

## **Updated Red List of the water bugs of Flanders (Belgium) (Hemiptera : Gerromorpha & Nepomorpha)**

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### **Abstract**

During the last decades, the Flemish Gerromorpha and Nepomorpha have been studied intensively. All the material sampled since 1989 by the Flemish Environment Agency for the monitoring of the ecological water quality has now been identified, which resulted in a lot of new data, especially for watercourses. On the other hand, stagnant waters were investigated during several studies carried out by the Royal Belgian Institute for Natural Sciences, the Research Institute for Nature and Forest, Natuurpunt and the authors. The increased knowledge of this group indicated that the previous Red List needed to be updated. In the mean time, a more standardised approach was used here by applying the IUCN-criteria. The results are alarming : 23 out of 62 evaluated species, or 37% of the Gerromorpha and Nepomorpha fauna, are either Regionally Extinct or threatened with extinction. Hopefully, the present Red List will result in an improved protection of the remaining populations and, preferably, the expansion of their area of occupancy.

**Keywords** : aquatic bugs, conservation, IUCN Red List criteria, water bugs.

### **Samenvatting**

De Vlaamse water- en oppervlaktewantsen werden de laatste decennia intensief bestudeerd. Al het materiaal dat sinds 1989 door de Vlaamse Milieumaatschappij werd verzameld om de ecologische waterkwaliteit te monitoren werd gedetermineerd, wat resulteerde in een grote hoeveelheid nieuwe gegevens, vooral voor waterlopen. Anderzijds werden stilstaande water bestudeerd tijdens verschillende studies uitgevoerd door het Koninklijk Belgisch Instituut voor Natuurwetenschappen, het Instituut voor Natuur- en Bosonderzoek, Natuurpunt en de auteurs. De toegenomen kennis van deze groep gaf aan dat de vorige Rode Lijst aan herziening toe was. Ondertussen werd ook meteen een meer gestandaardiseerde aanpak gebruikt door het toepassen van de IUCN-criteria. De resultaten zijn onrustwekkend : 23 van de 62 geëvalueerde soorten, ofwel 37% van de Gerromorpha en Nepomorpha fauna, is Regionaal Uitgestorven of in gevaar. Hopelijk kan de hier gepresenteerde Rode Lijst helpen om de resterende populaties beter te beschermen en bij voorkeur hun verspreidingsgebied te vergroten.

### **Résumé**

Ces dix dernières années, les Gerromorpha et Nepomorpha de Flandre ont fait l'objet de beaucoup d'études. Tout le matériel récolté par l'Agence Flamande de l'Environnement dans le but d'évaluer la qualité écologique des eaux a été identifié et il en résulte une grande quantité de nouvelles observations, particulièrement pour les eaux courantes. Par ailleurs, les eaux stagnantes ont fait l'objet de plusieurs études menées par l'Institut royal des Sciences naturelles de Belgique, par l'Institut pour l'Étude de la Nature et des Forêts, par Natuurpunt et par les auteurs. Dès lors, l'amélioration des connaissances sur ce groupe d'Hémiptères nécessitait une réactualisation de la Liste Rouge existante en tenant compte des critères de l'IUCN, ce qui fait l'objet du présent article. Le constat est navrant : 23 des 62 espèces évaluées, c'est-à-dire 37% des Gerromorpha et Nepomorpha, sont régionalement

éteints ou menacés en Flandre. Nous espérons que la mise à jour de cette Liste Rouge contribuera à une amélioration de la protection de ces insectes en sauvegardant leur habitat ou mieux en agrandissant leurs aires de distribution.

## Introduction

Red Lists assess the extinction risk of species on a global or a regional scale (IUCN, 2003). The Red List category can be used as one of the criteria to determine priorities for setting up species protection programmes or the delimitation of nature conservation areas or nature reserves (KELLER & BOLLMANN, 2004). They are also used to report on the state of the environment and to increase public awareness. Nature conservation policy in Belgium is the responsibility of the regional governments (Flanders, Brussels and Wallonia) and it is therefore appropriate to compile Red Lists per region rather than for Belgium as a whole. As Red Lists are based on data that are subject to change, they should be revised regularly, for example every 10 years (IUCN, 2003). Since the publication of the previous Red List for Gerromorpha and Nepomorpha in Flanders (BONTE *et al.*, 2001), there have been considerable changes in environmental conditions caused by, for example, habitat loss, eutrophication, fragmentation, succession, altered nature management practices and global warming. Due to the high number of recent records, changes in the distribution of a lot of species became apparent. In addition, high numbers of records now became available, which allowed to determine changes in the area of occupancy more accurately. Finally, the previous Red List is now more than 10 years old. Moreover, since none of the Belgian species occur on the annexes of the Habitats Directive (94/43/EEG), good regional Red Lists are an essential part in their conservation. All these reasons warranted the publication of an updated Red List for Gerromorpha and Nepomorpha in Flanders.

## Material and methods

Field surveys in Flanders involved volunteers, amateur entomologists, naturalists and others. The availability of user-friendly identification keys such as the ones by TEMPELMAN & VAN HAAREN (2009) and STOFFELEN *et al.* (in preparation) certainly promotes the study of Gerromorpha and Nepomorpha. The latter also contains a new distribution atlas, which will hopefully further stimulate the study of these insects, especially in Wallonia. For the evaluation of the current Red List status, dubious records were checked by one of the authors and analyses were performed on validated occurrences only. Records minimally consisted of a species name, an observation date and a location. Locations were attributed to 1x1km or 5x5km grid cells of the UTM (Universal Transverse Mercator) grid.

Since 1994, the World Conservation Union promotes the use of quantitative and objective criteria for the development of Red Lists (IUCN, 1994). The categories used here are the same as those proposed by the IUCN (2001). More recently, guidelines were developed for the application of Red List criteria at the regional level (IUCN, 2003). As suggested by MAES *et al.* (2011a), the IUCN (2003) criteria were followed here. The status of the Gerromorpha and Nepomorpha in Flanders was determined based on a trend criterion as well as a rarity criterion.

The trend criterion, reflecting the change in the extent of the area of occupancy between two compared periods, is important to determine the current status of a species. Only the 315 5x5km UTM squares that were investigated in both periods, which is about half of the 634 5x5km UTM squares in Flanders, were taken into account to calculate the trend. The number of 5x5km squares where species were observed in each period and the calculated trends are indicated in Table 1. When the number of squares, where a certain species was observed in the period 2000-2011, declined by more than 20% in comparison with the period 1989-1999, a species was considered as threatened. The assignment of the current status of a species was based on the trend according to the IUCN (2003) criterion A2c mentioned in Table 2. The year 1989 was chosen as a starting date because the Flemish Environment Agency started monitoring the ecological water quality in that year. Historical data from before 1989 were deliberately not taken into account because stagnant waters were intensively sampled during the doctoral work of BOSMANS (1981) and MERCKEN (1989). Since that time, such studies have not been performed anymore and therefore, such a detailed knowledge about the distribution of Gerromorpha and Nepomorpha could not be matched with recent data.

Table 1. Scientific and vernacular names (Dutch), number of 5x5km squares where species occurred in Flanders in the three distinguished periods and trend (%) of the prevalence between the periods 1989-1999 and since 1999 (only 315 5x5km squares that were investigated in both periods were taken into account). Species that were not recorded in each periods are indicated as 'Regionally Extinct', 'Found again' or 'New' where appropriate.

Scientific name	Dutch name	<1989	1989-1999	>1999	Trend (%)
<i>Aphelocheirus aestivalis</i> (Fabricius, 1794)	Rivierbodewants	6	7	15	114
<i>Aquarius najas</i> (De Geer, 1733)	Beekschaaftenrijder	23	18	21	11
<i>Aquarius paludum</i> (Fabricius, 1794)	Grote schaaftenrijder	192	5	33	360
<i>Arctocorixa germari</i> (Fieber, 1848)	Zandputduikerwants	10	3	6	150
<i>Callicorixa praeusta</i> (Fieber, 1848)	Vlekpoot	347	73	80	-9
<i>Corixa affinis</i> Leach, 1817	Kustduikerwants	110	4	23	250
<i>Corixa dentipes</i> (Thomson, 1869)	Venduikerwants	48	5	10	50
<i>Corixa panzeri</i> (Fieber, 1848)	Schaarse duikerwants	63	1	10	300
<i>Corixa punctata</i> (Illiger, 1807)	Gewone duikerwants	472	113	174	14
<i>Cymatia bondsdorffii</i> (C.R. Sahlberg, 1819)	Veenzwmertje	32	4	11	133
<i>Cymatia coleoprata</i> (Fabricius, 1776)	Gewoon zwemertje	152	18	67	182
<i>Cymatia rogenhoferi</i> (Fieber, 1864)	Oostelijk zwemertje	0	0	4	New
<i>Gerris argentatus</i> Schummel, 1794	Zilveren schaaftenrijder	192	8	67	563
<i>Gerris gibbifer</i> Schummel, 1832	Boschaaftenrijder	30	0	4	Found again
<i>Gerris lacustris</i> (Linnaeus, 1758)	Poelschaaftenrijder	347	52	162	142
<i>Gerris lateralis</i> Schummel, 1832	Rossige schaaftenrijder	4	0	3	Found again
<i>Gerris odontogaster</i> (Zetterstedt, 1828)	Buiktandje	189	7	54	483
<i>Gerris thoracicus</i> (Schummel, 1832)	Bruine schaaftenrijder	241	7	24	86
<i>Glaenocoris propinqua</i> (Fieber, 1848)	Baardduikerwants	6	3	2	0
<i>Hebrus pusillus</i> (Fallén, 1807)	Moslopertje	29	0	2	Found again
<i>Hebrus ruficeps</i> Thomson, 1871	Veenmoslopertje	79	0	7	Found again
<i>Hesperocorixa castanea</i> (Thomson, 1869)	Veenmoerwants	62	10	41	230
<i>Hesperocorixa linnaei</i> (Fieber, 1848)	Donkere moerwants	277	28	87	139
<i>Hesperocorixa moesta</i> (Fieber, 1848)	Zeldzame moerwants	7	0	0	Regionally Extinct
<i>Hesperocorixa sahlbergi</i> (Fieber, 1848)	Vlekmoerwants	372	125	244	50
<i>Hydrometra gracilentia</i> Horváth, 1899	Kleine vijverloper	26	0	9	Found again
<i>Hydrometra stagnorum</i> (Linnaeus, 1758)	Gewone vijverloper	216	7	51	600
<i>Ilyocoris cimicoides</i> (Linnaeus, 1758)	Platte waterwants	283	48	170	165
<i>Limnoporus rufoscutellatus</i> (Latreille, 1870)	Zwervende schaaftenrijder	14	0	1	Found again
<i>Mesovelia furcata</i> Mulsant & Rey, 1852	Bladloper	68	2	20	600
<i>Micronecta minutissima</i> (Linnaeus, 1758)	Noordelijk dwergduikertje	5	1	1	0
<i>Micronecta scholtzi</i> (Fieber, 1860)	Vijverdwergduikertje	164	39	138	216
<i>Microvelia buenoi</i> (Drake, 1920)	Slank dwerglopertje	26	1	14	1000
<i>Microvelia pygmaea</i> (Dufour, 1853)	Zuidelijk dwerglopertje	45	0	8	Found again
<i>Microvelia reticulata</i> (Burmeister, 1835)	Gewoon dwerglopertje	171	6	59	633
<i>Naucoris maculatus</i> Fabricius, 1798	Gevlekte platte waterwants	34	6	20	150
<i>Nepa cinerea</i> Linnaeus, 1758	Waterschorpioen	288	113	208	40
<i>Notonecta glauca</i> Linnaeus, 1758	Gewoon bootsmannetje	397	113	283	83
<i>Notonecta lutea</i> Müller, 1776	Bleek bootsmannetje	6	0	0	Regionally Extinct
<i>Notonecta maculata</i> Fabricius, 1794	Gevlekt bootsmannetje	72	21	69	124
<i>Notonecta obliqua</i> (Thunberg, 1787)	Zwart bootsmannetje	67	23	27	-5
<i>Notonecta reuteri</i> Hungerford, 1928	Noordelijk bootsmannetje	1	0	0	Regionally Extinct
<i>Notonecta viridis</i> Delcourt, 1909	Tenger bootsmannetje	343	47	132	100
<i>Paracorixa concinna</i> (Fieber, 1848)	Streepoot	223	28	56	36
<i>Plea minutissima</i> Leach, 1817	Dwergbootsmannetje	154	23	165	495
<i>Ranatra linearis</i> (Linnaeus, 1758)	Staafwants	121	45	75	33
<i>Sigara distincta</i> (Fieber, 1848)	Grote sigaar	239	36	79	91
<i>Sigara falleni</i> (Fieber, 1848)	Groothandsigaar	465*	89	75	-19
<i>Sigara fossarum</i> (Leach, 1818)	Slootsigaar	36	0	3	Found again
<i>Sigara hellensii</i> (C.R. Sahlberg, 1819)	Beeksigaar	8	1	1	0
<i>Sigara iactans</i> (Jansson, 1983)	Oostelijke sigaar	8*	65	133	65
<i>Sigara lateralis</i> (Leach, 1817)	Zwartvoetje	431	88	233	84
<i>Sigara limitata</i> (Fieber, 1848)	Tweestreepsigaar	37	1	17	1100
<i>Sigara longipalis</i> (J. Sahlberg, 1878)	Langhandsigaar	7	0	0	Regionally Extinct
<i>Sigara nigrolineata</i> (Fieber, 1848)	Richelsigaar	215	58	90	14
<i>Sigara scotti</i> (Douglas & Scott, 1868)	Vensigaar	43	5	30	667
<i>Sigara selecta</i> (Fieber, 1848)	Schorrensigaar	4	0	0	Regionally Extinct
<i>Sigara semistriata</i> (Fieber, 1848)	Driestreepsigaar	156	47	85	55
<i>Sigara stagnalis</i> (Leach, 1817)	Brakwatersigaar	36	0	7	Found again
<i>Sigara striata</i> (Linnaeus, 1758)	Gewone sigaar	525	239	381	16
<i>Velia caprai</i> Tamanini, 1947	Gewone beekloper	149	50	149	132
<i>Velia saulii</i> Tamanini, 1947	Zeldzame beekloper	1	0	0	Regionally Extinct
Number of investigated squares		586	333	502	
Investigated squares (%)		92	53	79	

\* *S. iactans* was only described in 1983 and therefore, the records of *S. falleni* from the first period (>1989) probably partly belonged to *S. iactans*.

Table 2. Applied IUCN (2003) criteria for assignment of the current species status based on : (A2c) the trend (based on the change in the number of 5x5km squares between the periods 1989-1999 and 2000-2011) and (B2) the rarity (the number of locations in B2a was based on the number of 5x5km squares) in combination with a decline in at least one of the four criteria under B2b.

IUCN (2003) criterion	Critically Endangered	Endangered	Vulnerable	Near Threatened
A2c: reduction in the area of occupancy	≥80%	≥50%	≥30%	≥20%
B2: area of occupancy and at least both:	<10km <sup>2</sup>	<500km <sup>2</sup>	<2000km <sup>2</sup>	<3000km <sup>2</sup>
a. Fragmented or known from limited # locations	1	≤5	≤10	≤15
b. Continuing decline in any of the following:				
(i) Extent of occurrence				
(ii) Area of occupancy				
(iii) Area, extent and/or quality of the habitat				
(iv) Number of locations or subpopulations				

Table 3. Current status of the Gerromorpha and Nepomorpha of Flanders, with indication of the fulfilled IUCN (2003) criterion.

<b>Regionally Extinct (6)</b> <i>Hesperocorixa moesta</i> , <i>Notonecta lutea</i> , <i>Notonecta reuteri</i> , <i>Sigara longipalis</i> , <i>Sigara selecta</i> , <i>Velia saulii</i>
<b>Critically Endangered (2)</b> <i>Micronecta minutissima</i> (B2), <i>Sigara hellensii</i> (B2)
<b>Endangered (5)</b> <i>Gerris gibbifer</i> (B2), <i>Gerris lateralis</i> (B2), <i>Glaenocoris propinqua</i> (B2), <i>Hebrus pusillus</i> (B2), <i>Sigara fossarum</i> (B2)
<b>Vulnerable (7)</b> <i>Artocoris germari</i> (B2), <i>Corixa dentipes</i> (B2), <i>Corixa panzeri</i> (B2), <i>Hebrus ruficeps</i> (B2), <i>Hydrometra gracilentata</i> (B2), <i>Microvelia pygmaea</i> (B2), <i>Sigara stagnalis</i> (B2)
<b>Near Threatened (3)</b> <i>Aphelocheirus aestivalis</i> (B2), <i>Cymatia bonsdorffii</i> (B2), <i>Microvelia buenoi</i> (B2)
<b>Least Concern (38)</b> <i>Aquarius najas</i> , <i>Aquarius paludum</i> , <i>Callicorixa praeusta</i> , <i>Corixa affinis</i> , <i>Corixa punctata</i> , <i>Cymatia coleoprata</i> , <i>Cymatia rogenhoferi</i> , <i>Gerris argentatus</i> , <i>Gerris lacustris</i> , <i>Gerris odontogaster</i> , <i>Gerris thoracicus</i> , <i>Hesperocorixa castanea</i> , <i>Hesperocorixa linnaei</i> , <i>Hesperocorixa sahlbergi</i> , <i>Hydrometra stagnorum</i> , <i>Ilyocoris cimicoides</i> , <i>Micronecta scholtzi</i> , <i>Mesovelia furcata</i> , <i>Microvelia reticulata</i> , <i>Naucoris maculatus</i> , <i>Notonecta glauca</i> , <i>Notonecta maculata</i> , <i>Notonecta obliqua</i> , <i>Notonecta viridis</i> , <i>Paracorixa concinna</i> , <i>Nepa cinerea</i> , <i>Plea minutissima</i> , <i>Ranatra linearis</i> , <i>Sigara distincta</i> , <i>Sigara falleni</i> , <i>Sigara iactans</i> , <i>Sigara lateralis</i> , <i>Sigara limitata</i> , <i>Sigara nigrolineata</i> , <i>Sigara scotti</i> , <i>Sigara semistriata</i> , <i>Sigara striata</i> , <i>Velia caprai</i>
<b>Not applicable (1)</b> <i>Limnoporus rufoscutellatus</i>

The rarity was based on the area of occupancy and in addition there had to be a continuing decline in the extent of occurrence, the area of occupancy, the area, extent and/or quality of the habitat or the number of locations or subpopulations (IUCN, 2003) (Table 2). Since the presence of a decline is quite subjective, rarity was mainly determined based on the number of locations where a species was found. The number of locations was quantified as the number of 5x5km UTM squares where a species was observed in the period 2000-2011.

In accordance with the new Red Lists for butterflies (MAES *et al.*, 2011b) and grasshoppers and crickets (LOCK *et al.*, 2011), the extent of occurrence was not taken into account since it is not suitable for small regions : all species would be potentially Vulnerable according to the IUCN (2003) criterion B1 because the extent of occurrence is always smaller than 20000km<sup>2</sup>, since Flanders covers a smaller area. Other criteria mentioned in the IUCN (2003) guideline are not considered relevant for Gerromorpha and Nepomorpha, because no population sizes were determined and no modelling efforts were performed.

## Results

Because nature policy in Belgium is a competence of the regions, a regional Red List was established for the Nepomorpha and Gerromorpha in Flanders (Table 3). A list of the scientific and Dutch names of the species observed in Flanders is given in Table 1. The most threatened and the rarest species are discussed below.

### *Regionally Extinct*

Six species are considered Regionally Extinct in Flanders : *Hesperocorixa moesta* (last observed in 1986), *Notonecta lutea* (last observed in 1987), *Notonecta reuteri* (only once collected in 1950),



Fig. 1. *Aquarius najas*, a species that is probably slowly recovering in the Campine region due to an improvement of the ecological water quality of running waters.

*Sigara longipalis* (last observed in 1986), *Sigara selecta* (last observed in 1982) and *Velia saulii* (only once collected in 1879). The former three species mainly occur in fens, a habitat which strongly declined. For *Sigara longipalis*, the habitat is not well known due to a lack of data, *Sigara selecta* is a species occurring in brackish waters and *Velia saulii* prefers running waters with a good ecological water quality (GABRIËLS *et al.*, 2010).

#### **Critically Endangered**

*Micronecta minutissima* and *Sigara hellensii* have only been found in one 5x5km UTM square in Flanders since 2000 and are therefore considered as Critically Endangered. *Micronecta minutissima* occurs in lakes and has possibly been overlooked due to its small size and its resemblance to *Micronecta scholtzi*. *Sigara hellensii* is a species living in watercourses with a good ecological quality.

#### **Endangered**

*Gerris gibbifer*, *Gerris lateralis*, *Glaenocorisa propinqua*, *Hebrus pusillus* and *Sigara fossarum* have been found in two to five 5x5km UTM squares and are therefore considered as Endangered in Flanders. *G. gibbifer* and *G. lateralis* are both species that can be found in pools and ditches in forests. The latter species was previously considered Regionally Extinct (BONTE *et al.*, 2001), however, this species was rediscovered in several Flemish *Alnus* forests (STOFFELEN & DE BROUWER, 2011 ; THYS & STOFFELEN, 2011). *G. propinqua* and *S. fossarum* are both species mainly occurring in fens, while *H. pusillus* prefers waters with a lot of emergent vegetation.

#### **Vulnerable**

*Arctocorisa germari*, *Corixa dentipes*, *Corixa panzeri*, *Hebrus rufipes*, *Hydrometra gracilentia*, *Microvelia pygmaea* and *Sigara stagnalis* were only found in six to ten 5x5km UTM squares and are thus considered as Vulnerable in Flanders. *A. germari* and *C. dentipes* are species mainly occurring in fens, *H. gracilentia*, *H. ruficeps* and *M. pygmaea* prefer waters with a lot of emergent vegetation, whereas *C. panzeri* and *S. stagnalis* are mainly found in slightly brackish waters.

#### **Near Threatened**

*Aphelocheirus aestivalis*, *Cymatia bondsdorffii* and *Microvelia buenoi* were recently found in only 11-15 5x5km UTM squares and are therefore considered as Near Threatened in Flanders. *A. aestivalis* is a species living in running waters with a good ecological quality (GABRIËLS *et al.*, 2010). As the distribution area of this species has already expanded due to the general improvement of the ecological water quality, it is expected that this species will soon be out of the danger zone. *C. bondsdorffii* mainly occurs in fens, while *M. buenoi* prefers waters with a lot of emergent vegetation.

### ***Least Concern***

*Cymatia rogenhoferi* is still rare in Flanders, however, since this species is currently expanding, the used IUCN (2003) criteria (Table 2) are not fulfilled because no decline is detected. This species was first observed in Flanders in 2001 and has now already been observed in four different 5x5km squares (BOSMANS *et al.*, unpublished data). All other species are neither rare nor has any decrease been detected and are therefore of Least Concern.

### ***Not applicable***

*Limnporus rufoscutellatus* is a vagrant species, which sometimes reproduces in Flanders, but never establishes sustainable populations and hence was categorised 'not applicable' according to IUCN (2003) guidelines. This species can accidentally be found on all water types, but it is very rare in Flanders and was recently only collected once in Westerlo.

## **Discussion**

A large part of the Flemish territory has been surveyed since 2000 : the database contains recent records for 79% of all 5x5km UTM grid cells in Flanders (Table 1). This high effort contributes to the reliability of the derived Red List. However, it should be noted that working with 5x5km squares is a crude method to quantitatively detect changes in the number of populations or the population size of a species (IUCN (2003) criteria A, C and D). Because a species was considered present in a square as soon as one specimen was observed, a decline could only be observed when a species was not longer observed in those squares. An increased number of visits per square could also have increased the probability of detecting a species. It is therefore possible that the decline of certain species remained unnoticed.

The number of 5x5km squares where Gerromorpha and Nepomorpha occurred, only decreased slightly for a few species. The decrease of *Sigara falleni* can probably be explained by the competition with *Sigara iactans*, a closely related species that recently colonised Flanders (VERCAUTEREN, 1997 ; STOFFELEN *et al.*, in preparation), which has now become a common species in Flanders. The decline of *S. falleni* therefore seems to be a natural process caused by niche segregation and it is expected that a new equilibrium will be reached, where *S. falleni* will diminish in certain habitats in favour of *S. iactans*. To a lesser extent, also *Callicorixa praeusta* and *Notonecta obliqua* have declined. As *C. praeusta* can be considered as an indicator for disturbances (TEMPELMAN, personal communication), its decline is maybe not such a bad sign. On the other hand, the decline of *N. obliqua* is worrying, since this is yet another fen species that is becoming rare. The abovementioned data might indicate that current conservation practices have halted the decline for most species in Flanders. However, a lot of species still remain rare and require additional conservation measures in order to maintain the current populations or, preferable, to extend their area of occupancy.

*Micronecta griseola* Horvath, 1899 and *Micronecta poweri* (Douglas & Scott, 1869) are additional species, which also have been reported for Belgium. However, both species have never been found in Flanders and only occur in Wallonia, the southern part of Belgium. Therefore, these species were not evaluated here. *Sigara dorsalis* (Leach, 1817) has also been mentioned for Belgium, however, these observations were all based on misidentifications.

When the presented Red List is compared with the previous one (BONTE *et al.*, 2001), it seems that the number of threatened species has not changed that much. Despite the fact that the criteria used by BONTE *et al.* (2001) are completely different from the IUCN (2003) criteria that were used here, both Red Lists are remarkably similar. The largest changes were obtained for several running water species, which recovered due to the general improvement of the ecological water quality : *Aphelocheirus aestivalis* dropped from Critically Endangered to Near Threatened, *Velia caprai* from Vulnerable to Least Concern and *Aquarius najas* (Fig. 1) from Critically Endangered to Least Concern. For Wallonia and Brussels, still not enough data are available to assess the Red List status of the Nepomorpha and Gerromorpha.

Currently, 23 out of 62 evaluated species, or 37% of the Flemish Gerromorpha and Nemomorpha fauna, are either Regionally Extinct or threatened. This high fraction is typical for aquatic organisms, because a lot of pressures affect species living in aquatic environments. For dragonflies, which is

another group of insects with aquatic larvae that mainly live in stagnant waters, 23 out of 64 species, or 36% of the Flemish Odonata fauna, are either Regionally Extinct or threatened (DE KNIJF, 2006). Of the Regionally Extinct or threatened Gerromorpha and Nepomorpha, especially species from fens (9 out of 13), running waters (3/6), forest pools and ditches (2/2), slightly brackish waters (3/4) and stagnant waters with a lot of emergent vegetation (4/7) are represented. Also rare species for which the habitat is not well yet known in Flanders are often threatened (2/3). Ubiquist species (0/21) and species from stagnant waters with a lot of submerse vegetation (0/5) seem to be less affected.

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