

www.araneae.unibe.ch Central European Spiders

- Determination Key

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Abstract

www.araneae.unibe.ch is the address of an identification key for Central European spiders on the internet. It is mainly based on Heimer & Nentwig (1991), but with the help of more than 100 contributors it received numerous additions and improvements and today it includes about 1300 species. Keys are dichotomous (a data-based key for Linyphiidae is being prepared) with internal links between the sexes. Species are illustrated with more than 11000 figures from various authors. Ecological information and distribution maps are included for many species. The key is progressing steadily and anyone working on a special group is invited to contribute by revising parts of the key.

Key words: determination key, Araneae, Central Europe, Internet

INTRODUCTION

Spiders (Araneae) form a large order of the class Arachnida with nearly 38000 species known worldwide today (Platnick 2003). According to the existing checklists of European countries (e.g. Blick et al. 2002), more than 3000 species may be expected in Europe. Differentiation of the species is not always easy and new methods bring up new tools to (re-) define new species (Knoflach 1998; Töpfer-Hofmann et al. 2000).

Apart from the good keys to the family and generic levels and excellent illustrations of Roberts (1985, 1987, 1998) which deal with western and northern European species, there are no up-to-date comprehensive determination keys for central Europe. Older keys exist for several countries (Simon 1914, 1926, 1929, 1932, 1937; Palmgren 1939, 1943, 1950, 1974a,b, 1975, 1976, 1977; Miller 1971) or for some families (Wiehle 1952, 1956, 1960, 1963) but these

lack all the species discovered and described since.

In 1991, Heimer & Nentwig produced a comprehensive key for central Europe, including about 1200 species. The aim was to produce one book, not too expensive, comprising as many species as possible. This was only possible by contributions from several authors. Of course, if one tries to publish 1200 species in a single book, some problems arise: figures have to be small and few. And if such a volume does not take years and years to prepare, mistakes will certainly slip in.

Taxonomic and faunistic work results in the detection of new species for the region concerned and is continuing steadily even in Central Europe, an already well known region. Consequently only some ten years after the publication, a need for a new edition arose. The question was, whether it was really useful to continue with the same strategy, the pro-

duction of another single book with all its advantages and disadvantages. Or would there be other, better possibilities?

WHAT MAKES A GOOD IDENTIFICATION KEY?

The quality of an identification key depends on how easy it is to identify a species. Of course, most important is how large and how "easy" the group being dealt with is. These two features are fixed and no technical support can change them. But there are other features that define a good key:

- it should treat all species in the region concerned
- it should present as many good figures as necessary / possible
- it should present figures from different authors / techniques
- it should be up-to-date with changes in taxonomy and nomenclature

- it should offer as much further information as possible (distribution, biology, ecology) for every species

Even in well-investigated regions, there are always new species to be found, and taxonomic changes will be published quite often. Therefore, shortly after publication even the best book will be out of date. Regular new editions would be necessary – but this is impossible, and not only for financial reasons. But today there is another technique available for the publication of data that have to be updated every now and then: the Internet. Not only additions after revisions and corrigenda may be integrated in an easy way, there are further advantages too:

- The key may include a large number of species (space is no problem). Starting from the 1200 species of Heimer & Nentwig (1991), it may be built up to cover the 3000 or so species of Europe

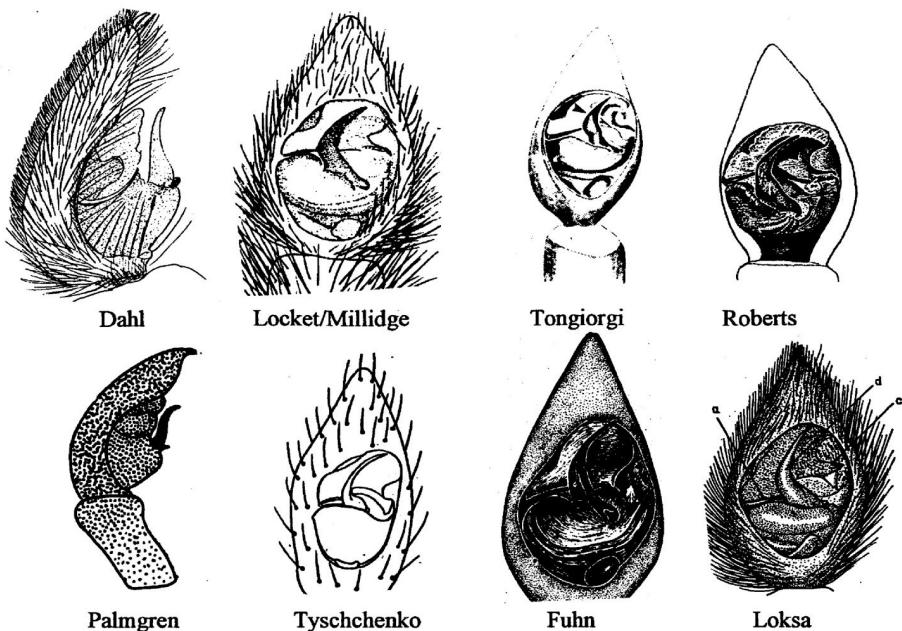


Fig. 1. Compilation of drawings of the palps of *Pardosa amentata* from eight different authors.

- The key may include many figures per species (no cost limits)
- Many authors may be (have to be) included. Therefore, the key will not depend on a personal style. Variations will be shown not only within a species but also in drawing (viewing) techniques.

In Fig. 1 we show drawings of the palps of *Pardosa amentata*, taken from eight different identification books, to show clearly the importance of the personal drawing style. To really show the important structures, illustrations from different sources have to be presented in such a way. For all these reasons, we

as editors decided, in 1998, to organise the development of an identification key on the Internet based on the version published by Heimer & Nentwig (1991) as it was presented in Hänggi et al. (1999).

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- THE ACTUAL STATE

Based on Heimer & Nentwig (1991), we knew from the beginning that today it is simply impossible to produce more than 10000 new figures. So we tried to use existing figures from papers and identification keys. Therefore, we asked the authors and editors for the copy-

1 Männchen				
	2			
- Weibchen				
	13			
2 Cheliceren mit einem langen Zahn, an seiner Basis manchmal Zähnchen				
(1)	3			
- Cheliceren mit mehr als einem Zahn				
	5			
3 Embolus und Konduktor berühren sich an der Basis, Medianapophyse anterior. Prosoma gelblich mit dunkler Zeichnung an Rand und Rückengrube, Sternum braunschwarz, Cheliceren gelblich, Beine gelblich-braun, Opisthosoma ventral einfarbig schwarz, lateral hellgrau, dorsal mit grossem, grauen Folium, durch schwarze und weisse Flecken begrenzt. Körpergrösse 4-6 mm, in Bodennähe an Meeresküsten, vereinzelt im Binnenland, selten gefunden, adult Frühsummer				
afrodite Hippa & Oksala 1983	Männlicher Pedipalpus (Hippa & Oksala 1983)	Männlicher Pedipalpus (Hippa & Oksala 1983)	Männlicher Pedipalpus (Pesarini 2000)	Männliche Cheliceren (Hippa & Oksala 1983)
♀ map				
- Embolus und Konduktor an ihrer Basis deutlich getrennt, Medianapophyse basal				
	4			
4 Radix kleiner als Medianapophyse (ventral betrachtet), Konduktorspitze (Pter) einfach rechtwinklig gebogen (Abb. 774.1), Prosoma hellgelb mit schmalen, schwarzem Rand und dunklem Mittelstreifen, Sternum hellgelb mit schwarzem Rand und Mittelstreifen, Cheliceren weisslich, beim Männchen mit kräftigem Zahn (Abb. 774.5), Beine hell, fast weiss, Tibia I immer mit schwarzem Endring, Opisthosoma hell, weisslich, dorsal oft mit grauer oder leuchtend roter Zeichnung und schwarzen Punkten, ventral mit breitem, schwarzem Mittelstreif, Körperlänge 3-5 mm, sehr häufig in dichtem Pflanzenwuchs an sonnigen Stellen, adult im Sommer, weit verbreitet, Europa (= Theridion redimitum, E. lineata)				
ovata (Clerck 1757)	Männlicher Pedipalpus (Wiehle 1937)	Männlicher Pedipalpus (Snazell 1983)	Männlicher Pedipalpus (Snazell 1983)	Männliche Cheliceren (Wiehle 1937)
♀				
Wunderlich (1996) beschreibt eine von ovata leicht abweichende Form als eigenständige Art, militaris Wunderlich 1996, die sich von ovata durch eine apikal gerundete Cymbiumspitze und eine rechtwinklig gebogene Konduktorspitze auszeichnet, bisher nur ein Fundort auf Magerrasen, Rhön (D)				

Fig. 2. Print screen of one example page from www.araneae.unibe.ch

right permit. So far, more than 100 authors, 20 printing houses, institutes, academies, museums and societies have already given us permission to use their figures. Only with the help of all these persons it is possible to do such a large project. The key is already on the Internet (www.araneae.unibe.ch) and includes about 1350 species (example in Fig. 2) but it is far from being completed (if ever an identification key may be completed).

Some "bookmarks" on the "News" page give an impression of what is included today.

- June 2002 - New database of species and genera
- May 2002 - English version of Introduction
- **Mar. 2002 - We cover 330 genera and 1350 species and include 11000 figures.**
- Mar. 2002 - The English version now includes all genus keys to the genera of the 43 families
- Feb. 2002 - In all generic keys, sex symbols allow a fast switch to the other sex
- Oct. 2002 - First distribution maps included.
- Oct. 2002 - First distribution maps included.

The structure of the homepage looks like a pure hierarchy (Fig. 3), but in reality it is possible to enter the key at each of the four taxonomic levels. Considering the many species and the more than 11000 figures, such flexibil-

ity would not be possible with a traditional book of, necessarily, several volumes.

To date, all the keys are traditionally dichotomous but an interactive key for the genera of the Linyphiidae is being prepared. In larger genera, males and females are treated separately but are linked together and it is possible to switch from one sex to the other. For some species, distribution maps may be seen (linked by the button "map") and information for 560 common species about their associations with habitat types (according to Hänggi et al. 1995 and Bolaños 2003) may be reached using a special button (figure 4).

AND THE FUTURE?

We consider our work to be as editors rather than contributors. Three of us are working in institutions that support taxonomic work, and we can guarantee the ongoing work for several years even if only very little funding exists for such a project. But we need the help of all single group specialists. It is only with the work of these specialists who prepare the information and provide the relevant figures to proceed properly.

Besides updating and improving the existing parts, our aims for the future are:

- data-based identification keys for all families (already being prepared for linyphiids)
- enlargement of the geographical range (more species)

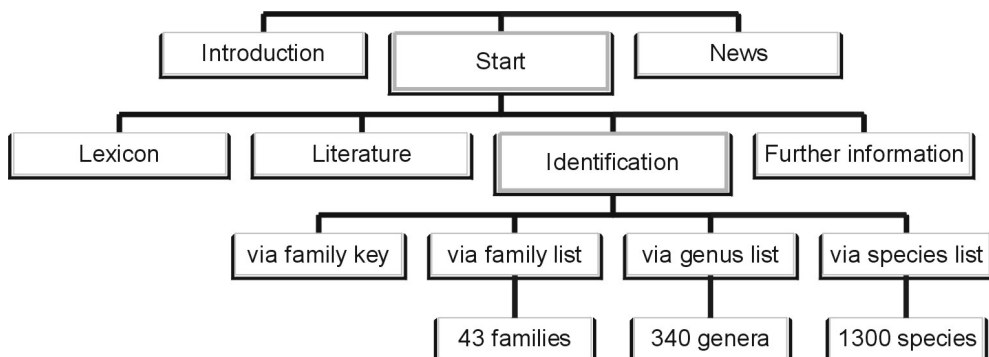


Fig. 3. Sitemap of the homepage www.araneae.unibe.ch

	Habitat Cluster									
Species	1	2	3	4	5	6	7	8	9	10
<i>Enoplognatha latimana</i>										0.1
<i>Enoplognatha mordax</i>	0.1									
<i>Enoplognatha ovata</i>			0.1			0.2		0.1		0.8
<i>Enoplognatha testacea</i>						0.5				
<i>Enoplognatha thoracia</i>			0.3		1.4	0.7	0.1	0.2		0.1
1 = saline inland waters	2 = montane raised bogs									
3 = fresh to moist meadows	4 = oligotrophic grassland									
5 = oligotrophic grasslands (Festucetalia)	6 = grassland, heath/vineyards									
7 = oligotrophic grasslands / dry elements	8 = forest edge									
9 = fresh deciduous forest	10 = mixed forest									
	(relative frequency values)									

Fig. 4. Example of ecological information (distribution among habitat types) as provided in www.araneae.unibe.ch

- distribution maps for most species
- more ecological information
- colour pictures (but consider download speed!)

There is one thing everybody is asking us all the time: when will we get the identification key on CD? Well, this will not be done, and for several reasons. First, as with a book, the information on CD will soon be out of date. Second, and more important, most scientists and organisations that have given us the copyright permit to use figures or other information did so under the explicit condition that we will use it only on the internet, free of charge.

Including all the "old" specialists of the known identification keys, some 100 people have contributed to this work so far in one way or another. To all of them, and in the name of all users of our identification key, we would like to express our thanks. But we need more help, and therefore ask everybody to submit his or her knowledge wherever it is useful. In the same way, we ask for feedback wherever you find technical or arachnological problems with the key.

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