

Book Review

Doppelfüßer (Diplopoda) Deutschlands [Millipedes of Germany]

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2019 published by Deutscher Jugendbund für Naturbeobachtung.

The book costs 15 Euros; available from www.naturbeobachtung.de.

This, apparently small, book is packed with information about millipedes. While the main focus is on keys and distribution maps there is plenty more information in addition and it includes many colour photographs.

The main sections include an introduction and short description of what millipedes are. This is followed by a description of each order with photographs and diagrams and a section with information about mating, moulting, growth and development. This is followed by chapters on ecology and biogeography, a short section on collecting methods and then the identification section including keys. The appendices include distribution maps and information about which

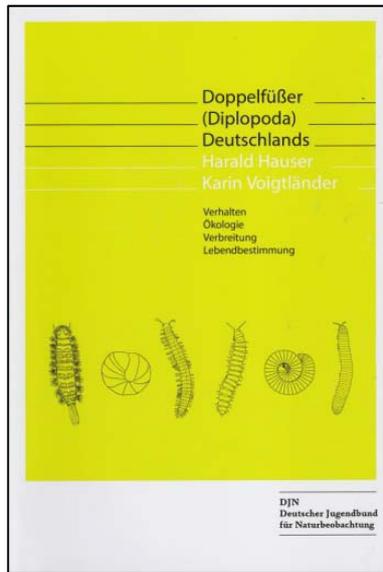
species are found where in Germany. This section has both lists per region and per species. Finally, there are several appendices including a glossary and a tabular identification key with figures of gonopods.

The ecological information includes some interesting background information, such as temperature ranges at which different species are active and details of humidity preferences. The tables of course include non UK species but there are also plenty of familiar ones. It is interesting to note for example that *Tachypodoiulus niger* is listed as having temperature range of 18-26° whereas for *Polydesmus angustus* it is 4-10°. There is a diagram and additional information about degree of synanthropism where it is interesting to see that *Cylindroiulus britannicus* and *C. parisiorum* are both listed as very synanthropic species something we wouldn't perhaps expect in the UK. Another species listed in this category is *Ophiodesmus albonanus* which we would. *Glomeris marginata* is listed as predominantly in natural biotopes whereas we might find it in synanthropic conditions too. One point to bear in mind is that some of these figures may be based on very low numbers of specimens where the species are rare in Germany.

The ecological information continues with a kite diagram showing changes in abundances in the species found in biotopes of a specific valley/valley sides and details of biotope preferences for some species. Finally there is a section on microhabitats including information for four woodland species on whether they are found more in the leaf litter (*Allajulus nitidus*), at the base of trees (*Tachypodoiulus niger*), in tree stumps (*Polydesmus angustus*) or found roughly equally in all three (*Glomeris marginata* - least at the base of trees). It might be interesting to repeat this study in an English woodland where I would suspect different results.

There are notes on phenology and activity over the year with graphs illustrating different patterns for various species. For example *Ommatoiulus sabulosus* is summer active, *Melogona voigtii* and *Craspedosoma rawlinsii* are active in spring and autumn and *Leptoiulus belgicus* in winter.

There is a section on faunogenesis with a case study presenting the origin of some species found in Germany. This shows many species found in the UK as reaching Germany from the west but the country also has both an alpine suite of species and an eastern suite. Most of these last two groups are not part of the British fauna except for a few rarer species.



The section on study methods is quite short but includes illustrations of include a home made spi-pot, similar to that used by arachnologists for studying live specimens, as well as a pooter and sieves etc.

The section on identification starts with a table showing characteristics of each order, largely using diagrams to show the important features of how these vary. Each order is treated separately with the identification method varying. For example for *Glomeris* species there are photographs and drawings of colour patterns; for Polydesmids there is a table and text using size, number of rings and comments on distribution to help separate the species; Chordeumatids have a similar table and text. For Blaniulids there is a table incorporating drawings of the male heads showing cheek plate shape and eye colour and pattern. Julids have two tables, one featuring photographs of habitus and the other drawings of telson and anal valve shape. The final part of this section is a dichotomous key to all species.

The appendices make up a fair section of the book and are largely focussed on distribution in Germany. These start with introductory tables including one listing all the Red Data Book species and includes for example *Brachycheateuma bagnali* and *Cylindroiulus parisorum* (see also the maps in the appendix). Then follow the distribution maps for each species. A couple of introductory maps show the German Federal states and some physical features that might be important for distributions such as the Rhine valley. The species maps have an interesting addition which is that they incorporate information on which other countries the species has been found in by listing them to the relevant cardinal point (Sweden to the north, Belgium to the west and Ukraine to the east for example). Different species are shown with different coloured dots, the significance of which I was unable to determine – probably due to my poor language skills.

In appendix 2 each species is listed with were they are found in Germany and the type of place where they were found such as beech forests, botanic gardens, caves etc. and there is a wealth of information here.

Finally there is a tabular key to all species and this includes illustrations of the gonopods of everything other than Glomerids.

In summary the book will be useful for identification and includes a variety of different methods, both dichotomous and tabular (although they are in different places in the book). For a small book it is packed with information and the ecological details are presented in a variety of visual formats which makes them both interesting and accessible. In addition there are the distribution maps for each species. This booklet will be of use for British workers as there are many species found in both countries, as well as some more eastern and alpine species that are not recorded from the British Isles. For someone with better German language skills there is even more information to be gleaned from it but the fact that it is well illustrated with nice photographs and drawings means there is still much of interest for someone with very limited German. Although seemingly small it is packed with useful information.

Helen Read