

A remarkable assemblage of water mites in quagfens and carr in The Netherlands (Acari: Hydrachnellae)

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Abstract: The results of a survey of water mites in a number of Dutch quagfens and carr are presented. In both habitats many interesting and rare species were found. *Vietsia scutata* is recorded for the first time for The Netherlands.

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Introduction

Quagfens (Dutch: “trilvenen”) belong to the rarest vegetation types in The Netherlands, and are highly appreciated from a nature conservation point of view. They represent a succession phase in the terrestrializing of former turbaries (Dutch: “petgaten”) where peat was dredged. As far as we know, they have never been examined for water mites, neither in The Netherlands or abroad. Our most extensive quagfens are found in the north-west of the province of Overijssel, in the nature reserves “De Wieden” and “De Weerribben”. Smaller areas can be found in mires in the provinces of Utrecht and South- and North-Holland. The results of the examination of four oligo-mesotrophic quagfen areas are presented: the above mentioned “De Wieden” and “De Weerribben”, the “Westbroekse Zodden”, north of the city of Utrecht and the “Naardermeer”. Further, the water mites of two carr-areas (Dutch: “broekbos”), which form the end of the succession phase in the terrestrializing of the former turbaries are given.

A description of the quagfens

Van Wirdum et al. (1992) give an extensive description of the different succession phases associated with terrestrializing of former turbaries. They distinguished the aquatic, semi-aquatic, brownmoss, sphagnaceous and fen-bog phase. We have been collecting water mi-

tes in the last three phases, and therefore confine our description to them. The brownmoss phase is characterized by an abundant growth of mosses, of which *Scorpidium scorpioides* (Hedw.) Limpr. is the most important. The sphagnaceous phase is dominated by different *Sphagnum*-species. Eventually, this phase is replaced by a fen-bog phase with an abundant growth of raised-bog mosses and ericaceous dwarfshrubs. Vegetation of this last phase is still floating. Finally, without management, quagfens will evolve in carr, especially with alder and birch.

Den Held et al. (1992) give a classification of the Dutch terrestrializing fen vegetation. Furthermore, ranges of a number of chemical parameter are given. For vegetation types of the brownmoss phase a pH-range of 5.0 - 7.5 has been recorded, the salinity ranges from 100 - 1000 mg Cl/l, and the nutrient status is eu-mesotrophic to mesotrophic. The pH-range of the sphagnaceous phase is 3.5 - 6, the salinity ranges from 50 - 800 and the nutrient status is oligo-mesotrophic to oligotrophic. The pH-range of the fen-bog phase is (3) 3.5 - 5.5, the salinity range is 50 - 100 and the nutrient status is oligotrophic. No data are known to us of carr.

Methods

The water mites were collected with a dip net. Different habitats in the quagfen, such as very small pools or in the floating vegetation, were

Table 1. Water mites of four quagfen-areas and two carr-areas in The Netherlands. WZ: Westbroekse Zodden; WI: Wieden; WE: Weerribben; NM: Naardermeer.

Area	Quagfens				Carr	
	WZ	WI	WE	NM	WZ	WE
Number of localities	2	3	5	2	1	3
Species of temporary waters						
<i>Arrenurus inexploratus</i> Viets	x	x	x	x	x	x
<i>A. mediorotundatus</i> Thor	x			x		
<i>A. stecki</i> Koenike	x					
<i>A. truncatellus</i> (Müller)	x		x	x	x	
<i>Euthyas truncata</i> (Neuman)		x	x			
<i>Hydryphantes crassipalpis</i> Koenike	x			x		
<i>H. octoporus</i> Koenike	x		x			
<i>H. ruber</i> (Geer)	x	x	x			
<i>Oxus nodigerus</i> Koenike			x			
<i>Piersigia intermedia</i> Williamson	x	x	x	x		x
<i>Piona clavicornis</i> (Müller)			x			x
<i>P. nodata laminata</i> (Thor)	x	x	x		x	x
<i>Pionacercus norvegicus</i> Thor			x			
<i>Thyas dirempta</i> Koenike	x	x	x	x		x
<i>T. pachystoma</i> Koenike	x	x	x	x		x
<i>Tiphys ensifer</i> (Koenike)	x		x	x		
<i>T. latipes</i> (Müller)	x	x	x	x		
<i>T. pistillifer</i> (Koenike)	x	x	x	x	x	x
<i>T. scaurus</i> (Koenike)		x	x	x		
<i>Vietsia scutata</i> (Protz)			x			
<i>Zschokkea oblonga</i> Koenike		x				
Total number of species of temporary waters	14	11	17	11	4	7
Species of permanent waters						
<i>Arrenurus batillifer</i> Koenike		x	x	x		
<i>A. bifidicodulus</i> Piersig	x		x	x		
<i>A. bruzelii</i> Koenike				x	x	
<i>A. crassicaudatus</i> Kramer			x			
<i>A. cuspidator</i> (Müller)			x	x		
<i>A. fimbriatus</i> Koenike	x			x		
<i>A. globator</i> (Müller)	x	x	x	x	x	
<i>A. integrator</i> (Müller)	x		x	x		
<i>A. knauthei</i> Koenike	x	x		x		
<i>A. latus</i> Barrois & Moniez	x		x	x		
<i>A. novus</i> George				x		
<i>A. perforatus</i> George				x		
<i>A. sinuator</i> (Müller)	x			x		
<i>Brachypoda versicolor</i> (Müller)			x			
<i>Eylais extendens</i> (Müller)	x					
<i>E. setosa</i> Koenike	x					
<i>Forelia liliacea</i> (Müller)				x		
<i>Hydrodroma despiciens</i> (Müller)				x		
<i>Hygrobates longipalpis</i> (Hermann)					x	
<i>Limnesia connata</i> Koenike	x	x	x			
<i>L. fulgida</i> Koch		x				
<i>L. maculata</i> (Müller)	x					
<i>Limnochares aquatica</i> (Linnaeus)				x		
<i>Midea orbiculata</i> (Müller)		x	x	x		
<i>Mideopsis orbicularis</i> (Müller)			x			

Table 1. Water mites of four quagfen-areas and two carr-areas in The Netherlands. WZ: Westbroekse Zodden; WI: Wieden; WE: Weerribben; NM: Naardermeer (Continuation).

Area	Quagfens				Carr	
	WZ	WI	WE	NM	WZ	WE
Number of localities	2	3	5	2	1	3
<i>Neumania spinipes</i> (Müller)	x		x			
<i>Piona alpicola</i> (Neuman)	x	x	x			x
<i>P. conglobata</i> (Koch)	x					
<i>P. longipalpis</i> (Krendowsky)				x		
<i>P. nodata</i> (Müller)	x	x	x	x		x
<i>P. pusilla</i> (Neuman)		x		x		
<i>P. variabilis</i> (Koch)	x			x		
<i>Pionopsis lutescens</i> (Hermann)					x	
<i>Tiphys ornatus</i> Koch	x					
<i>T. torris</i> (Müller)						x
<i>Unionicola crassipes</i> (Müller)		x	x	x		
<i>U. gracilipalpis</i> (Viets)				x		
<i>U. minor</i> (Soar)				x		

sampled. In the Naardermeer two terrestrializing ditches were examined which were situated in a quagfen area. The amount of surface water in quagfens is limited. We made no differentiation between the different succession phases in quagfens as described in the previous chapter. The Westbroekse Zodden have been visited twice, in spring and in summer. As the results of summer collection were rather poor, we decided to visit the other quagfen areas only in spring.

Besides quagfens, we collected water mites in carr. We were interested to see if similar water mites species can be found in this vegetation type.

The Westbroekse Zodden were visited on May 14-15 and September 17, 1993, the Naardermeer on April 21 and 29, 1993 and the quagfen areas in north-west Overijssel on April 21-22, 1994.

Results

In table 1 the results of collection of water mites are given for the quagfens and carr. We divided the species in two groups, species of temporary waters and species of permanent waters. Species of permanent waters can sometimes occur quite abundant in temporary waters, but are not confined to this water type. This division is based on our experience and the literature (Lundblad, 1920; Lundblad,

1962; Böttger & Völkl, 1987; Smit & Van der Hammen, 1992).

From table 1 it can be concluded, that in quagfens and carr a large number of species of temporary waters can be found. However, the number of species in carr is much lower compared to quagfens. Almost all of the temporary species from table 1 are rare or very rare in The Netherlands. This conclusion is based on the results of about 2.500 localities in The Netherlands. Only *Arrenurus inexploratus* and *Hydryphantes ruber* are rather common species. Partly this is the result of lack of data from these habitats, partly from the fact that these habitats are rare nowadays.

The rarest species is *Vietsia scutata*, which was, up to now, only known from six locations in Europe (Sweden, Germany and Ireland). The species is recorded for the first time in The Netherlands and was found in a quagfen called the Wobberribben (Weerribben-area, province of Overijssel, Amersfoort-co-ordinates 194.75-533.10). Lundblad (1962) collected *Vietsia scutata* in Sweden on one location, a ditch with grasses. Accompanying species were *Euthyas truncata*, *Thyas barbiger* Viets and *Hydryphantes ruber*. Viets & Viets (1954) reported the species from flooded meadow- and reedlands in northern Germany. Protz (1923) collected the species in a marsh, and Halbert (1944) in a ditch.

Piersigia intermedia is another rare species

in The Netherlands, although the species is widespread, and reported from Europe and North-America. Imamura & Mitchell (1967) described the habitat of the species as semi-aquatic, shallow marshes and swamps with a fluctuating water level. Husiatinski (1936) found the species in ponds in Rumania with abundant growth of mosses and *Sphagnum*. Böttger & Völkl (1987) reported *P. intermedia* from two temporary ponds in northern Germany, with a pH between 6.5 and 6.6. Recently, we reported this species for the first time in The Netherlands (Smit & Van der Hammen, 1990). Since then, three new locations have become known to us (two in the province of Groningen and one in the Betuwe, province of Gelderland). In the quagfens and carr-areas the species has been found on 11 localities. Almost all of the locations in The Netherlands are semi-aquatic water bodies, e.g. terrestrializing ditches, quagfens, carr or swamps, and are thus similar to the habitats mentioned in the literature.

Discussion

Lundblad (1962) published species lists for a large number of localities in Sweden. A number of the listed temporary waters had a species composition remarkably similar to the quagfens in The Netherlands. The following species were often collected together by Lundblad: *Arrenurus stecki*, *A. truncatellus*, *Limnesia connata*, *Neumania spinipes*, *Oxus nodigerus*, *Piersigia intermedia*, *Pionacercus norvegicus*, *Tiphys ensifer*, *T. pistillifer*, *T. scaurus* and *Zschokkea oblonga*. Further, a number of Thyasidae and Hydryphantidae are present on these locations. Unfortunately, his description of the vegetation types of these locations is poor. The temporary ponds which were examined by Böttger & Völkl (1987) have less species in common with quagfens. Based on the reported macrophytes (e. g. *Lemna minor* L., *Glyceria fluitans* (L.) R. Brown), it can be concluded that these ponds are more eutrophic. These ponds had the following species of temporary waters in common: *Piersigia intermedia*, *Hydryphantus*- and

Thyas-species, *Tiphys latipes*, *Piona clavicornis* and *Arrenurus inexploratus*.

A small number of the above mentioned species occur in a wider range of biotopes. *Zschokkea oblonga* has been found by Smit et al. (1993) in a moorland pool and *Arrenurus stecki* can be commonly found in this biotope as well. *Limnesia connata* occurs in a wide range of biotopes, from slow running streams to moorland pools.

From the results it is clear, that quagfens and carr are inhabited by a remarkable assemblage of water mite species. A large part is rare or very rare, some of them even outside The Netherlands. This may be caused by the fact that quagfens have never been examined for water mites.

No typical species of quagfens can be distinguished, although a small number of species is almost confined to terrestrializing water bodies. These are *Piersigia intermedia*, *Tiphys ensifer*, *T. pistillifer*, *T. scaurus* and *Vietsia scutata*.

The number of samples is too small to make a good comparison between the water mite assemblages of quagfens and carr. The results indicate that in carr the number of species is much lower than in quagfens. An important factor might be the influence of eutrophication by dead leaves and branches and/or permanent shading.

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