

Characteristic spider species of peat bog fenlands in the Netherlands (Araneae)

*Peter J. van Helsdingen*¹

Abstract: Peat bogs in the Netherlands passed through a dynamic history over the centuries from developing in the wet river delta, exploitation by man for energy purposes, filling-in again by natural forces and vegetation succession, and recent dragging for nature management purposes in the remaining larger reserves. Seepage of mineral-rich water from deep underground water layers is a prerequisite. For the present semi-natural habitat condition the term “peat bog fenland” is used. The spider fauna composition of the ecotone land–water, usually the margins of quaking bogs, was investigated. The typical fauna comprises relatively rare species on the international scale often in large numbers, such as *Dolomedes plantarius* (CLERCK), *Tetragnatha striata* L. KOCH, *Enoplognatha caricis* (FICKERT), *Theridion hemerobium* SIMON, *Entelecara omissa* O.P.-CAMBRIDGE, and *Clubiona juvenis* SIMON. The microhabitats of the different species was described. Environmental threats are numerous and very strict management measures are necessary to keep the ecological conditions and the populations in good condition.

Key words: ecotone land-water, filling-in, habitat restoration, peat bog fenland, quaking bogs, water management

Introduction

The aim of the present study was to investigate the spider fauna composition of the ecotone land-water of the peat bog fenlands in the Netherlands, as part of a general and still ongoing inventory of the spider fauna of the Netherlands. The work in the field was carried out dispersed over the last decade of the 20th century and mainly in spring and summer. Twelve different reserves have been visited several times each and at different parts so as to get an overall picture of each reserve.

The spider fauna of the peat bog fenlands in the Netherlands was poorly known. This may have been partly caused by unsuitable collecting methods in a hardly accessible habitat in the past. The floating vegetation at the margins of a quaking bog is inaccessible from the land side without destroying or at least disturbing the habitat. The only profitable method to investigate this zone is to collect by hand from the waterside, which can be done best from a boat.

History

The general geological structure of the Netherlands is that of the margin of the continent. Sand deposits in the south and east were put down by the rivers and remodelled by glaciers from the north. With the rising of the sea-level at the end of the Würm Glaciation the western part of the country was remodelled into a river delta area because the larger rivers, such as the Rhine, Meuse and Scheldt, now ended in the enlarged North Sea and not farther to the north. From then onwards the Netherlands had major drainage problems because the fresh water from the rivers could not

¹European Invertebrate Survey-Netherlands, P.O. Box 9517, 2300 RA, Leiden, Netherlands.
E-mail: helsdingen@nmm.nl

flow off to the sea at all times. Behind the range of dunes, constructed out of the sand deposits through the forces of tide and wind, a lowland area developed into marshland, intersected by river arms and local higher areas.

In this marshy region in some places the forming of peat bog started through a succession of floating vegetation (filling-in) towards quaking bog, subsequently towards more solid soil and finally carr with alder (*Alnus*) and birch (*Betula*). At many places there existed a special condition: mineral rich ground water from higher areas seeping in through the deeper soil created mesotrophic conditions in which the typical vegetation of fenlands could develop. Where the sea broke through, which happened from time to time, clay was deposited and salt was absorbed by the existing peat soil.

Land use

The land became inhabited on the drier areas along the rivers and the dune range and at local higher places, and the area was brought under cultivation for agricultural purposes by cutting down the forested parts. Ditches and small canals were made for managing the water level and for transport. From 13th century onwards the wet marshes were also used as a source of energy. Peat was extracted, dried and used as fuel for household purposes and even exported to energy-poor countries. We sold our country! The peat extraction resulted in open water surfaces and set back the succession of the vegetation. When most of the peat had been harvested the filling-in restarted as a natural process. As a result many of the open water bodies (lakes, fenlands) became smaller again over the centuries. This is what I call peat bog fenlands: man-made fenlands caused by the extraction of peat.¹

Land used for agriculture underwent a different development. Farmers made polders by building a dike around an area and lowering the water table by pumping water away with the aid of windmills, thus making the land accessible for farming. The unforeseen consequence was the oxydation of the soil and subsequent lowering of the surface level or land subsidence. One had to pump quicker and deeper with more mills following the sinking soil, but in fact the surface followed the water table. Through cultural history we inherited an inverted profile, an inversion of the relief: the canals into which the water is pumped now lie higher than the polder water table and at the same level as the fenlands which remained after the extraction of peat.

Restoration of the historical landscape

The remaining fenlands all became nature reserves in the 20th century. In the last decades of that century the nature management decided to restore some of the former open water areas by enlarging the remaining open water surfaces through cutting the carr and dragging out the peat soil to a depth of about two metres in order to restart the filling-in process. This is a cultural development which was initiated by nature protection societies and became possible through the relative wealth of the country. In the case of the fenlands, the former peat bogs, one faced two major problems, viz. the leaking away of water from the reserve to the lower surrounding agricultural land, the polders, and the loss of the inward seepage from higher areas. As to the leaking, the area loses more water than the rain can supplement and in a dry summer the fenland starts to dry out. One then has to choose between two evils: let the area suffer from drought, let animals die, let the

¹ In my opinion the traditional definitions for bog and fen are not applicable here. Bog is usually defined as a wet oligotrophic organic deposit. Fen is described as a eutrophic organic deposit or mire with the winter water table at ground level (modified after LINCOLN *et al.* 1982). Peat bog fenland is man-made through the extraction of peat and mesotrophic in combination with inward seepage of mineral rich water from higher areas.

ecosystem suffer; or pump in water from a strange source which necessarily is always of lesser quality in the Netherlands. The only answer is to acquire a buffer area around the reserve and bring up the water level in this buffer and thus at least partly stop the leaking.

To solve the second problem one had to restore the inward seepage from far-off filter areas. The original seepage often appeared to have stopped because of the excessive extraction of water by watersupply companies on the higher grounds; this had to be restored first by convincing the watersupply companies to obtain their water from other sources (e.g. the central inland sea IJsselmeer). In many cases the mineral rich seepage thus could be restored, at least partly.

Characteristic vegetation of the floating and filling-in stage

Filling-in starts with the development of floating vegetation in which plants such as watersoldier (*Stratiotes aloides* L.) and frogbit (*Hydrocharis morsus-ranae* L.) are characteristic. Together with deep-rooting waterlily (*Nymphaea alba* L.) and different species of pondweed (*Potamogeton* spec.) they soon form layers of floating vegetation in which common reed (*Phragmites australis* (CAV.) TRIN. ex STEUD.) and sedges (*Carex* spec.) soon invade. Marsh fern (*Thelypteris palustris* (SALISB.) SCHOTT) becomes one of the common species on the borders of the vegetation. Slowly the layer of vegetation gets thicker and develops carrying capacity and one can walk on a quaking bog.

Importance of the peat bog fenlands on the European level

The Netherlands form only a marginal chip of the European mainland. It does not have mountains, rocks or stony areas, it is poor in old forest and has nothing which comes near to ancient forest. The historical development has been too dynamic for the survival of original landscapes. Peat bog fenlands are man-made out of lowland peat bog and presumably many former biota have survived there which originally were more widespread over the extensive wet and marshy areas in the river delta. All the important peat bog fenlands now have the status of reserves and are managed by one of the nature conservation organisations, the private society Natuurmonumenten or the semi-independent State Forestry Service (Staatsbosbeheer). The peat bog fenland reserves are concentrated in two chains, locally interrupted but, nevertheless, more or less contiguous, one in the western part of the country and one in the northeast (Fig. 1). All reserves are part of the National Ecological Network, which is presently being developed and should connect all the main sites with characteristic biota. With the two chains we contribute proportionally very well to the conservation of this type of wetland habitat in Europe. Most of the characteristic spider species mentioned are found in the surrounding countries, but they appear to be rare and are often restricted to few smaller reserves.

Characteristic spider fauna composition

Investigations of the spider fauna composition of the ecotone land-water of the peat bog fenlands resulted in a short list of characteristic spider species of the different (micro)habitat types, such as tussocks of sedge, mixed vegetation of marsh fern and common reed, or marsh fern and cowbane (*Cicuta virosa* L.) mixed with bittersweet (*Solanum dulcamara* L.), both shaded and unshaded. This border of vegetation is very rich in biota, probably because it is well-structured and provides large supplies of food. Investigations were made from a boat and the vegetation was sampled by hand.

In the fenlands the following characteristic species were found which appear to be rare in other areas and habitats. They are not completely restricted to peat bog fenland habitats but the main populations in the Netherlands clearly occur there. The distribution of the species in the



Fig. 1. Distribution of peat bog fenlands in the Netherlands. The fenlands in the northwestern part are too brackish because of relatively recent flooding by the sea and lack of seepage of mineral-rich water to develop into peat bog fenlands.

Netherlands is indicated and compared with those in the surrounding countries Great Britain, Belgium, Germany and Denmark. For a complete distribution per country one is referred to the Fauna Europaea Database (VAN HELSDINGEN 2005).

***Dolomedes plantarius* (CLERCK, 1757) (Pisauridae)**

The larger raft spider appears to be very common on and near the water in the peat bog fenlands (Fig. 2). The young leave the egg sac in the female web on the vegetation, often watersoldier (*Stratiotes aloides*), after some days and disappear into the lower vegetation close to the water level, inside the vegetation or at the border of the vegetation mat. They prey on insects and other spiders, overwinter in the same vegetation, live through the next summer and overwinter a second time. They reach adulthood in the following month of May and thus show a two-year life-cycle.

One gets a good impression of the density of the *Dolomedes plantarius* populations at the different sites by counting the nursery webs on the floating *Stratiotes armada*'s, often completely covering the water surface of a ditch, or on the shore vegetation. The number of juvenile and subadult specimens (of two different year classes) in the shore vegetation, e.g. between the marsh ferns and below the overhanging sedges, at some sites can be quite impressive. At one site I counted over 50 specimens of last years egg batches over a stretch of three metres!

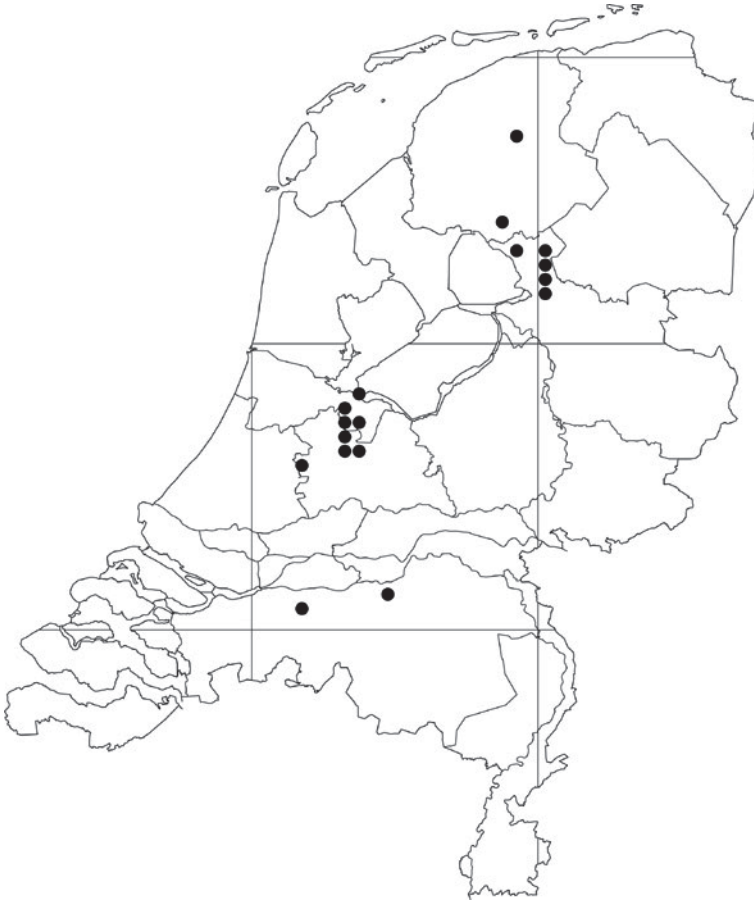


Fig. 2. Distribution map of *Dolomedes plantarius* (CLERCK, 1757) in the Netherlands.

In the Netherlands *D. plantarius* also used to occur in oxbows of rivers but there are no recent records known from such places. In the United Kingdom *D. plantarius* occurs at four localities (three of which are mentioned in HARVEY *et al.* 2002: 265). In Belgium it is known from one site in the East. In Germany a few older records are known besides some from the second half of last century from the northern Bundesländer (see also FRÜND *et al.* 1994 for records from the North German plain) and a recent capture in Rheinland-Pfalz (KITZ, NÄHRIG 2002). But there are no actual confirmations for Nordrhein-Westfalen and Bayern (see RENNER 1987). In Denmark it was rediscovered recently (GAJDOS *et al.* 2000). In the literature artificial fishponds are frequently mentioned as habitat (RUZICKA, HOLEC 1998, BOSMANS, JANSSEN 1979). This demonstrates that the species is able to reach such places or manages to survive where natural wetlands are converted into fishponds.

In many countries the species has become rare or has disappeared, probably because of changes on the original sites, e.g. changes in the water conditions or pressure from touristic developments. It has always been rare in Mediterranean Europe and more common in the north where it still is represented by sizable populations (Sweden, Finland) (see VAN HELSDINGEN 2005). In most neighbouring countries this species is protected by law or put on a Red List. In Great Britain one is actively implementing a Species Action Plan. The second *Dolomedes* species in Europe, *D. fimbriatus* (CLERCK, 1757), does not occur in the peat bog fenlands but is restricted to the oligotrophic peat-moors and wet forests in the eastern part of the Netherlands.

***Tetragnatha striata* L. KOCH, 1862 (Tetragnathidae)**

It is generally indicated that this species inhabits the flowerheads of common reed. This is true, but adult specimens are very frequently found low in the shore vegetation where they seek cover or prey, or both. Numbers are not very high, but the species is common in the peat bog fenlands and characteristic for the peat bog fenland sites, in reeds as well as in other vegetation. In the Netherlands it is hardly found outside this type of habitat. In the United Kingdom this species is well represented in reed-beds around lakes (HARVEY *et al.* 2002: 218). In Belgium the species is known from a number of localities throughout the country (DECLLEER 1988, ALDERWEIRELDT 1992). Known from Germany and Denmark and in fact recorded from most European countries except the Mediterranean Region (VAN HELSDINGEN 2005).

***Enoplognatha caricis* (FICKERT, 1876) (Theridiidae)**

This species was usually found hanging below stems and leaves of sedges and marsh fern and overhanging the water in their web just above the water level. Usually a number of specimens were hanging together with their egg sacs (from July onwards). It is also found in tussocks of sedge in the shore vegetation. It certainly can be called a common species in the shore vegetation, although densities are never very high.

Known from only two sites in the South of the United Kingdom in association with common reed and sedge (HARVEY *et al.* 2002: 61, as *E. tecta*). Recorded from Germany (PLATEN *et al.* 1999: 57). From Belgium mentioned by BOSMANS (1980), ALDERWEIRELDT, SELYS (1990). Known from most other European countries but missing in Fennoscandia, Denmark, Ireland and Spain (VAN HELSDINGEN 2005). Apparently it is nowhere else a common species. All authors refer to wetland conditions. I am convinced that a proper survey of the available habitats will yield many more records. It has been pointed out (RUZICKA, HOLEC 1998) that in North America (*Enoplognatha tecta*) and East-Asia the habitat preferences seem to be different (drier situations).

***Theridion hemerobium* SIMON, 1914 (Theridiidae)**

This species is very common where tussocks of sedge provide spatial structure and microhabitat with shelter, shade and food. In such places it occurs in large numbers together with many other spider species, among which another theridiid, *Rugathodes instabilis* (O.P.-CAMBRIDGE, 1871). Other common species in this microhabitat are *Clubiona phragmitis* C. L. KOCH, 1843, *Hypomma fulvum* (BÖSENBERG, 1902), and *Microlinyphia impigra* (O.P.-CAMBRIDGE, 1871). *T. hemerobium* is a common species in the peat bog fenlands. In the Netherlands *T. hemerobium* up to now has been collected only in peat bog fenland areas.

In the United Kingdom *T. hemerobium* is known from four sites near water, such as marshes and flood-plains (HARVEY *et al.* 2002: 51). DAWS (2003) has found this species to inhabit fishing complexes in the flood-plains of rivers in England where it could easily be traced under bridges, wooden walks and fishing platforms, but also farther away from rivers (DAWS 2004). In Belgium the species is known from at least three localities (DECLLEER 1990, VANUYTVEN *et al.* 1991) which are all described as reed vegetations. There are many records from Germany. Not recorded from Denmark. In the Czech Republic "it is quite common in all littoral vegetation, in sedge grass and reed-mace growth." In Europe occurring in most countries but not in Spain and Greece and not (yet) found in Norway and Finland, where I expect it to turn up when looked for in the proper habitat. Also known from North America. The distribution is mapped by ANTHES (2000) and available in database format (VAN HELSDINGEN 2005).

***Entelecara omissa* O.P.-CAMBRIDGE, 1902 (Linyphiidae)**

So far in the Netherlands this species has been found only in peat bog fenland. It is a rare species in this type of habitat. It has not been found outside these areas. It was found in low numbers in

the tussocks of sedge. In the United Kingdom the species is recorded from a number of marshy areas, mostly in East-Anglia (HARVEY *et al.* 2002: 83). In Belgium it is recorded for the first time on the European mainland (DECLER 1992) and is said to be threatened now with extinction (<http://www.instnat.be/docupload/1593.xls>). In Germany a first record dates from 1994 (SCHIKORA 1994, Niedersachsen) from peat-moor. In Denmark it is on the Red List. The species apparently prefers wet habitats, either in peat bog or on peat-moor. The European distribution is summarised by VAN HELSDINGEN (2005).

***Clubiona juvenis* SIMON, 1878 (Clubionidae)**

C. juvenis in our inventories was found to be associated with reed. They were often hiding in old stems of last years reed present in the shore vegetation. Specimens can easily be found by opening old reed stems along the water border. Apparently they use the stems for hiding during the daytime. In the Netherlands the species appears to be present exclusively in peat bog fenlands, although specimens are never collected in large numbers at one site.

In the United Kingdom *C. juvenis* is established in East-Anglia “in reeds and ground vegetation” (HARVEY *et al.* 2002: 310). DECLER, BOSMANS (1989) have presented an overview of all European records then available. Apart from the Neusiedler See in Austria, where the species is said to be abundant (NEMENZ 1967), there are very few records from other European countries, while it is absent, again, from Fennoscandia and Denmark. DECLER, BOSMANS (1989) mention the same ecological niche. In the Netherlands it has not been found, so far, outside the peat bog areas. However, in most cases the species was found in any reed vegetation bordering ponds and lakes. In Ireland and Germany *C. juvenis* has been found in coastal dunes where it was collected in the densest parts of tussocks of grass, far away from the water (BOCHMANN 1941). In the Netherlands *C. juvenis* has never been found in the dune area, where instead *C. diversa* O.P.-CAMBRIDGE, 1862 and *C. subtilis* L. KOCH, 1867 are found in the tussocks of maram grass. The species occurs in most European countries, the Mediterranean Region excepted (VAN HELSDINGEN 2005).

Other frequently found species

A number of other interesting species was found to be common but are not typical for such peat bog fenlands since they can also occur in other wet habitats.

***Donacochara speciosa* (THORELL, 1875) (Linyphiidae)**

A species of wet places, also outside the peat bog fenlands. Quite frequently found in the leaf-sheath of reedmace (*Typha spec.*) and in dry old reed stems. In the United Kingdom recorded from a number of sites in East Anglia (HARVEY *et al.* 2002: 147). In nearly all European countries found in wet places but absent from Portugal, Spain and Greece (VAN HELSDINGEN 2005).

***Hypomma fulvum* (BÖSENBERG, 1902) (Linyphiidae)**

A common species in wet habitats, such as peat bog fenlands, lowland marshes and vegetation along ditches. It is, therefore, not typical for peat bogs. In the United Kingdom again most frequently found in East Anglia “in fens and marshes, on *Phragmites* or in the litter beneath, sometimes in *Cladium* marshes” (HARVEY *et al.* 2002: 89). The European distribution has been summarised by VAN HELSDINGEN (2005).

***Rugathodes instabilis* (O.P.-CAMBRIDGE, 1871) (Theridiidae)**

This species occurs in large numbers along the border of the peat bog fenlands in the vegetation also inhabited by *Theridion hemerobium*, and equally abundant. The occurrence of these two species together in the same habitat is also mentioned by RUZICKA, HOLEC (1998). Common in

southern England in wetland habitats (HARVEY *et al.* 2002: 57). The species is present in Belgium and Germany, but has not been recorded from Denmark. There are records from most European countries and one gets the impression that it forms dense populations in the preferred habitat (VAN HELSDINGEN 2005).

***Microlinyphia impigra* (O.P.-CAMBRIDGE, 1871) (Linyphiidae)**

One of the common species in lowland Netherlands. It builds extensive webs close to or above the water surface in dense, taller vegetation. In the United Kingdom mostly restricted to England (HARVEY *et al.* 2002: 213). Recorded from Belgium, Germany, Denmark, and most European countries (VAN HELSDINGEN 2005).

***Theridiosoma gemmosum* (L. KOCH, 1877) (Theridiosomatidae)**

In the peat bog fenlands it was usually found in the more shaded places in the structures offered by dead branches of trees lying in and above the water and the vegetation of sedges and other grasses. At such places they have been found in large numbers. The spiders were often seen gliding or sailing down a slightly sloping line without any leg movement. In the Netherlands it has also been found in swampy forest in the East, e.g. at the margin or in depressions in peat-moors. In the United Kingdom restricted to southern England and “often abundant where found, but very local” (HARVEY *et al.* 2002: 67), which agrees with my own observations above. Known from Belgium, Germany, Denmark, and most European countries (VAN HELSDINGEN 2005).

***Ozyptila brevipes* (HAHN, 1826) (Thomisidae)**

This species occurs in low densities at places where the filling-in process is in an advanced stage and soil has formed between the plants. Specimens of this species are regularly found in small depressions in the soil under moss and detritus. In the Netherlands *O. brevipes* has been found regularly in peat bog fenlands, but it is also known from the Frisian Islands in the north. In the United Kingdom it occurs “in fens and marshy places”, but also in drier habitats (HARVEY *et al.* 2002: 365). Recorded from most European countries (VAN HELSDINGEN 2005).

Conclusion

Peat bog fenland reserves in the Netherlands appear to be a stronghold for a number of otherwise rare spider species, in the Netherlands as well in most of Europe. The peat bog fenlands offer the habitat requirements for these species. This is also the case for a number of other taxa (the waterbeetle *Graphoderus bilineatus* (DE GEER, 1774), the dragonfly *Aeshna viridis* EVERS-MANN, 1836 some birds such as the black tern *Chlidonias niger* (LINNAEUS, 1758)). The occurrence of such a special fauna certainly justifies the costly restoration and management of the peat bog fenland reserves.

Acknowledgements: I want to thank Phil Pearson, University of East-Anglia, Norwich, UK for making me aware of the definitions of the habitats discussed here. Peter Gajdos of Nitra, Slovakia helped with the inventory of many fenlands in the Netherlands in 1995.

Received: 10.11.2005

Accepted: 20.03.2006

References

- ALDERWEIRELDT M. 1992. Een merkwaardige oude vondst van *Tetragnatha striata* (Araneae, Tetragnathidae), indicator van de vroegere natuurwaarde van het Donkmeer. - *Nieuwsbrief van de Belgische Arachnologische Vereniging*, 7 (2): 9-11.
- ALDERWEIRELDT M., J. SELYS 1990. Een araneologische survey van een heiderelict en een ruigtevegetatie te Sint-Andries (Brugge, West-Vlaanderen). 1. Samenstelling van de spinnentaxocoenosis en faunistiek. - *Nieuwsbrief van de Belgische Arachnologische Vereniging*, 5 (3): 1-6.

- ANTHES N. 2000. Verbreitung und ökologische Charakterisierung der Kugelspinne *Theridion hemerobium* Simon, 1914 (Araneae: Theridiidae) in Europa. - *Arachnologische Mitteilungen*, **20**: 43-55.
- BOCHMANN G. VON 1941. Die Spinnenfauna der Strandhaferdünen an den deutschen Küsten. - *Kieler Meeresforschung*, **4**: 38-69.
- BOSMANS R. 1980. Araignées nouvelles pour la faune de Belgique. - *Bulletin et Annales de la Société Royale belge d'Entomologie*, **116**: 53.
- BOSMANS R., M. M. JANSSEN 1979. Araignées rares ou nouvelles pour la faune belge. - *Bulletin et Annales de la Société royale belge d'Entomologie*, **115**: 30.
- DAWS J. 2003. *Theridion hemerobium* Simon, 1914: Are you looking in the right places? - *Spider Recording Scheme News* 47. In: *Newsletter of the British Arachnological Society*, **98**: 10.
- DAWS J. 2004. *Theridion hemerobium* Update for Leicestershire. - *Spider Recording Scheme News* 50. In: *Newsletter of the British Arachnological Society*, **101**: 7.
- DECLER K. 1988. Quelques remarques sur *Tetragnatha striata* (L. Koch, 1862): une nouvelle espèce pour l'araneofauna belge. - *Nieuwsbrief van de Belgische Arachnologische Vereniging*, **7** (1): 11-13.
- DECLER K. 1991. Een nieuwe vindplaats van *Theridion hemerobium* in Vlaanderen. - *Nieuwsbrief van de Belgische Arachnologische Vereniging*, **6** (2): 11.
- DECLER K. 1992. First record of the Linyphiid spider *Entelecara omissa* O.P.-Cambridge on the European Mainland. - *Newsletter of the British Arachnological Society*, **64**: 6.
- DECLER K., R. BOSMANS 1989. Distribution and ecological aspects of four rare wetland spiders, recently reported from Belgium. - *Bulletin of the British Arachnological Society*, **8**: 80-88.
- FRÜND H.-C., J. GRABO, H.-D. REINKE, H.-B. SCHIKORA, W. SCHULTZ 1994. Verzeichnis der Spinnen (Araneae) des nordwestdeutschen Tieflandes und Schleswig-Holsteins. - *Arachnologische Mitteilungen*, **8**: 1-46.
- GAJDOS P., S. TOFT, S. LANGEMARK, N. SCHARFF 2000. The fishing spiders *Dolomedes* (Araneae, Pisauridae) in Denmark. - *Steenstrupia*, **25**: 201-208.
- HARVEY P. R., D. R. NELLIST, M. G. TELFER (eds) 2002. Provisional atlas of British spiders (Arachnida, Araneae). Vols 1, 2. Huntingdon, U.K., Biological Records Centre, 214 + 406 pp.
- HELSDINGEN, P.J. VAN 2005. Araneae. - In: Fauna Europaea Database (Version 2005.1). (<http://www.european-arachnology.org>).
- KITT M., D. NÄHRIG 2002. Erstnachweis der Listspinne *Dolomedes plantarius* (Clerck, 1757) für Rheinland-Pfalz. - *Fauna Flora Rheinland-Pfalz*, **9**: 1211-1216.
- LINCOLN R. J., G. A. BOXSHALL, P. F. CLARCK 1982. A dictionary of ecology, evolution and systematics. Cambridge University Press, 298 p.
- NEMENZ H. 1967. Einige interessante Spinnenfunde aus dem Neusiedlerseegebiet. - *Anzeiger der mathematisch-naturwissenschaftlichen Klasse, Österreichische Akademie der Wissenschaften*, **1967**: 132-139.
- PLATEN R., D. BRAASCH, K. BRUHN, R. GRUBE 1999. *Pseudeuophrys browni* (Millidge & Locket, 1955) (Araneae: Salticidae) neu für Deutschland und *Enoplognatha caricis* (Fickert, 1876) (Araneae: Theridiidae) neu für Brandenburg. - *Arachnologische Mitteilungen*, **18**: 55-60.
- RENNER F. 1987. Revision der europäischen *Dolomedes*-Arten (Araneida: Pisauridae). - *Stuttgarter Beiträge zur Naturkunde, A (Biologie)*, **406**: 1-15.
- RUZICKA V., M. HOLEC 1998. New records of spiders from pond littorals in the Czech Republic. - *Arachnologische Mitteilungen*, **16**: 1-7.
- SCHIKORA H.-B. 1994. *Entelecara omissa* neu für Deutschland (Araneae: Linyphiidae). - *Arachnologische Mitteilungen*, **8**: 3-64.
- VANUYTVEN H., J. VAN KEER, M. JANSSEN 1991. *Theridion hemerobium* Simon, 1914, new for the Belgian spiderfauna (Araneae, Theridiidae). - *Nieuwsbrief van de Belgische Arachnologische Vereniging*, **5** (2): 16.

Характерни паяци в изкуствените торфени блата на Холандия (Araneae)

П. ван Хелсдинген

(Резюме)

Торфените блата в Холандия имат динамична история през вековете. През Средновековието те са експлоатирани от хората за енергийни нужди, по-късно е последвало естественото им запълване с вода и сукцесия на растителността. В съвременното време, блатата, които се намират на територията на по-големите резервати, се драгират, което е част от мерките, заложили в планове им за управление. В статията са представени резултатите от изследване на видовия състав на паяците, обитаващи динамично променящия се екогон между сушата и водата. Типичната фауна обхваща сравнително редки видове, като например: *Dolomedes plantarius*, *Tetragnatha striata*, *Enoplognatha caricis*, *Theridion hemerobium*, *Entelecara omissa* и *Clubiona juvenis*, които в изследваната територия са с висока численост. Описани са микрохобитатите, обитавани от установените паяци. Авторът смята, че поради големият брой заплахи са необходими стриктни управленски мерки за поддържане на екологичното равновесие и жизнеността на популациите в тези екосистеми.