

### Acknowledgements

Many thanks are due to M. DEKEYSER for valuable help in the field work. We also thank Dr. K. DESENDER for critical reading of the manuscript and for his kind permission to let us present some distribution maps.

### References

- ADIS, J., 1979. - Problems of interpreting Arthropod sampling with pitfall traps. *Zool. Anz.* 202 : 177-184.
- ALDERWEIRELDT, M., 1987. - De fauna van een intensief begraaasd weiland met aangrenzende weiderand en berm te Sint-Denijs-Westrem (Gent, België). 1. De loopkeverfauna (Coleoptera : Carabidae). *Phegea* 15 (2) : 65-75.
- DESENDER, K., 1984. - De betekenis en het gebruik van bodemvallen voor faunistisch-oecologisch onderzoek van bodemoppervlakte-actieve ongewervelden. *Phegea* 12 (3) : 85-94.
- DESENDER, K., 1985. - Naamlijst van de loopkevers en zandloopkevers van België (Coleoptera, Carabidae). *Studiedocumenten van het K.B.I.N.* nr. 19, 36 pp.
- DESENDER, K., 1986a. - Distribution and ecology of carabid beetles in Belgium (Coleoptera, Carabidae). Part 1. *Studiedocumenten van het K.B.I.N.* nr. 26, 30 pp.
- DESENDER, K., 1986b. - Distribution and ecology of carabid beetles in Belgium (Coleoptera, Carabidae). Part 2. *Studiedocumenten van het K.B.I.N.* nr. 27, 24 pp.
- DESENDER, K., 1986c. - Distribution and ecology of carabid beetles in Belgium (Coleoptera, Carabidae). Part 3. *Studiedocumenten van het K.B.I.N.* nr. 30, 23 pp.
- DESENDER, K., 1986d. - Distribution and ecology of carabid beetles in Belgium (Coleoptera, Carabidae). Part 4. *Studiedocumenten van het K.B.I.N.* nr. 34, 48 pp.
- DESENDER, K. & POLLET, M., 1987. - Life cycle strategies in the most abundant ground beetles from a heavily grazed pasture ecosystem. *Med. Fac. Landbouww. Rijksuniv. Gent* 52 (2a) : 191-199.
- FREUDE, H., HARDE, K. W. & LOHSE, G. A., 1976. - *Die Käfer Mitteleuropas*. Band 2. Carabidae. Goecke & Evers Verlag, Krefeld, 302 pp.
- LARSSON, S. G., 1939. - Entwicklungstypen und Entwicklungszeiten der dänischen Carabidae. *Ent. Meddelelser* 20 : 277-560.
- LINDROTH, C. H., 1974. - *Handbooks for the Identification of British Insects*. Vol. IV, part 2. Coleoptera, Carabidae. Roy. Ent. Soc. London, 148 pp.
- MAELFAIT, J.-P. & BAERT, L., 1975. - Contribution to the Arachno- and Entomofauna of different woodhabitats. *Biol. Jb. Dodonaea* 43 : 179-196.
- THIELE, H. U., 1977. - *Carabid beetles and their environments*. Springer Verlag, 369 pp.
- TRETZEL, E., 1955. Technik und Bedeutung des Fallenfanges für ökologische Untersuchungen. *Zool. Anz.* 165 : 276-287.

3. Op verzoek van J.-P. MAELFAIT leest de secretaris de volgende mededeling.

### Lycosid spiders of the Belgian coast

by J.-P. MAELFAIT<sup>1</sup>, M. ALDERWEIRELDT<sup>2</sup>, K. DESENDER<sup>2</sup> and L. BAERT<sup>3</sup>

- <sup>1</sup> Instituut voor Natuurbehoud, Kiewitdreef 3, B-3500 Hasselt.  
<sup>2</sup> Laboratorium voor Ecologie, Ledeganckstraat 35, B-9000 Gent.  
<sup>3</sup> K.B.I.N., Vautierstraat 29, B-1040 Brussel.

### Summary

*In this contribution, the knowledge concerning the wolfspider fauna (Araneae, Lycosidae) of the Belgian coast is summarized. Of the 43 Lycosidae known from Belgium, 21 have been recorded from the dune and saltmarsh areas that occur along the Belgian coast. Several rare species were encountered. Of each species some information on its habitat preference and distribution along the Belgian coast is provided.*

### Introduction

The Belgian coast is a narrow strip 1 to 2 km in width and some 60 km long of lime rich sand between the North Sea and the polder region. After World War II mass tourism led to the transformation of the beach front to an almost continuous wall of concrete and apartment buildings (DAELS & VERHOEVE, 1988). The landward side of dunes was turned into camping and caravanning sites. Only few natural dune areas survived this process of touristic expansion. The more important dune relicts are situated near the French and Dutch border. Smaller relicts in between have often been planted by trees or are used for the pumping of drinking water.

There is however good hope, because governmental authorities recognized the urgent need for the preservation of the remaining areas. Mere conservation will however not suffice. Active management, including for instance preventing sea buckthorn invading open short vegetation, will be needed.

A better understanding of the threats of these unique ecosystems is needed. We try to contribute to this by studying the arthropods occurring in these habitats. We summarize here what is known about the lycosid spiders (Araneae : Lycosidae).

### Material and methods

The hereafter given characterization of the habitat and the occurrence along the Belgian coast of lycosid spiders is based on a large number of records. These were only very fragmentary published, e.g. DESENDER et al., 1982, HUBLE (1975, 1976), HUBLE & MAELFAIT (1982), MAELFAIT et al. (in press). The complete list of records will be published in ALDERWEIRELDT & MAELFAIT (in prep.).

### Results and discussion

#### Discussion per species

*Alopecosa accentuata* (LATREILLE, 1817).

This species has been recorded from several localities along the whole coast-line, where it occurs in dry dune habitats. In the northeast of Belgium it is present in open heathlands. It is rare in the southern part of Belgium where it has been found in a few chalk grasslands.

*Alopecosa cuneata* (CLERCK, 1758).

Along the coast this species is found in short dry vegetation. Inland it is somewhat more common than the foregoing species. As *A. accentuata* it occurs in northern Belgium in heathland, but also in dry low productive grassland.

*Alopecosa fabrilis* (CLERCK, 1758).

This large species is confined to open sandy places, where a burrow can be excavated. Only known from two localities in the western part of the coast. It also occurs on inland dunes and in heathland with patches of bare ground (e.g. after burning) in northeast Belgium. Only one recent record from the southern part of Belgium.

*Alopecosa pulverulenta* (CLERCK, 1758).

Found all along the Belgian coast, however not so common as inland. This may be due to its preference for not too dry places with rough vegetation.

*Arctosa leopardus* (SUNDEVALL, 1832).

It can occur in quite large numbers in wet dune slacks which are yearly mown. Only recorded from the western part of the coast. Inland it is known from wet heathland (*Molinia*) and some wet grasslands.

*Arctosa perita* (LATREILLE, 1799).

Records from dry dunes along the whole coast. This species of dry open sand was recently caught in large numbers in the border zone of young dune slacks. Inland it is found in open heathland and in low productive grassland on dry sandy soils.

*Aulonia albimana* (WALCKENAER, 1805).

Only recent records of that species from the southern part of Belgium, where it is found among low vegetation in dry and warm habitats. One older record (1936) from the coast. It was caught in large numbers in Dutch coastal dunes.

*Pardosa agrestis* (WESTRING, 1861).

*Pardosa purbeckensis* F.O.P. CAMBRIDGE, 1895.

*P. agrestis* and *P. purbeckensis* are sometimes considered to be two forms of one species (ROBERTS, 1985). The form *agrestis* is only known from a few individual captures inland, mostly on arable land. The form *P. purbeckensis* is known to occur in large numbers in a small saltmarsh along the estuary of "De IJzer" and in the saltmarshes of the nature reserve "Het Zwin". These observations seem to be in agreement with the view that we are dealing with two forms of one species.

*Pardosa ameniata* (CLERCK, 1757).

Widespread and common all over the country. A species typical of rough vegetation with a well developed litter layer. It occurred for instance in large numbers in a dune with rough vegetation. After some ten years of yearly mowing it disappeared almost completely and was replaced by *P. palustris*.

*Pardosa lugubris* (WALCKENAER, 1802).

Widely distributed in Belgium, occurring in all kinds of not too dense and not too wet woodland. Few captures along the coast, probably due to an undersampling of dry dune woodland.

*Pardosa monticola* (CLERCK, 1758).

This species of short and open vegetation can be very abundant on rabbit grazed dune grassland. It has been found in these situations along the whole coast. Inland it occurs in open heathland (northeastern Belgium) and on chalk grassland (southern part of the country).

*Pardosa nigriceps* (THORELL, 1856).

A species of rather dry rough vegetation. Widespread and common. There are numerous records along the whole coast.

*Pardosa palustris* (LINNAEUS, 1758).

A species typical for intensively managed grassland which is not too dry. It does not occur on places with litter accumulation. It is also found in young *Calluna* heathland. Widespread and common in Belgium. Recorded along the whole coast.

*Pardosa proxima* (C. L. KOCH, 1848).

This southernly species has only very rarely been found in our country (wet grassland, arable land). Two individuals were caught in a yearly mown wet grassland in a small dune reserve ("De Fonteintjes", Blankenberge).

*Pardosa pullata* (CLERCK, 1757).

The commonest species of the pullata group (sensu HOLM & KRONESTEDT, 1970). Found in a variety of situations : heathland, grassland, pasture and field edges, etc.. It is the only species of the group that has been found in the coastal dunes (along the whole coast). It occurs abundantly in dune slacks with a herbaceous vegetation (not overgrown by sea buckthorn).

*Pirata hygrophilus* THORELL, 1872.

A common species of damp, shadowy situations. In the Belgian dunes it occurs in wet woodland and under sea buckthorn scrub and between rough vegetation on damp places.

*Pirata latitans* (BLACKWALL, 1841).

A rather common species of wet short vegetation. It can occur in quite high abundance in wet dune slacks with a continuous herbaceous plant cover. Only known from the western part of the coast.

*Pirata piraticus* (CLERCK, 1757).

Widespread, but not so common. It is bound to wet grassland and wet heathland. Along the coast it is known from dune slacks with herbaceous vegetation (west coast) and a wet grassland (east coast).

*Trochosa ruricola* (DE GEER, 1778).

Widespread and common species of wet open habitats (wet grasslands). Infrequently recorded along the whole coast : higher parts of salt marshes and wet dune slacks.

*Trochosa terricola* THORELL, 1856.

The most common species of the genus (inland and along the coast). Inland it is found in distinctly drier places than *Trochosa ruricola*. Along the coast it is found in dry as well as in rather wet situations.

*Xerolycosa miniata* (C. L. KOCH, 1834).

A species of dry open dune. Only very rarely encountered in sandy inland habitats. In open Calluna heathland *X. nemoralis* and not *X. miniata* occurs.

### Conclusions

- Although suited habitats seem to be available along our coast, a rather high number of species are surprisingly absent, e.g. *Tricca lutetiana*, *Aulonia albimana*, *Pirata piscatorius*, *Trochosa spinipalpis*, *Pardosa prativaga*, *Arctosa fulvolineata*. These species have indeed been shown to occur along the coast of neighbouring

countries, like Great Britain and The Netherlands (LOCKET et al., 1974; VAN HELSDINGEN, 1980). Are the reasons for this zoogeographical or ecological ? This has to be known first before introductions can be taken into consideration.

- From Table 1 we can conclude that most of the more interesting lycosid species occur in dry dune habitats with short or only patchy vegetation. In our country the occurrence of these species is often confined to the coastal dunes and to open heathland.

	Habitat	Rare
<i>Alopecosa accentuata</i>	(1)	+
<i>Alopecosa cuneata</i>	(1),(2)	
<i>Alopecosa fabrilis</i>	(1)	+
<i>Alopecosa pulverulenta</i>	(2),(4)	
<i>Arctosa leopardus</i>	(3)	+/-
<i>Arctosa perita</i>	(1)	+
<i>Aulonia albimana</i>	(1)	+
<i>Pardosa agrestis</i> f. <i>purbeckensis</i>	(6)	+
<i>Pardosa amentata</i>	(4)	
<i>Pardosa lugubris</i>	(5)	
<i>Pardosa monticola</i>	(1)	+
<i>Pardosa nigriceps</i>	(2)	
<i>Pardosa palustris</i>	(3)	
<i>Pardosa proxima</i>	(3),(4)	+
<i>Pardosa pullata</i>	(3),(4)	
<i>Pirata hygrophilus</i>	(5)	
<i>Pirata latitans</i>	(3)	
<i>Pirata piraticus</i>	(4)	
<i>Trochosa ruricola</i>	(3),(4)	
<i>Trochosa terricola</i>	(2)	
<i>Xerolycosa miniata</i>	(1)	+

Table 1.- Summarized habitat preference of the lycosids occurring along the Belgian coast, with (1) Dry dune habitats with short vegetation and open patches, (2) Dry rough dune vegetation, (3) Wet dune habitats with short vegetation, (4) Wet places with rough vegetation, (5) Wet and shadowy dune habitats (shrubs and woodland) and (6) Saltmarshes. The rare species are indicated.

### References

- ALDERWEIRELDT, M. & MAELFAIT, J.-P., in prep. - Catalogus van de spinnen van België. Zesde deel. Lycosidae. Studiedocumenten K.B.I.N.
- DAELS, L. & VERHOEVE, A., 1988. - Flanders, dense population and widespread urbanization. In : CHRISTIANS, C. & DAELS, L. (Eds.). Belgium. A geographical introduction to its regional diversity and its human richness. Bulletin géographique de Liège 24 : 1- 180.
- DESENDER, K., HUBLE, J. & VANHERCKE, L., 1982. - Loopkevers, spinnen en hooiwagens van het duinreservaat "De Kijkuit" te De Haan (West-Vlaanderen). *Phegea* 10 (4) : 201-214.

- HOLM, A. & KRONESTEDT, T., 1970. - A taxonomic study of the Wolf spiders of the *Pardosa pullata* group (Araneae, Lycosidae). *Acta Entom. Bohemoslov.* 67: 408-428.
- HUBLE, J., 1975. - Arachnofauna van strooisel onder duinstruweel van de Belgische Westkust (soortenlijst). *Biol. Jb. Dodonaea* 43: 146-150.
- HUBLE, J., 1976. - Bodemspinnen van duinmoeras en helmduinen in het staatsnatuurreservaat "De Westhoek" (soortenlijst). *Biol. Jb. Dodonaea* 44 : 226-230.
- HUBLE, J. & MAELFAIT, J.-P., 1982. - Analysis of the spider fauna from a North and South facing slope of a coastal dune (Belgium). *Faunistisch-Ökologische Mitteilungen* 5 : 175-189.
- LOCKET, G. H., MILLIDGE, A. F. & MERRETT, P., 1974. - *British spiders*. Volume 3. Ray Society, London, 310pp.
- MAELFAIT, J.-P., BAERT, L., DESENDER, K., POLLET, M., VERLINDEN, A., DE RAEVE, F. & LETEN, M., in press. - Arthropod communities and dune grassland management. *Proceedings EUDC Coastal dune Congress*, Sevilla, Spain.
- VAN HELSDINGEN, P. J., 1980. - *Novus catalogus araneorum. Hucusque in Hollandia inventarum*. Rijksmuseum van Natuurlijke Historie, Leiden, 145 pp.

4. De secretaris doet de volgende mededeling.

#### A short note on the pipunculid fauna of the Belgian dunes (Diptera, Pipunculidae)

by M. DE MEYER, P. GROOTAERT & G. HAGHEBAERT

During 1989, a part of the dunes near Lombardsijde was sampled with small white water traps. The main purpose of the experiment was to see if there exists differences in species composition in a gradient from young (yellow) dunes to older (grey) dunes more inland. Therefore a set of four white water traps were placed at ground level at five different sites.

1° The edge of the yellow dunes, facing the sea with a short overgrowth of *Psammophila arenaria*: an open (few shade), hilly zone.

2° Grey dunes with a short vegetation of *Carex* sp., mosses, *Psammophila arenaria* and many other herbs. An open area without shade and low flattened dunes.

3° Dune slack with *Carex* sp., very short *Salix repens* and *Paranassia palustris*. A flat open area.

4° Small wood composed of *Populus alba*, *Sambucus nigra* and on the edge some *Hippophae rhamnoides*. A flat but covered and quite shady area. The soil covered with *Portulaca oleracea* in spring and short grasses in summer.

5° Bush with *Sambucus nigra*, *Carex* sp. and grasses. A flat and covered area with some shade.

Although water traps are usually not very effective for trapping Pipunculidae, a number of specimens were collected. The following species were found (with indication of the site they were found at):

- *Chalarus* sp. (not identified to species level since the genus is momentarily under revision): dune slack (3) & wood (4)
- *Pipunculus campestris* LATREILLE: bush (5)
- *Cephalops semifumosus* (KOWARZ): wood (4)
- *Cephalops ultimus* (BECKER): bush (4)
- *Eudorylas zermattensis* (BECKER): dune (2)
- *Tomosvaryella littoralis* (BECKER): dune edge (1) and dune (2)
- *Tomosvaryella sylvatica* (MEIGEN): dune edge (1)

*Eudorylas zermattensis* is recorded here for the first time from Belgium. Although the species was captured in a dune area, it is not a typical coastal species. As can be deduced from the name it was originally described from the Swiss Alps, and it is further reported from Denmark, France, Great Britain, Sweden (TANASIJTSHUK, 1988), Austria and Yugoslavia (LAUTERER, 1983). Only one female specimen was found but it can easily be differentiated from other *Eudorylas* species by the partly shining abdominal terga and thorax, and by the shape of the ovipositor which does not have a median groove along the base (see BANKOWSKA, 1973 and COE, 1966).

*Tomosvaryella littoralis* is a typical coastal species. It has already been found on the Belgian coast (DE MEYER & DE BRUYN, 1985) and is also reported from most of the neighbouring countries (TANASIJTSHUK, 1988). *T. littoralis* is the most common species found in the samples but it was only present in material from the dune ridge and the dunes close to the sea.

Pipunculids are parasitoids of Auchenorrhyncha (Homoptera). European representatives of the genus *Tomosvaryella* seem to parasitize solely on Deltocephalinae (Cicadellidae) (see WALOFF & JERVIS, 1987). Dr. J. VAN STALLE kindly identified the Deltocephalinae that were found in the water traps at the dune edge (1) and the grey dunes (2):

- *Conosanus obsoletus* (KIRSCHBAUM)
- *Euscelis incisus* (KIRSCHBAUM)
- *Psammotettix confinis* (DAHLBOM)
- *Psammotettix pallidinervis* (DAHLBOM)
- *Doratula exilis* HORVATH

OSSIANNILSSON (1983) mentions all these species except the first one from dune areas and indicates the latter two as truly xerophilous. The former three species are already reported as hosts for pipunculids (WALOFF & JERVIS, 1987). It is possible that the host of *T. littoralis* is among these homopterans, but this can only be verified by rearing experiments.

#### References

- BANKOWSKA, R., 1973. - Muchowki-Diptera Pipunculidae. *Klucze Oznac. Owad. Pol.* 28 (33): 52 pp.
- COE, R. L., 1966. - Diptera Pipunculidae. *Handbk Ident. Br. Insects* X, 2 (c): 83 pp.
- DE MEYER, M. & DE BRUYN, L., 1985. - On the occurrence of Pipunculidae (Diptera) in Belgium. *Studiedocumenten K.B.I.N., Brussel* 24: 52 pp.
- LAUTERER, P., 1983. - Contribution to the knowledge of distribution and bion-