Pollen feeding of Deuterosminthurus repandus (Ågren) in the High Pyrenees, and some systematic notes (Collembola: Sminthuridae)

by

WILLEM N. ELLIS

Instituut voor Taxonomische Zoölogie, Zoölogisch Museum, University of Amsterdam

ABSTRACT. — *Deuterosminthurus repandus* (Ågren, 1903) was witnessed in a high alpine vegetation in the Pyrenees, feeding on pollen of *Galium pumilum* Murr. straight from the flowers. This habit is brought into connection with the scarcity of wind-borne pollen at higher altitudes. The parallelism in the southern and northern form of both *D. repandus* and *D. pallipes* (Bourlet, 1843) is stressed, and the separation of both taxa is doubted.

During a collecting trip of my wife and myself in the neighbourhood of the well known tourist resort Gavarnie, in the French Hautes Pyrénées, ample attention was given to epigeic Collembola species, particularly at alpine altitudes. One of the easiest attainable higher sites is the vicinity of the so-called Brèche de Roland; from the pass at the Spanish-French border, which can be reached by car, an easy trail leads upwards, and in favourable weather a long procession of old and young mountaineers may be seen and heard here. At 2350 m we found along this trail a typical high-alpine vegetation, which was hardly or not at all influenced by the intense tourism nearby. The vegetation consists of a very sparse cover of isolated dwarfish plants, mainly *Ranunculus alpestris* L. and *Primula integrifolia* L. At the time of our visit, 22 July 1975, the snow had not altogether disappeared. In this extreme habitat we found only one truly epigeic species of Collembola, viz *Deuterosminthurus repandus* (Agren, 1903). In NW Europe this is a common species with a preference for unshaded macrophyte vegetations, e.g. patches of Stinging Nettles (*Urtica dioica* L.), thistles, Hemp Agrimony (*Eupatorium cannabinum* L.) and the like, where judging after the contents of its intestine, it feeds almost exclusively on pollen grains and spores which are distributed as "dust" on the plants (Ellis, 1974a). In the alpine habitat now discussed such macrophytes are absent and *repandus* inhabited a completely different sort of habitat, viz tiny clusters of Slender Bedstraw, *Galium pumilum* Murr., which grow in completely isolated patches in an otherwise barren field of fine gravel mixed with some coarser stones. Almost none individuals of *repandus* were seen which were not sitting on these plants, and even these stragglers may have been scared away from their proper habitat by ourselves. The majority of the animals was found on the flowers, often in an active, feeding position with the antennae kept upwards and in constant motion. The small size of both animals and flowers, however, precluded a definite statement that they were biting the anthers or the like. A study of the material collection at this site (all adult individuals, with the large majority female), however, confirmed our supposition that the animals were feeding on the Bedstraw pollen. Almost all specimens had an intestine bulging with *Galium* pollen; only a few specimens had a small fraction of brownish, detrital material in the intestine.

This certainly is not the first time that Collembola are found within flowers. Handschin (1924) for instance lists among the visitors of flowers of *Ranunculus glacialis* L. in the Swiss National Park: *D. repandus, D. pallipes* (Bourlet, 1843) and "*Bourletiella lutea*". The latter name is variously misinterpreted, but generally refers to some yellow *Deuterosminthurus*. An exhaustive bibliography on Collembola as flower visitors and pollen feeders is given by Kevan & McE. Kevan (1970) to which I refer for complete references (see also Kevan, 1972). These authors emit the suggestion, that in the harsh arctic and high-alpine environments Collembola are attracted to flowers not only for the sake of food, but also because of the "ameliorated thermal regime" within flowers. This may well be effective in some cases, but the small open Bedstraw flowers can hardly be expected to offer such a regime (although the whole plant perhaps may do so). It seems more appropriate to me to consider the concentration of *repandus* on its food

source to be imposed primarily by the general scarcity of wind-borne pollen available at high-alpine altitudes. Above the level of the extensive mats of *Carex curvula* All. almost no more wind pollinating plants are present and the pollen rain has to come from comparatively long distances. (Perhaps glaciers are such an attractive habitat for Collembola precisely because of the descending air-currents which they cause?).

It is interesting to note that at lower altitudes *repandus* returns to its normal habitat: it was found on a low *Salix*, and elswhere on a mixed vegetation of macrophytes, both times at about 1700 m.

In NW Europe *D. repandus* occurs together with *D. pallipes*. Both species differ somewhat in their ecology: *pallipes* is found more rarely, and seemingly prefers macrophytes and dwarf shrubs (*Vaccinium*) under a light tree cover. The species can be told apart by their pigmentation only: *repandus* is uniformly yellow, often with a tinge of orange, *pallipes* is blue-black except for the white feet. Both species possess a very small tooth on the unguis. *D. pallipes* is replaced in southern Europe by *D. fenyesi* Stach, 1926, which was reduced by me to a subspecies of the former after study of the type material from Hungary, and of material from Rhodes (Ellis, 1974b). *D. p. fenyesi* is known now moreover from Yugoslavia and the Pyrenees (in the latter case as the synonymous *D. beckeri* Coineau & Delamare Deboutteville, 1961). *D. p. fenyesi* differs from typical *pallipes* in its larger size, in having a variable number of dorso-median setae on the male postabdomen (0-2 in *fenyesi*, 0 in *pallipes*), and in the possession of a much stronger tooth on the unguis. Now the first character is generally of little practical value in Collembola, the second is very interesting but difficult to assess in a limited material, so that the practical distinguishing character remains the degree of differentiation of the ungual tooth.

In the material from Rhodes were four specimens which agreed completely with *pallipes fenyesi*, except for the total lack of black pigment. Obviously, this material could either be interpreted as a pigmentless from of *fenyesi*, or alternatively as a form, eventually even as a subspecies, of *repandus*, differentiated from the latter in having a strong ungual tooth! In view of the scarcity of the material I refrained from the latter, most far-reaching conclusion, and decided provisionally to have peace with the curious inconsistency of an uncoloured forma *pallida* of the subspecies *pallipes fenyesi*.

The material from the Pyrenees which I have available now shows the following pertinent details: mean head diameter of 24 females 269 µ, standard deviation 19 µ (head diameter thus significantly shorter than both in Greek and Dutch material); in none of the 8 males available any dorso-median seta was found on the postabdomen; and finally, the unguis has a pronounced tooth. So this material could be indentified as *pallipes fenyesi* forma *pallida* although the constancy in the absence of setae on the male postabdomen would call for an explanation. Therefore I prefer the other alternative, which means, first, to drop the forma *pallida* - an action luckily not having nomenclatural consequences - and to face the situation that both the species *repandus* and *pallipes* are differentiated in a northern subspecies or clinal form, having a small ungual tooth, and a southern form with a strong tooth.

This strong parallelism in two species which are so very close in morphological details supplies me again with ample reason of dissatisfaction concerning the validity of their distinction. As a matter of fact, in the European fauna there are several comparable pairs of species, each differing only in pigmentation, and in ecological preference. I may mention the pairs *Lepidocyrtus lanuginosus* (Gmelin, 1788) - *L. cyaneus* Tullberg, 1871, and *Lepidocyrtus lignorum* I. C. Fabricius, 1775 - *L. violaceus* Lubbock, 1873. A close scrutiny of the actual reproductive isolation of such pairs might provide far reaching results.

Acknowledgements. — The help of Dr. T. van de Hammen, Hugo de Vries Laboratorium, Amsterdam, in confirming the identity of the pollen, and the permission of Dr. P. Chimits to collect in the Parc National des Pyrénées is gratefully acknowledged.

REFERENCES

Ellis, W. N., 1974a. Ecology of epigeic Collembola in the Netherlands. — *Pedobiologia* 14: 232—237.

———, 1974b. The spring fauna of Collembola (Insecta) from Rhodes, with descriptions of some new taxa. — *Beaufortia* 22 (292): 105—152.

Handschin, E. H., 1924. Oekologosche und biologische Beobachtungen an der Collembolenfauna des schweizerischen Nationalparkes. — *Verh. naturf. Ges. Basel* 35 (2): 71—101.

Kevan, P. G., 1972. Collembola on flowers on Banks Island, N. W. T. — *Quaest. ent.* 8 (2): 121—121.

Kevan, P. G. & D. Keith McE. Kevan, 1970. Collembola as pollen feeders and flower visitors with observations from the High Arctic. — *Quaest. ent.* 6: 311—326.

Plantage Middenlaan 64, 1018 DH Amsterdam.

Uralaphorura, a new name for Uralia Martynova, 1976 (Collembola: Onychiuridae)

by

E. F. MARTYNOVA

Quite recently, I proposed the subgenus *Onychiurus* (*Uralia*) for a new species of Collembola from Siberia (Martynova, 1976). The subgeneric name, however, appears now to be preoccupied, as it was used for a genus of birds by Mulsant & Verreaux, 1866. I consequently now propose as replacement name for the subgenus *Uralaphora*. The subgenus is closely related to *Protaphorura*, but is distinguished by the possession of a clavata tenent hair on all tibiotarsi; this character is very unusual within the family Onychiuridae.

REFERENCES

Martynova, E. F., 1976. Species of genus Onychiurus Gervais, 1841 (Collembola, Onychiuridae) from the north and north-east of Asia. — *Novie i maloizvestnie vidi fauni Siberi* 10: 5—44 (6).

Mulsant, E., J. Verreaux & E. Verreaux, 1866. Essai d'une classification méthodique des Trochilidés comprenant le catalogue de toutes les espèces connues de ces oiseaux. — *Mém. Soc. Imp. Sci. nat. Cherbourg* 12: 148—242 (225).

Kathedra Entomologii, Biologo-pochvenie th-t, Universitetskaja nab., 7/9, Leningrad 199164, USSR.

DENNIS, R. L. H., 1977. THE BRITISH BUTTERFLIES — THEIR ORIGIN AND ESTABLISHMENT. pp 318, 20 figs, 15 tabellen. E. W. Classey Ltd., Faringdon, Oxon, England. SN7 7DR ISBN 0-900848-44-4. Prijs gebonden £ 10.

Dit boek is de derde poging om het ontstaan en het verdere verloop van de Britse dagvlinderfauna te reconstrueren. De eerste, die zich met deze problemen bezig hield, was E. B. Ford, die daaraan in zijn boek „British Butterflies" (1945) een hoofdstuk wijdde. In 1947 volgde B. P. Beirne met zijn uitvoeriger publicatie „The origin and history of the British Macrolepidoptera". En nu, 30 jaar later, volgt een volledig boekwerk.

Dennis begint met een uitvoerige bespreking van de geologische geschiedenis van de Britse eilanden sinds het einde van de laatste ijstijd en het begin van het Pleistoceen. Deze vormt het stramien waarop al zijn verdere argumentaties berusten. Sinds 1947 zijn tal van nieuwe gegevens op palaeontologisch en geologisch gebied bekend geworden, die maken dat Dennis' conclusies soms belangrijk afwijken van die van zijn voorgangers. Namen deze nog het bestaan van refugiën aan, waarin sommige soorten de laatste ijstijd hadden kunnen overleven, volgens de nu bekende gegevens moet dit als uitgesloten geacht worden. Alle nu op de eilanden voorkomende soorten moeten daar na de laatste ijstijd pas gekomen zijn (net als bij ons). Uitvoerig wordt o.a. de geografische variabiliteit op de Britse eilanden nagegaan. Van grote betekenis is daarbij de isolatie geweest na de verbreking van de verbindingen met het continent. Pas toen geen uitwisse-