kulczyński collected very rich material of pseudoscorpions and was going to prepare a monograph of Pseudoscorpiones of Poland, but he never finished it. All of his material and his notes disappeared during the First World War. Before the Second World War the famous Polish arachnologist and acarologist,- Prof. J. Rafalski, has begun collecting pseudoscorpions from many parts of Poland. The results have been published in the Catalogus faunae Poloniae in 1967. Poland was divided into 21 faunistic regions and subregions. Based on literature and his own collection, Rafalski has given information on the distribution and tentative ecology of 38 species and subspecies of pseudoscorpions from Poland.

This paper is based on the literature and field investigations which have been carried out by the author in several regions of Poland (Jędryczkowski 1985, 1987, 1987a).

Zoogeography

Our knowledge about the distribution of Pseudoscorpiones in Poland reflects a tendency of directing scientific interests mainly regions which are especialy favoured because of touristic or natural value. Figure 1 presents a map on which all sites are plotted from which information on pseudoscorpions was obtained.

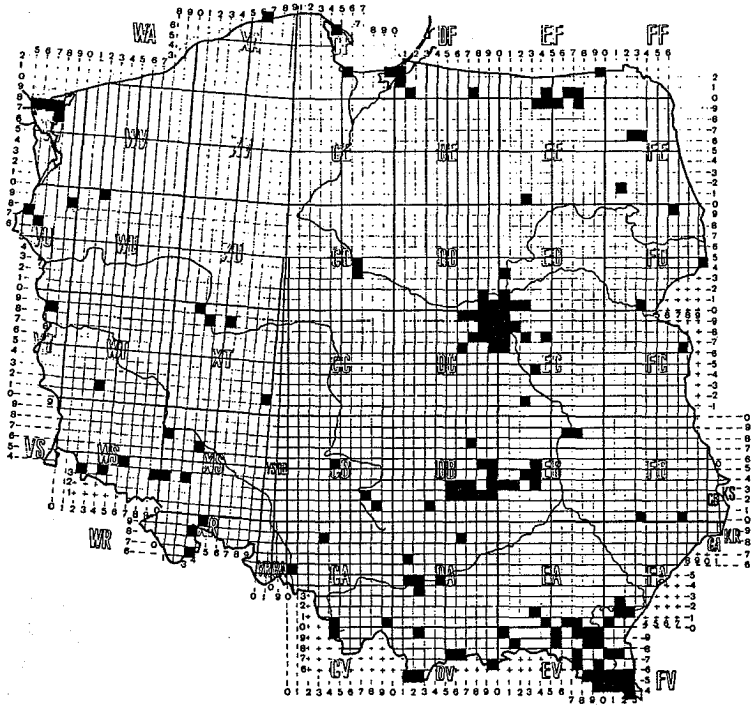

Figure 1. Distribution of Pseudoscorpiones in Poland based on literature and collections.

It is clear that the main sources are directly linked with scientific centers such as Warsaw, Cracow or Wrocław or with regions where the main faunistic projects have been carried out (i.e. Bieszczady Mts., Świętokrzyskie Mts., Pieniny Mts.). Despite what has been mentioned above, it is possible to present a general feature of zoogeographical elements which make up the pseudoscorpion fauna in Poland.

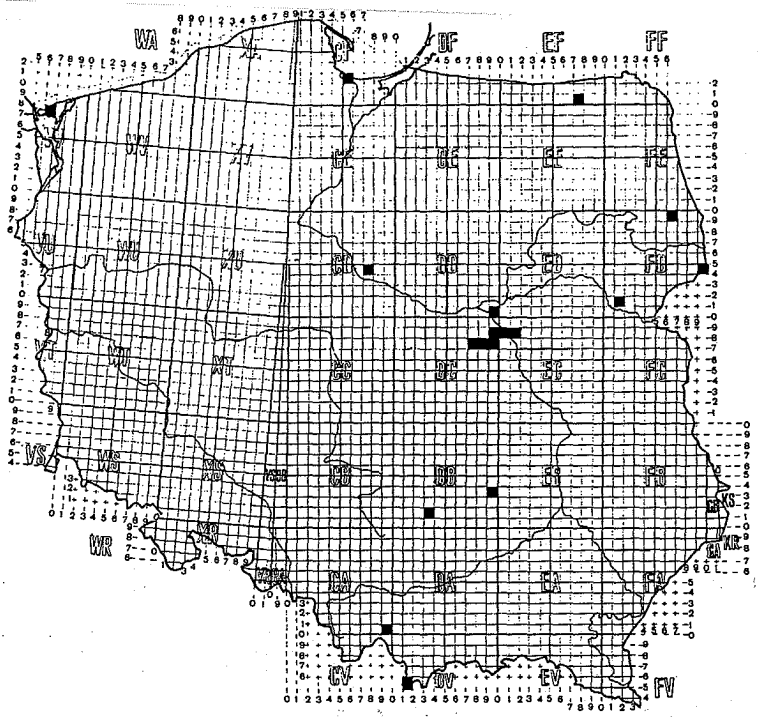

Figure 2. Distribution of the Cosmopolitan element in Poland.

There are six main zoogeographical elements in the Polish fauna. The Cosmopolitan element (fig. 2) is represented by *Chelifer cancroides* which is known only from few sites, although it might be present all over Poland. It prefers houses, barns and bird nests, and thereby avoids the attention of collectors and is rarely represented in samples.

The most frequent zoogeographical element in Poland is the European one. It is represented by *Neobisium erythrodactylum*, *Neobisium carcinoides*, *Chernes hahni*, *Chernes cimicoides*, *Lamprochernes chyzeri*, *Allochernes wideri*, *Pselaphochernes scorpioides* and *Mesochelifer ressli*. These species occupy various environments and are distributed all over Poland (Fig. 3), although they avoid high altitudes.

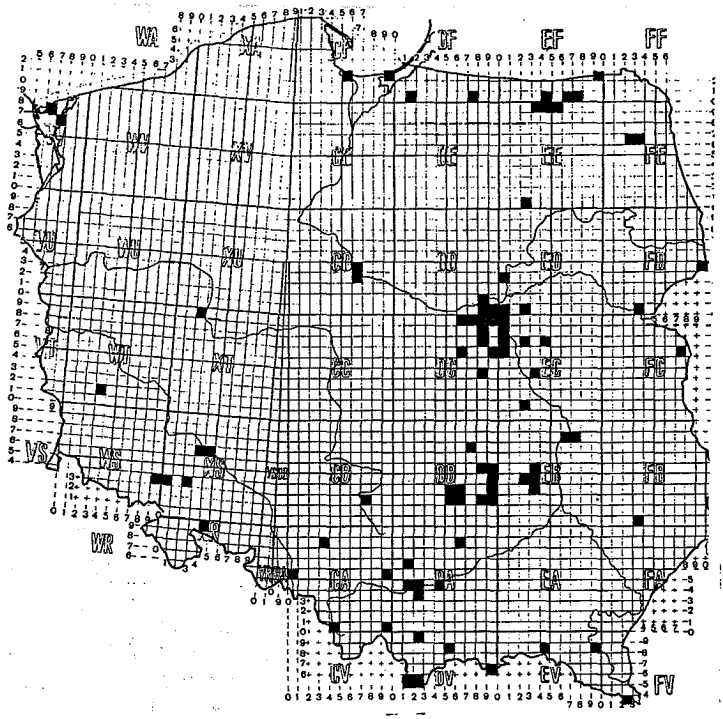

Figure 3. Distribution of the European element in Poland.

The North European element is represented by at least four of the following species: *Microbisium suecicum*, *Microbisium brevifemoratum*, *Allochernes peregrinus* and *Dinocheirus panzeri*. They are represented in most parts of Poland exept the southwestern part (Fig. 4). As can be seen, there is only little evidence fo the distribution of this group in Poland.

The South European element is represented by *Neobisium silvaticum silvaticum* (Fig. 5), which is very frequent in the southern part of Poland. This species prefers uplands and not very high mountains. In the Świętokrzyskie Mts. it reaches its northernmost distribution in Europe. The distribution of *N. sylvaticum sylvaticum* is well documented.

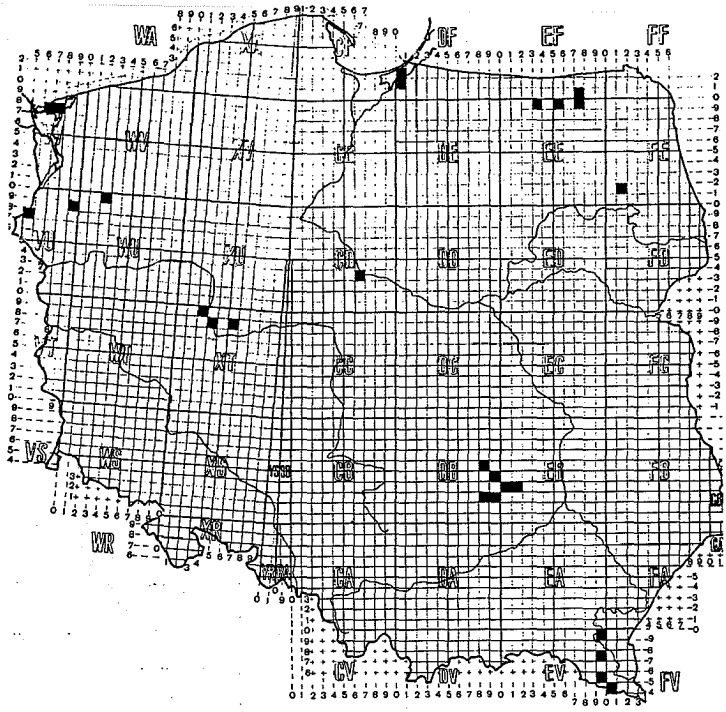

Figure 4. Distribution of the North European element in Poland.

The Carpathian element contains the following three species: *Mundochthonius carpaticus*, *Neobisium carpaticum* and *Chthonius heterodactylus*. The distribution of these species (Fig. 6) is very distinctive. They are distributed over the Carpathian chain and appear in the Świętokrzyskie Mts, where *Mundochthonius carpaticus* has its northern border of distribution. There is one locality of this species in the Bielany Reservation at Warsaw, but it is an artificial one. This species was probably introduced there in previous centuries during the transportation of logs from the Carpathian sites to Gdańsk on the Vistula river . At that time there was a big timber yard at Warsaw located near a natural forest which is now the reservation. This forest is known as a place where a few carpathian elements, mostly insects, live.

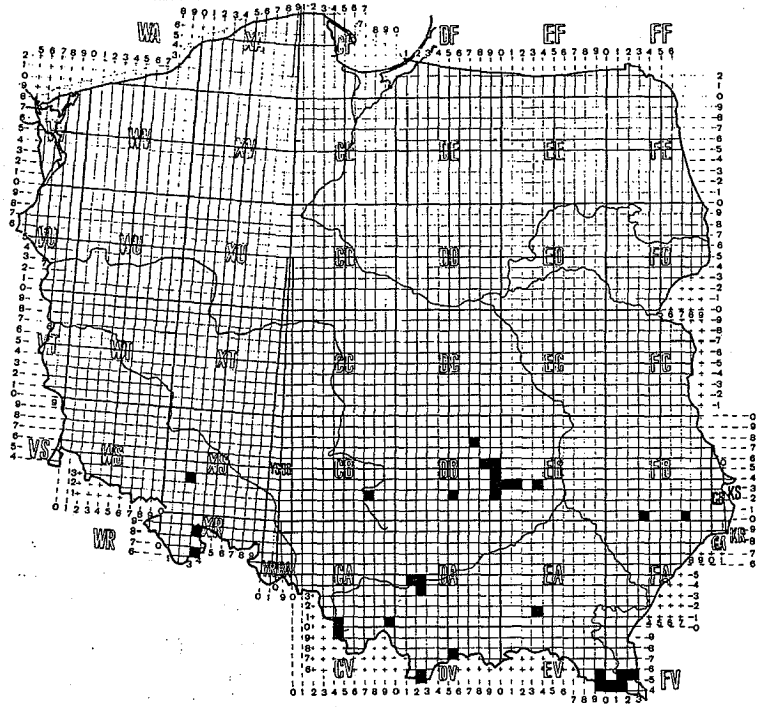

Figure 5. Distribution of the South European element in Poland.

The East Carpathian element consists of three species: *Neobisium polonicum*, *Neobisium brevidigitatum* and *Roncus transsilvanicus*. They occupy mainly the Bieszczady Mts. (Fig. 7), where *N. polonicum* and *R. transsilvanicus* are very common in various environments.

Ecology

From the variety of environments in Poland, nine of the best known have been chosen to be presented here.

1. Coniferous forest with fir (*Abietetum polonicum*).

This type of forest is spread mostly in the southern part of Poland with a northern border of distribution in the Świętokrzyskie Mts. Four species of pseudoscorpions occur there. Three of them - *N. sylvaticum sylvaticum*, *N. erythrodactylum* and *N. carcinoides*, live in leaf litter, while *D. panzeri* occupies

dwcayed wood and places under bark.

2. Mixed forest with pine and oak (*Pino-Quercetum*).

The mixed forests are a very common type of forest which cover most of Poland except the mountainous regions. In this environment there live six species. Those inhabiting leaf litter are *N. sylvaticum sylvaticum* (but only in the Świętokrzyskie Mts.), *N. erythrodactylum* and *N. carcinoides*. *A. wideri* and *C. hahni* live under bark of oaks, in hollows and in decayed wood. *Mesochelifer ressli* lives under bark of old pines in sunny places.

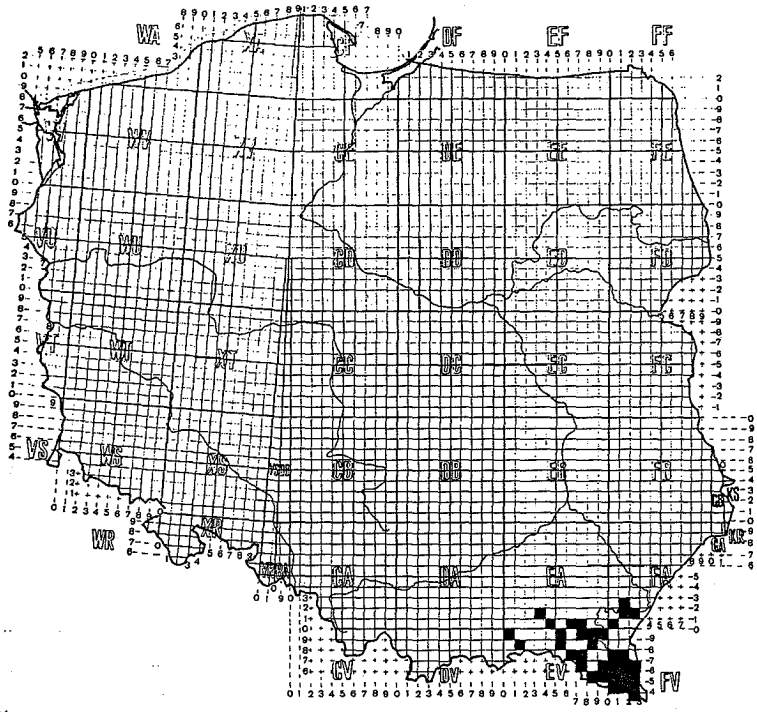

Figure 6. Distribution of the Carpathian element in Poland.

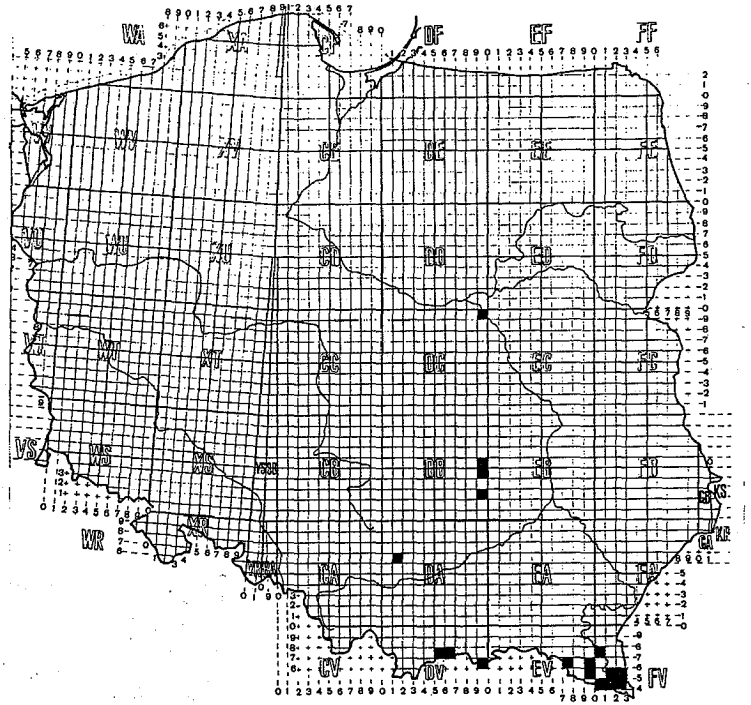

Figure 7. Distribution of the East Carpathian element in Poland.

3. Deciduous mountainous forest with beech (*Dentario glandulosae - Fagetum*).

This type of forest is typical of most mountains in Poland. It offers very good environmental conditions, so the pseudoscorpion fauna is very rich there. Fifteen species of Pseudoscorpiones have been recorded from there. The following species are characteristic of leaf litter: *M. carpaticus*, *Chthonius heterodactylus*, *N. sylvaticum sylvaticum*, *N. erythrodactylum*, *N. carcinoides*, *N. brevidigitatum*, *N. carpaticum*, *N. polonicum*, *N. fuscimanum fuscimanum* and *Roncus transsilvanicus*. The following species live in tree hollows, decayed wood and under bark: *A. wideri*, *D. panzeri*, *C. cimicoides*, *C. hahni* and *Dendrochernes cyrneus*.

4. Deciduous forest with oak and lime (*Tilio-Carpinetum*).

Since this type of forest occupies only rich soils, it is not frequent in Poland except in national parks and reservations. The forest floor is occupied by *M. carpaticus* and *N. sylvaticum sylvaticum* (in mountains only), *N. erythrodactylum*, *N. carcinoides* and *Pselaphochernes scorpioides*. Under bark and in tree hollows there are *A. wideri*, *C. cimicoides*, *C. hahni* and *D. cyrneus*.

5. Bushes.

There is a large variety of bushes in Poland. In montain localities they can be moisty especialy along streams. Here occur *M. carpaticus*, *C. heterodactylus*, *N. sylvaticum sulvaticum*, *N. carpaticum*, *N. polonicum*, *N. fuscimanum fuscimanum* and *R. transsilvanicus*. In lowland bushes covering slopes and hills live *N. erytrodactylum* and *N. carcinoides*.

6. Meadows.

A variety of meadows are inhabited by different groups of pseudoscorpions. In mountains, under stones at river banks live *N. polonicum*, *N. sylvaticum sylvaticum*, *N. fuscimanum fuscimanum* and *R. transsilvanicus*. In the northen part of Poland, where meadows are more steppe-like, live *N. erythrodactylum* and *Microbisium suecicum*.

7. Peat-bogs.

The peat-bogs have the greatest variety and abundance in the northern part of Poland and in the Świętokrzyskie Mts. They are not very rich in pseudoscorpion fauna, but there is one species - *Microbisium brevifemoratum* which is typical for this environment. Apart from this species *N. sylvaticum sylvaticum*, *N. erythrodactylum* and *N. carcinoides* occur.

8. Tree hollows and bird nests.

This is a very special sort of environment, which is inhabited by a peculiar fauna. Although much has been published on especially insect fauna, there is little information about Pseudoscorpiones. During the author's study the following species have been collected: *Cheiridium museorum*, *A. wideri*, *C. hahni*, *D. panzeri* and *C. cancroides*.

9. Synanthropic environments (gardens, parks, houses etc.).

Five species of pseudoscorpions were recorded from these environments. Outdoors live *N. carcinoides* and *N. erythrodactylum* while inside, especialy in barns and poultry-houses, *C. museorum*, *A. wideri* and *C. carcinoides* occur.

This analysis does not contain the complete material on all species of Pseudoscorpiones in Poland, but refers only to reliable data.

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