Bulletin S.R.B.E./K.B.V.E., 139 (2003) : 194-203

The spider fauna (Araneae) of ecological valuable alluvial forests: the case of the 'Raspaille-Moerbeke-Karkoolbos' complex (Eastern Flanders, Belgium)

by Domir DE BAKKER[1,2], Konjev DESENDER[2], Peter VAN DE KERKCHOVE[3] & Jean-Pierre MAELFAIT[1,4]

[1] Ghent University, Department of Biology, Research Unit of Terrestrial Ecology, K.L. Ledeganckstraat 35, B-9000 Ghent (e-mail: Domir.Debakker@UGent.be).
[2] Royal Belgian Institute of Natural Sciences, Department of Entomology, Vautierstraat 29, B-1000 Brussels (e-mail: Domir.Debakker@naturalsciences.be, Konjev.Desender@naturalsciences.be).
[3] Institute for Forestry and Game Management, Gaverstraat 4, B-9800 Geraardsbergen (e-mail: Peter.Vandekerckhove@lin.vlaanderen.be).
[4] Institute of Nature Conservation, Kliniekstraat 25, B-1070 Brussels (e-mail: Jean-Pierre.Maelfait@instnat.be).

Summary

The spider fauna of the 'Raspaille-Moerbeke-Karkoolbos' forest complex has been analysed during a year round sampling campaign (1999-2000) using pitfall trapping. A total of 10974 adult individuals were caught belonging to 116 species. 19 species were listed on the Red list for spiders of Flanders. A remarkable capture was that of *Robertus kuehnae*, a theridiid spider that has only been caught once in Belgium.

Keywords: spiders, Araneae, alluvial forests, Flanders, *Robertus kuehnae*.

Résumé

La faune aranéologique a été étudiée dans le 'Raspaille-Moerbeke-Karkoolbos' forêt pendant une année (1999-2000) à l'aide de pièges à Barber. Au total, 10974 individus adultes ont été capturés répartis sur 116 espèces. 19 espèces sont citées dans la liste rouge des araignées de Flandres. Une capture remarquable était celle de *Robertus kuehnae*, araignée theridiide, trouvée une fois dans notre pays.

Samenvatting

De spinnenfauna van het 'Raspaille-Moerbeke-Karkoolbos' boscomplex werd geanalyseerd gedurende een bemonsteringscampagne van 1 jaar (1999-2000) met bodemvallen. In totaal werden 10974 adulte individuen gevangen die tot 116 soorten behoren. 19 soorten zijn in meer of mindere mate bedreigd in Vlaanderen en staan op de Rode lijst. Een opmerkelijke vangst tijdens deze campagne was deze van *Robertus kuehnae*, een kogelspin die slechts nog maar éénmaal in België werd gevangen.

Introduction

Forests on nutrient-rich soils (often associated with wells) are extremely rare, highly fragmented and restricted to certain regions in our country. Furthermore, forests bound to humid, alluvial soils only cover about 0.35 to 0.70% of the total surface area of Flanders (VAN LANDUYT *et al.*, 1999). Despite research with other invertebrates, no literature is available in Flanders concerning the effects of forest exploitation, history and fragmentation on spider faunas. To evaluate this, a first case study was launched to study these effects (DESENDER *et al.*, 2001). Thereby, a project was performed in the 'Raspaille-Moerbeke-Karkoolbos' forest complex. In this research, several forest stands (differing in history, exploitation degree and fragmentation) were studied. Detailed information concerning analysis of the spider communities will be published in the future. This article deals only with the spider species list found in a sampling campaign of the forest complex.

History and general outline of the 'Raspaille-Moerbeke-Karkoolbos' forest complex

The 'Raspaillebos' forest complex has a total surface of 180ha and is situated on the frontier between the provinces of Eastern Flanders and Brabant on the loamy ridge between the valley of the river Dender in the north and the valley of the river Mark in the south (Fig. 1). The forest stretches out on the territory of the villages Moereke, Onkerzele and Grimminge (three villages under the jurisdiction of the city of Geraardsbergen). The area is completely situated on a loam layer with tertiary sand and clay underneath. It consists of some connected forest parts (Raspaillebos, Moerbekebos and the Karkoolbos) surrounded by some smaller forest fragments, which are scattered in the landscape of today.

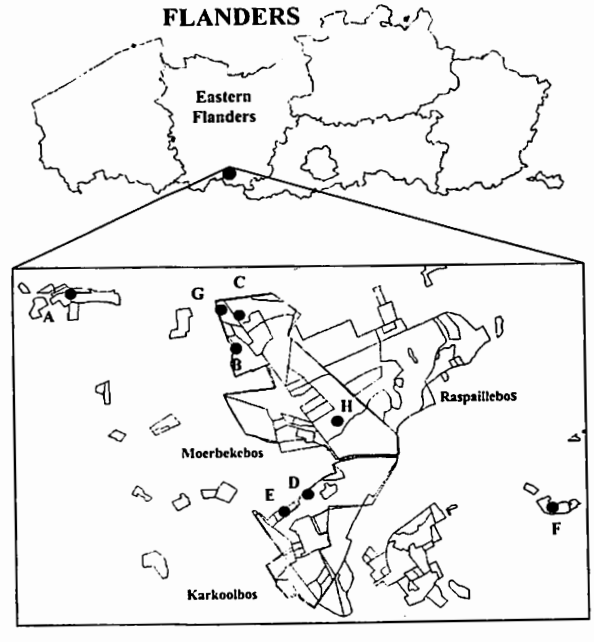

Fig. 1. The position of the 'Raspaille-Moerbeke-Karkoolbos" complex in Flanders and position of the sampled stations in the forest complex. Station H was already sampled earlier (1997-1998).

The forest complex used to be a part of the 'Kolenwoud', which has been fragmented during medieval times. In the 17th century, the present 'Karkoolbos' was owned by the Lord of Boerlare (Moerbeke), the monasteries of Sint-Adrian (Geraardsbergen) and Beaupré (Grimminge), the abbey of Sint-Cornelius (Ninove) and the hospital of Geraardsbergen. The farmhouse and chapel on the beginning of the 'bosberg' are remains of the monastery of the Dominican order that was built in the 17th century. At the end of the 'Ancien Régime', all church belongings were sold to the upper class. Fortunately, the forest complex was spared. The 'Karkool'- and 'Moerbekebos' have become the property of the Flemish Government (AMINAL) respectively in 1979 and 1981 and are being managed by the department 'Bos en Groen'. Recently, the 'Raspaillebos' was purchased by the nature organisation 'Natuurpunt VZW'.

The three parts of the complex display different kinds of vegetation types. The largest part of the 'Raspaillebos' consists of a complex of oak-beechforest (*Fago-Quercetum*) with transitions to an oak-hornbeam forest type (*Endymio-Carpinetum*). The tree layer mainly consists of beech (*Fagus sylvatica*) with sporadic presence of oak (*Quercus robur*). Shrubs mainly consist of hazel (*Corylus avellana*), red dogwood (*Cornus sanguinea*), common elder (*Sambucus nigra*), hornbeam (*Carpinus betulus*) and one-styled hawthorn (*Craetagus monogyna*). In this part of the larger complex, a typical spring vegetation develops every year with wood anemone (*Anemona nemorosa*) and wild bluebell (*Hyacinthoides non-scripta*) as main herbal species.

Due to an intensive wood management in the 'Moerbekebos' (most in connection with the production of charcoal), which lasted even after the Second World War, no old trees are present in this part. Species like common maple (*Acer pseudoplatanus*), spanish chestnut (*Castanea sativa*), rowantree (*Sorbus aucuparia*) and hazel were used. Despite the discontinuation of this kind of management, these trees are still abundantly present in this part. Since the acquisition of this part, a reconversion took place from these trees to more indigenous trees like oak, forest cherry (*Prunus avium*) and lime (*Tilia spec.*). Nevertheless, in the past several stands were planted with coniferous trees like Japanese and European larch (*Larix kaempferi* and *L. decidua*) and Corsican pine (*Pinus nigra ssp. laricio*).

Beech is the main tree species in the 'Karkoolbos'. Nevertheless, some springs are present on the slope of the 'Bosberg' thus creating more alluvial forest types like alder carr forest type (*Alno-Padion*) and a *Carici remotae-fraxinetum chrysoplenietosum* forest type. Several of these stands have been planted with the exotic Canadian poplar (*Populus x canadensis*).

Sampled stations

Since this article only consists of a species list, no details are given about forest exploitation and

history and degree of fragmentation of each sampled stand, but this information can be found in DESENDER *et al.* (2001). In total, 8 stands were sampled.

The percentage coverage of respectively tree, shrub, herb layer and mosses plus an indication of the percentage dead wood near the sampled stands together with a measurement (mean) of the thickness of the litter layer per station are given in Table 1.

Table 1. Coverage (percentage) of trees, shrubs, herbs, mosses, dead wood with an indication of the thickness of the litter layer. Abbreviation n.m. means that this parameter was not measured. Thickness of litter layer is the mean of 5 measurements done in the neighbourhood of the pitfall traps.

Parameters/Stations	Ras A	Ras B	Ras C	Ras D	Ras E	Ras F	Ras G	Ras H
Coverage tree layer	90	80	60	100	95	40	0	90
Coverage shrub layer	50	85	95	85	80	2	10	60
Coverage herb layer	40	100	105	81	101	164	56	60
Coverage by mosses	1	1	1	5	<1	n.m.	n.m.	<1
Amount of dead wood	<1	1	<1	10	5	n.m.	n.m.	2
Thickness litter layer (cm)	0	0,3	1	3,5	1,5	n.m.	n.m.	2,4

Station A was the most humid station dominated by Canadian poplar and alder (*Alnus glutinosa*). The latter was also present in the shrub layer together with hazel. The herb layer consisted of mainly marsh-marigold (*Caltha palustris*) and lesser celandine (*Ranunculus ficaria*). That this is an old forest stand is clearly seen in the presence of typical old forest species like *Chrysoplenium alternifolium* and wood anemone.

Station B is dominated by Canadian poplar and ash (*Fraxinus excelsior*). The shrub layer mainly consists of common elder, hazel and young ashes. The herb layer consisted completely of *Alium ursinum* with some patches of *Mercurialis perennis*.

Station C had only Canadian poplar as tree species. The shrub layer consisted of hazel and common elder. The herb layer consisted of a mainly typical spring flora with wood anemone, wild bluebell and creeping myrtle (*Vincia minor*).

Station D consisted mainly of beech intermingled with Canadian poplar. The shrub layer consisted of hazel. Just as station B is the herb layer dominated by *Alium ursinum*.

Station E had Canadian poplar and ash as main tree species. The shrub layer consisted of common elder. This station is already distorted a long time which resulted in a roughened vegetation, mainly consisting of blackberry (*Rubus spec.*), large stinging nettle (*Urtica doica*) and lesser celandine.

For the following 2 stations, only data from 1999 are known (VAN DE KERCKHOVE & VAN DEN MEERSSCHAUT, *pers. comm.*). The listing of the vegetation was not repeated in 2001 since it was not relevant to the aim of the project and has endured severe changes since.

Station F is already degenerated for a long time, indicated by the presence of cleavers (*Galium aparine*), large stinging nettle, herb Robert (*Geranium robertianum*), blackberry and ground ivy (*Glechoma hederacea*). Before the stand was cleared (in september 2000) it consisted of Canadian poplar and willow (*Salix spec.*). Nowadays, a large amount of soft rush (*Juncus effusus*) is present. The latter is an indicator species for upwelling water, probably due to a compaction of the soil through exploitation and/or possible lack of extra evaporation by trees.

Station G was cleared in the winter of 1998-1999, so before the beginning of the sampling. The tree layer consisted mainly of Canadian poplar. Despite the exploitation in the past, we can still find a typical spring flora with wild bluebell, wood anemone and creeping myrtle, although probably they were more abundant before the clearing. Recently, disruptive species like soft rush have emerged. The station has been replanted with trees.

Station H was sampled during a large sampling campaign of 56 forest stands in Flanders (DE BAKKER *et al.*, 2000). It consists mainly of Spanish chestnut and red oak (*Quercus rubra*) intermingled with some birches (*Betula spec.*). The shrub layer mainly consisted of maple, Spanish chestnut and elder. The herb layer was dominated by wild bluebell and blackberry. In summer, some daffodils (*Narcissus pseudonarcissus ssp. pseudonarcissus)* were present. It had a well-developed thick litter layer (due to the fact that the leaves of the trees do not break down fast).

Material and Methods

Seven forest stands were sampled in the 'Raspaille-Moerbeke-Karkoolbos' forest complex. Five of them were sampled during a complete year cycle. Sampling in stands F and G was stopped somewhere during the year due to silvicultural practices where the traps were either destroyed or not found again.

Each stand (A to G) was sampled using 6 pitfall traps per station which were operational during a consecutive year (spring 1999-spring 2000), with this exception that stations F and G were sampled until 12th October and 14th December respectively. These traps (diameter 9.5cm filled with a 4% formaldehyde solution with a little bit of detergent added to reduce surface tension) were emptied every fortnight, except during winter when, due to a lower activity of animals, traps were emptied every three or four weeks. Further details concerning the use of pitfall trapping is described in DE BAKKER *et al.* (2000). Station H was sampled using only 3 pitfall traps in 1997-1998.

Results

In total, 10974 adult spiders were caught in all forest stands (see Table 2 for a complete species list and number of catches per forest stand). These individuals belong to 116 species. A remarkable catch is that of *Robertus kuehnae* BAUCHNESS & UHLENHAUT, 1993. Information concerning the biology and distribution of this species is discussed below. 19 species out of 116 are listed on the Red List of spiders of Flanders (MAELFAIT *et al;* 1998). With addition of the formerly sampled station (which we called station H) in 1997-1998, the total list of species found in the forest complex is 126 (number of caught individuals in total: 11651).

Table 2. List of caught species per forest stand.

Species	RAS A	RAS B	RAS C	RAS D	RAS E	RAS F	RAS G	RAS H	Total
Family Amaurobiidae									
Coelotes inermis (L. KOCH, 1855)		139	97	94	106		44	67	547
Coelotes terrestris (WIDER, 1834)	78	177	135	290	72	9	102	175	1038
Family Dictynidae									
Cicurina cicur (FABRICIUS, 1793)	2	1	4	2	5		5		19
Lathys humilis (BLACKWALL, 1855)			1						1
Family Dysderidae									
Dysdera erythrina (WALCKENAER, 1802)							1		1
Family Gnaphosidae									
Haplodrassus silvestris (BLACKWALL,1833)								1	1
Zelotes pusillus (C.L. KOCH, 1833)						1	1		2
Family Clubiondiae									
Clubiona compta C.L. KOCH, 1839				1				2	3
Clubiona lutescens WESTRING, 1851	3					2		2	7
Clubiona reclusa O.P.-CAMBRIDGE, 1863					1				1
Clubiona terrestris WESTRING, 1862		1	1	5				1	8
Family Liocranidae									
Agroeca brunnea (BLACKWALL, 1833)		3	8	1	1		6	8	27
Apostenus fuscus WESTRING, 1851								4	4
Family Zoridae									
Zora spinimana (SUNDEVALL, 1833)			1					1	2
Family Anyphaenidae									
Anyphaena accentuata (WALCKENAER, 1802)		1						1	2
Family Thomsidae									
Ozyptila simplex (O.P.-CAMBRIDGE, 1862)							1		1
Ozyptila trux (BLACKWALL, 1846)		12	4	5		14	48	11	94
Xysticus cristatus (CLERCK, 1757)								1	1
Xysticus lanio C.L. KOCH, 1824								6	6
Family Philodromidae									
Philodromus albidus KULCZYNSKI, 1911				1			1		2
Family Lycosidae									
Arctosa leopardus (SUNDEVALL, 1833)							6		6
Pardosa amentata (CLERCK, 1757)	1			2	6	2	120	4	135
Pardosa lugubris (WALCKENAER, 1802)							8	22	30
Pardosa palustris (LINNAEUS, 1758)							1		1
Pardosa saltans TÖPFER-HOFMANN, 2000							10	22	32
Pirata hygrophilus THORELL, 1872	84	52	73	11	6	422	32	62	742
Pirata latitans (BLACKWALL, 1841)	2				1	13	8		24
Pirata piraticus (CLERCK, 1757)	3	1				6	1		11
Trochosa ruricola (DEGEER, 1778)				1	1				2

Trochosa terricola THORELL, 1856	1		1		10	1	4	2	19
Family Agelenidae									
Histopona torpida (C.L. KOCH, 1834)	5	26	4	353	10	1	15	23	437
Tegenaria picta SIMON, 1870				2			1	3	6
Tegenaria silvestris L. KOCH, 1872	1								1
Family Hahniidae									
Antistea elegans (BLACKWALL, 1841)	98	1		6	4	7	1		117
Hahnia helveola SIMON, 1875			1	4					5
Hahnia montana (BLACKWALL, 1841)		1		2			1		4
Hahnia pusilla C.L. KOCH, 1841					1			1	2
Family Mimetidae									
Ero furcata (VILLERS, 1789)			1					1	2
Family Theridiidae									
Achaearanea simulans (THORELL, 1875)			1						1
Achaearanea tepidariorum (C.L. KOCH, 1841)		1							1
Enoplognatha ovata (CLERCK, 1757)		1	2		1	5		1	10
Enoplognatha thoracica (HAHN, 1833)								1	1
Euryopis flavomaculata (C.L. KOCH, 1836)							1		1
Robertus kuehnae BAUCHHENS & UHLENHAUT, 1993		3	3						6
Robertus lividus (BLACKWALL, 1836)	15		2	7	25	11	2		62
Theridion instabile O.P.-CAMBRIDGE, 1871			2						2
Family Tetragnathidae									
Pachygnatha clercki SUNDEVALL, 1823	24	13	5	2	29	20	7		100
Pachygnatha degeeri SUNDEVALL, 1830	1	1	1			3	1		7
Pachygnatha listeri SUNDEVALL, 1830			2		1		1	4	8
Tetragnatha montana SIMON, 1874	1		1	1	1	2			6
Family Metidae									
Metellina mengei (BLACKWALL, 1869)	1	2	4	1	3	1	1	4	17
Metellina meriana e (SCOPOLI, 1773)			1						1
Metellina segmentata (CLERCK, 1757)		1	1		1				3
Family Linyphiidae									
Subfamily Erigoninae									
Ceratinella brevis (WIDER, 1834)			2					8	10
Ceratinella scabrosa (O.P.-CAMBRIDGE, 1871)	1	10	13		6	3	13	1	47
Dicymbium nigrum (BLACKWALL, 1834)								1	1
Dicymbium tibiale (BLACKWALL, 1836)	93	74	25	3	38	171	8		412
Diplocephalus latifrons (O.P.-CAMBRIDGE, 1863)		86	52	2	153		12		305
Diplocephalus permixtus (O.P.-CAMBRIDGE, 1871)	2								2
Diplocephalus picinus (BLACKWALL, 1841)	5	217	36	52	159	46	207	10	732
Dismodicus bifrons (BLACKWALL, 1841)						1			1
Erigone atra (BLACKWALL, 1841)	88	17	2	6	9	64	103	6	295
Erigone dentipalpis (WIDER, 1834)	3	1			3	5	39	1	52
Glyphesis servulus (SIMON, 1881)					30				30
Gnathonarium dentatum (WIDER, 1834)	1								1
Gonatium rubellum (BLACKWALL, 1841)		8	8	1	6			14	37
Gongylidiellum vivum (O.P.-CAMBRIDGE, 1875)	2			1	1	4		1	9
Gongylidium rufipes (SUNDEVALL, 1829)	3	1				3	1		8
Hypomma bituberculatum (WIDER, 1834)			1						1
Maso sundevalli (WESTRING, 1851)	5	12	11	1	2	2	11		44
Micrargus herbigradus (BLACKWALL, 1854)		21	48	18	32		16	14	149
Milleriana inerrans (O.P.-CAMBRIDGE, 1884)					1	1			2
Monocephalus fuscipes (BLACKWALL, 1836)	1	87	84	2	155	4	28	4	365
Oedothorax agrestis (BLACKWALL, 1853)	1	2							3
Oedothorax apicatus (BLACKWALL, 1850)	3	1				11	4		19
Oedothorax fuscus (BLACKWALL, 1834)	74	9	8	5	18	65	39	4	222
Oedothorax gibbosus (BLACKWALL, 1841)	46		1			15	2		64
Oedothorax retusus (WESTRING, 1851)	52	3		2	11	153	22		243
Pocadicnemis juncea LOCKET & MILLIDGE, 1953					1	5	1		7
Pocadicnemis pumila (BLACKWALL, 1841)							2		2
Prinerigone vagans AUDOUIN, 1826	1				1		4		6
Saloca diceros (O.P.-CAMBRIDGE, 1871)	39	12	2	4	91	26	3		177
Tapinocyba insecta (L. KOCH, 1869)				43	62	16	2		123
Tiso vagans (BLACKWALL, 1834)							1		1
Walckenaeria acuminata BLACKWALL, 1833		50	29	23	52	6	17	21	198

Walckenaeria atrotibialis (O.P.-CAMBRIDGE, 1878)	1	39	13	174	66	40	23	1	357
Walckenaeria cucullata (C.L. KOCH, 1836)				4					4
Walckenaeria cuspidata (BLACKWALL, 1833)		2	2						4
Walckenaeria dysderoides (WIDER, 1834)		4	2						6
Walckenaeria furcillata (MENGE, 1869)				13				1	14
Walckenaeria mitrata (MENGE, 1868)								4	4
Walckenaeria nudipalpis (WESTRING, 1851)	10	6	5		27	9			57
Family Linyphiidae									
Subfamily Linyphiinae									
Agyneta ramosa JACKSON, 1912	3					13			16
Bathyphantes gracilis (BLACKWALL, 1841)	130	4	31	9	35	29	93	12	343
Bathyphantes nigrinus (WESTRING, 1851)	7	2			3	57	1	4	74
Bathyphantes parvulus (WESTRING, 1851)						1	1		2
Centromerus aequalis (WESTRING, 1851)			1	5				11	17
Centromerus dilutus (O.P.-CAMBRIDGE, 1875)					1			5	6
Centromerus sylvaticus (BLACKWALL, 1841)	31	34	122	16	161	1	16	21	402
Diplostyla concolor (WIDER, 1834)	272	209	160	8	203	348	73	30	1303
Drapetisca socialis (SUNDEVALL, 1832)		3	1						4
Helophora insignis (BLACKWALL, 1841)		11	1	1	6				19
Lepthyphantes cristatus (MENGE, 1866)			11		3			38	52
Lepthyphantes ericaeus (BLACKWALL, 1853)	1				1	7			9
Lepthyphantes flavipes (BLACKWALL, 1854)								1	1
Lepthyphantes minutus (BLACKWALL, 1833)				2	1				3
Lepthyphantes pallidus (O.P.-CAMBRIDGE, 1871)	14	20	8	1	37	7	21	3	111
Lepthyphantes tenuis (BLACKWALL, 1852)	6	14	3		14	11	25	2	75
Lepthyphantes zimmermanni BERTKAU, 1890	44	192	363	174	93	4	48	40	958
Leptorhoptrum robustum (WESTRING, 1851)	8	1	1		7	19	6		42
Linyphia hortensis SUNDEVALL, 1829		1	2		2	1		3	9
Linyphia triangularis (CLERCK, 1757)		5	1		2	3	1		12
Macrargus rufus (WIDER, 1834)		4	1	44	1			103	153
Meioneta rurestris (C.L. KOCH, 1836)							1		1
Meioneta saxatilis (BLACKWALL, 1844)					1		4		5
Microneta viaria (BLACKWALL, 1841)	1	64	26	136	6	3	21	39	296
Neriene clathrata (SUNDEVALL, 1829)		1				4	1	5	11
Neriene emphana (WALCKENAER, 1837)			1	2					3
Neriene montana (CLERCK, 1757)		1							1
Poeciloneta globosa (WIDER, 1834)								3	3
Porrhomma egeria SIMON, 1884		6	8	5	10			2	31
Porrhomma pygmaeum (BLACKWALL, 1834)	7					2			9
Saaristoa abnormis (BLACKWALL, 1841)	1	33	11	16	11	3	11	9	95
Tallusia experta (O.P.-CAMBRIDGE, 1871)		2							2
Total number of individuals	**1276**	**1706**	**1452**	**1564**	**1807**	**1683**	**1311**	**852**	**11651**
Total number of species	**49**	**59**	**62**	**50**	**62**	**55**	**65**	**59**	**124**
Number of Red list species	**5**	**5**	**10**	**7**	**7**	**4**	**12**	**10**	**22**

This means that an additional 10 species were found in the formerly sampled station. These are: *Dicybium nigrum*, *Walckenaeria mitrata*, *Haplodrassus silvestris*, *Lepthyphantes flavipes*, *Porrhomma egeria*, *Poeciloneta globosa*, *Apostenus fuscus*, *Enoplognatha thoracica*, *Xysticus cristatus* and *X. lanio*. Three species of these additional catches are also listed on the Red list of spiders of Flanders (*Walckenaeria mitrata*, *Haplodrassus silvestris* and *Apostenus fuscus*). All three are threatened in their existence and have dry deciduous forests with large amounts of dead wood as preferential habitat. Until now, 22 species of the forest complex are present on the Red List.

Figure 2 displays the number of species and Red list species that were found in all sampled stations (not including the formerly sampled station H).

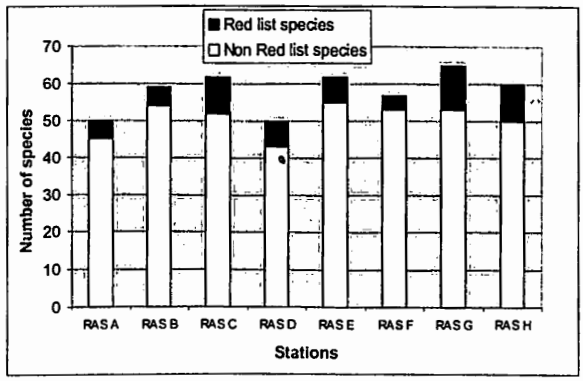

Fig. 2. Number of observed species per sampled forest stand with indication of the found Red list species (see MAELFAIT *et al.*, 1998).

Table 3. Red list species caught during the whole sampling campaign in all stations (including the earlier sampled station H).

Red list species	Status	Preferential habitat
Coelotes inermis (L. KOCH, 1855)	Geographically restricted	Dry deciduous forest with large amounts of dead wood
Coelotes terrestris (WIDER, 1834)	Vulnerable	Dry deciduous forest with large amounts of dead wood
Dysdera erythrina (WALCKENAER, 1802)	Threathened	Dry deciduous forest with large amounts of dead wood
Haplodrassus silvestris (BLACKWALL,1833)	Threathened	Dry deciduous forest with large amounts of dead wood
Apostenus fuscus WESTRING, 1851	Threathened	Dry deciduous forest with large amounts of dead wood
Philodromus albidus KULCZYNSKI, 1911	Threathened	Verges of dry deciduous forests
Arctosa leopardus (SUNDEVALL, 1833)	Vulnerable	Wet oligotrophic grasslands with tussocks
Pardosa lugubris (WALCKENAER, 1802)	Vulnerable	Verges of dry deciduous forests
Pardosa saltans TÖPFER-HOFMANN, 2000	Vulnerable	Verges of dry deciduous forests
Histopona torpida (C.L. KOCH, 1834)	Geographically restricted	Dry deciduous forest with large amounts of dead wood
Tegenaria silvestris L. KOCH, 1872	Vulnerable	Dry deciduous forest with large amounts of dead wood
Hahnia pusilla C.L. KOCH, 1841	Indeterminate	Not known
Robertus kuehnae BAUCHHENS & UHLENHAUT, 1993	Indeterminate	Not known
Pachygnatha listeri SUNDEVALL, 1830	Vulnerable	Open marshy forests
Glyphesis servulus (SIMON, 1881)	Threathened	Open marshy forests with tussocks
Oedothorax gibbosus (BLACKWALL, 1841)	Vulnerable	Open marshy forests
Saloca diceros (O.P.-CAMBRIDGE, 1871)	Vulnerable	Open wet deciduous forests
Neriene emphana (WALCKENAER, 1837)	Vulnerable	Verges of dry deciduous forests
Hahnia helveola SIMON, 1875	Vulnerable	Dry deciduous forest with large amounts of dead wood
Theridion instabile O.P.-CAMBRIDGE, 1871	Threathened	Marshland with large sedges (*Carex*)
Euryopis flavomaculata (C.L. KOCH, 1836)	Vulnerable	Dry oligotrophic grasslands with rough vegetation
Walckenaeria mitrata (MENGE, 1868)	Threathened	Dry deciduous forest with large amounts of dead wood

There we observe that no large differences occur between stations and that exploitation has no overall effect on the diversity of species found (i.e. there's no correlation between the found diversity and the degree of exploitation and age of the sampled stations).

When we look at the number of red list species caught per stand, it is observed that the highest number (12) was caught in station G. This is remarkable because this was an incomplete sampling (see above). Although this station was already cut when sampling begun, still some typical stenotopic woodland species could be found like *Coelotes terrestris*, *C. inermis* and *Histopona torpida*. Remarkable also is the presence of two species known to have forest edges and clear-cut places as preferential habitat (*Pardosa lugubris* and *P. saltans*). Furthermore, a species typical for wet oligotrophic grasslands (*Arctosa leopardus*) and one typical for dry oligotrophic grasslands (*Euryopis flavomaculata*) were observed. It seems likely that clearing had a positive effect on the number of red list species. When looking at the two stations that were cleared (F and G), we see that the stand that was cut first, still contains the most red list species. This difference should be interpreted in this way that station G is near the larger remains of the forest complex. This allows probably some kind of immigration with woodland species from the forest nearby. Station F, on the other hand, is an isolated patch in which immigration of typical woodland species is more restricted and/or almost absent. In the latter, only the typical forest species *Coelotes terrestris* (typical for dry deciduous forests with large quantities of dead wood) and *Saloca diceros* (a species typical for wet deciduous forests) are still found, although in small numbers. All these findings point out that this stand is transforming to habitation by a fauna that resembles that of wet grasslands with still some relics of typical stenotopic woodlands. These species will either gain in strength if the forest is restored or will perish if silvicultural practices continue.

With respect to habitat specificity of the red list species, we can observe that most of them (even in the number of caught individuals) prefer wet and dry deciduous forests. In lesser degree some species typical for grasslands are present probably due to the fact that some stands were close by arable lands and meadows. Red list species, which were caught in the highest numbers, were caught in those stands that were most dry (stands B, D and E).

Biology and distribution of *Robertus kuehnae* BAUCHNESS & UHLENHAUT, 1993

This species was first described as *Robertus grashoffi* (WUNDERLICH, 1973), but it was observed that both sexes used in the formal description belonged to different species (BAUCHNESS & UHLENHAUT, 1993). For the male, the name *grashoffi* was retained, while the female was reassigned to the new species *Robertus kuehnae*. Later, it was observed that the described male was in fact a *Robertus neglectus* with an expanded palp (KNOFLACH & THALER, 2000). Therefore, the name *Robertus grashoffi* became a synonym of *Robertus neglectus*. So, habitat specificity of *Robertus grashoffi* was used in literature between 1973 and 1993. A female of this species (identified as being *R. grashoffi*, but later on corrected, ALDERWEIRELDT, 1993) was caught for the first time in Melle (Eastern Flanders) in arable land sowed mainly with Italian rygrass (*Lolium perenne*) (ALDERWEIRELDT, 1987). The males found in this forest complex were thus the first encountered in Belgium. In other countries, the species occurs in a quarry, in woodlands dominated by maple and ash and in gorge woodlands. Additional sites are a meadow-like xerothermic slope, steppe-like heathland, a southern exposed meadow hillside on calcareous subsoil and a managed vineyard (Germany, WUNDERLICH, 1973; HEIMER & NENTWIG, 1991). The species was also found in humid gorge woodland dominated by spruce (MAURER & HÄNGGI, 1990; HÄNGGI *et al.*, 1995), herb-rich maple-alder gorge woodland and a strong afforested vineyard (BAUCHHENS & UHLENHAUT, 1993). Finally, MARTIN & HEIMER (1977) report the species in air plankton, which would indicate aeronautic behaviour. Probably because of the hidden lifestyle of *Robertus kuehnae* (probably living in crevices of stones and in tunnels (corridors) of mammals, WUNDERLICH, 1973; HEIMER & NENTWIG, 1991; BAUCHHNESS & UHLENHAUT, 1993), the species has not been recorded until recently in a lot of countries in Europe: Great Britain (HARVEY *et al.*, 2002), the Netherlands (VAN HELSDINGEN, 1999), Norway (AAKRA & HAUGE, 2000), Sweden (KRONESTEDT, 2001), Denmark (LANGEMARK, 2000), the former Soviet Union (MIKHAILOV, 1997), Portugal (CARDOSO, 1999), Spain (MORANO, 2002), Bulgaria (DELSTHEV & BLAGOEV, 2001), Slovakia (GAJDOS *et al.*, 1999), Czech Republic (KLIMES, 2000), Lithuania (RELŸS, 1996), Hungary (SAMU & SZINETAR, 1999), Rumania (WEISS & URAK, 2000). The species has thus only been found in Belgium (references above), Germany (references above), Switzerland (BLICK *et al.*, 1998) and Austria (KNOFLACH, 1992; STEINBERGER, 1996), but additional data for this species will probably arise in the future.

Six individuals of this species were caught during the sampling campaign (5 males and 1 female) and this in stations B and C. The literature concerning the biology and ecology of the species is scarce (mostly due to the fact that the species was only officially described in 1993), but some suggest a subterranean way of life (see above). The presence of the species in both stations could be explained by the many catches of mice in the samples (VAN DE KERCKHOVE, pers. comm.). Due to the lack of knowledge, this species is listed in the Red list of spiders of Flanders as 'Insufficiently known' (MAELFAIT *et al.*, 1998) and even our catches of the species do not allow us to point out a typical habitat for the species. Pending further information, the biology and ecology of this species remains unclear.

With regard to phenology, most males were found in January, April and May in Germany (BAUCHNESS & UHLENHAUT, 1993), while females were found in January, April-May and December. Most probably this species is, not uncommon with cavernicolous species, adult during the whole year. We found our individuals mainly in autumn and winter. More captures should allow us to better pinpoint an exact date of maturation and activity.

Conclusion

A large diversity was observed in the sampled stands, certainly if you consider that only some habitat types were sampled. This diversity was however, mostly dominated by open landscape species and not by species typical for woodlands and this for all sampled stands. No clear line could be drawn when looking at diversity. Diversity was not significantly higher in a number of fragmented and exploited stands, and certainly for these stands close to a forest edge. No species were found which could be indicative of old forests. This is due to the fact that it is hard to distinguish such species in spiders. The recently exploited stands displayed the highest diversity of threatened species, but this is due to the fact that these stands were nearby the remaining larger forest, which allows accidental catches of good stenotopic forest species. Furthermore, some species typical for woodlands were still present (although in low numbers) in

these exploited stands, indicating that the exploitation was too recent to observe an effect of the practices.

Acknowledgements

First of all, the Flemish Government responsible for the forests (AMINAL, Department 'Bos en Groen') and especially Ir. DRIES GORISSEN and Ir. DANNY MADDELEIN are acknowledged for funding this project (projectno. B&G/19/99) and for access to this forest. Also, Ir. KRIS VANDEKERCKHOVE and Ir. DIEGO VAN DEN MEERSSCHAUT (Institute for Forestry and Game Management) are acknowledged for all their help with sampling in the forest. Mr. AUREL VANDEWALLE and Dr. LÉON BAERT (RBINSc) are acknowledged for help in finding literature of spiders.

References

AAKRA K. & HAUGE E., 2000. - Araneae Norvegiae. Checklist and distribution maps of Norwegian spiders with taxonomic zoogeographical and ecological notes. Version 15.12.2000. Internet: http://www.ntnu.no/vmuseet/nathist/norspider/

ALDERWEIRELDT M., 1987. - *Robertus grashoffi* WUNDERLICH, 1973 (Araneae, Theridiidae), une espèce nouvelle pour la faune belge. *Bulletin Annales de la Société royale Belge Entomologique* 123: 309-310.

ALDERWEIRELDT M., 1993. - *Robertus kuehnae* BAUCHHENNS & UHLENHAUT, 1993, een nieuwe naam voor het Belgisch materiaal van *Robertus grashoffi* WUNDERLICH, 1973. *Nieuwsbrief van de Belgische Arachnologische Vereniging* 8: 53-54.

BAUCHHNESS E. & UHLENHAUT H., 1993. - *Robertus kuehnae*, n. sp., eine neue kleintheridiide aus Mitteleuropa (Arachnida, Araneae, Theridiidae). *Entomologische Nachrichten und Berichte* 37: 25-28.

BLICK T., PFIFFNER L. & LUKA H., 1998. - Erstnachweise der Spinnenarten *Robertus kuehnae* und *Lessertia dentichelis* für die Schweiz (Araneae: Theridiidae, Linyphiidae). *Mitteilungen der Schweizerischen Entomologischen Gesellschaft* 71 (1-2), 107-110.

CARDOSO P., 1999. - Portugese spiders Checklist. Version 17.07.1999. Internet: http://www.geocities.com/rainforest/vines/5197/checklist.html.

DE BAKKER D., DESENDER K., GROOTAERT P. & BAERT L., 2000. - Determinatie en bio-indicatie van bosgebonden ongewervelden. 1. Bio-indicatie van standplaatsvariabelen. Rapport ENT.2000.01. Onderzoeksopdracht B&G/29/98: 146pp.

DELTSHEV C. & BLAGOEV G., 2001. - A critical checklist of Bulgarian spiders (Araneae). *Bulletin of the British Arachnological Society* 12: 110-138.

DESENDER K., DE BAKKER D. & VAN DE KERCKHOVE P., 2001. - Inventarisatie en determinatie van ongewervelden als ecologische indicatoren in Vlaamse integrale bosreservaten. 2. Casestudie naar de invloed van boshistoriek, bosfragmentatie en bosexploitatie op de spinnen- en loopkeverfauna van ecologisch waaardevolle bossen. Rapport ENT.2001.03. Onderzoeksopdracht B&G/19/99: 98pp.

GAJDOS P., SVATON J. & SLOBODA K., 1999. - Catalogue of Slovakian spiders. Bratislava: 337pp.

HÄNGGI A., STÖCKLI E. & NENTWIG W., 1995. - Lebensraume Mitteleuropäischer Spinnen (habitats of Central European Spiders). *Miscelleanea Faunistica Helvetiae*: 459pp.

HARVEY P.R., NELLIST D.R. & TELFER M.G., 2002. - Provisional Atlas of British spiders (Arachnida, Araneae). Volumes 1 & 2. *Huntingdon: Biological Records Centre*: 406pp.

KLIMES L., 2000. - Check-list of spiders of the Czech Republic. Version 31.12.2000. Internet: http://www.butbn.cas.cz/klimes/arachno.

KNOFLACH B., 1992). - Neue *Robertus*-Funde in den Alpen: *R. mediterraneus* Eskov und *Robertus* sp. (Arachnida, Aranei: Theridiidae). *Berichte der naturwissenschaftlichen-medischen Vereins Innsbruck* 79: 161-171.

KNOFLACH B. & THALER K., 2000. - Notes on mediterranean Theridiidae. I. *Memoires de la Société entomologique d'Italie* 78: 411-442.

KRONESTEDT T., 2001. - Checklist of spiders (Araneae) in Sweden. Version 02.2001. Internet: http://www. nrm.se/en/spindlar.html.

LANGEMARK S., 2000. - Check-list of Danish spiders. Internet: http://www.zmuc.dk/entoweb/collections-databaser/dklist/main.htm.

MARTIN D. & HEIMER S., 1977. - Beiträge zur Spinnenfauna der DDR (Arachnida, Araneae). *Faunistische Abhandlungen der Museum Tierkunde Dresden* 6(19): 227-231.

MAURER R. & HÄNGGI A., 1990. - Katalog der Schweizerischen Spinnen (Catalogue des araignées de Suisse). *Documenta Faunistica Helvetiae* 12. *Schweizerischen Bund für Naturschutz* (*Centre Suisse de Cartographie de la faune*), Neuchatel: 37pp + maps.

MIKHAILOV K.G., 1997. - Catalogue of the spiders of the territories of the former Soviet Union (Arachnida, Aranei). Moscow: *Zoological Museum of the Moscow State University*: 416pp.

MORANO E., 2002. - Catalago de Aranas de la Peninsula Iberica. Versión 02.07.2002. Internet: http://www.entomologia.rediris.es/gia/catalogo/index.htm.

RELŸS V., 1996. - Check-list of spiders of Lithuania. Version 08.12.2002 (update by Algirdas Vilkas). Internet: http://www.free-hosting.lt/lietvorai/index1.htm.

SAMU F. & SZINETAR C., 1999. - Bibliographical checklist of the Hungarian spider fauna. Bulletin of the British Arachnological Society 11: 161-184. Internet: http://www.julia-nki.hu.

STEINBERGER, K. H., 1996. - Die Spinnenfauna der Uferlebensräume des Lech (Nordtirol, Österreich) (Arachnida: Araneae). *Berichte der naturwissenschaftlichen-medischen Vereins Innsbruck* 83: 187-210.

VAN HELSDINGEN P., 1999. - Catalogus van de Nederlandse spinnen (Araneae). *Nederlandse Faunistische Mededelingen* 10: 1-189.

VAN LANDUYT W., MAES D., PAELINCKX D., DE KNIJF G., SCHNEIDERS A. & MAELFAIT J.-P., 1999. - Biotopen. In: KUIJKEN E. (red.). Natuurrapport 1999. Toestand van de natuur in Vlaanderen: cijfers voor het beleid. Mededelingen van het Instituut voor Natuurbehoud, Brussel 6: 5-44.

WEISS I. & URAK I., 2000. - Faunenliste der Spinnen Rumaniens. Checklist of the Romanian spiders (Arachnida: Araneae). Version 27.12.2000. Internet: http://www.members.aol.com/arachnologie/Faunenlisten.htm.

WUNDERLICH J., 1973. - Zur spinnenfauna Deutschlands. XV. Weitere seltene und bisher unbekannte Arten sowie Anmerkungen zur Taxonomie uns Synonymie (Arachnida: Araneae). *Senckenbergiana biologica* 54: 405-428.

Bulletin S.R.B.E./K.B.V.E., 139 (2003) : 203-206

First records of *Scaeva dignota* Rondani, 1857 (Diptera Syrphidae) in Belgium : a species for the future?

Frank VAN DE MEUTTER

Laboratory of Aquatic Ecology, Ch. de Bériotstraat 32, B-3000 Leuven (e-mail: Frank.vandemeutter@bio.kuleuven.ac.be).

Summary

The syrphid species *Scaeva dignota* (RONDANI, 1857) can be added to the Belgian fauna list. This species has been observed for the first time in Belgium in 2002, and again in 2003. Also in other West and North West European countries *S. dignota* is a recent newcomer. In Northwestern Europe, many observations originate from anthropogenic environments. Presumably, *S. dignota* is a vagrant from the Mediterranean region, and its occurrence in Northwestern Europe is possibly linked to exceptionally warm summer temperatures. If this is true, we expect that *S. dignota* will probably show up more regularly in the future.

Keywords : Scaeva dignota, Belgian fauna, Syrphidae, Hoverfly, Climate change

Samenvatting

De zweefvliegensoort *Scaeva dignota* (RONDANI, 1857) kan worden toegevoegd aan de Belgische faunalijst. Deze soort werd in 2002 op drie verschillende locaties verzameld en in 2003 is er reeds opnieuw een waarneming. Ook in onze buurlanden werd *S. dignota* de laatste jaren als nieuwkomer voor de fauna vastgesteld. De soort is hoogstwaarschijnlijk een migrant vanuit de Mediterrane regio, en wordt vaak gemeld uit omgevingen met een antropogene invloed. Het voorkomen van deze soort in Noordwest-Europa is mogelijk gelinkt aan warme zomers. Hoogstwaarschijnlijk zal *S. dignota* in de toekomst meer en meer in ons land opduiken.

Résumé

L'espèce *Scaeva dignota* (RONDANI, 1857) peut être ajoutée à la liste des Syrphides de Belgique. En 2002, cette espèce a été attrapée à trois endroits différents en Belgique. Une autre observation est également rapportée en 2003. Récemment, *S. dignota* a aussi été rencontrée pour la première fois dans les pays limitrophes. Cette espèce est probablement un migrateur venu du Sud; elle est souvent rencontrée dans des milieux à forte pression anthropogénique. L'apparition de cette espèce en Europe du Nord-Ouest est éventuellement liée aux étés chauds. Il est probable que dans le futur, *S. dignota* sera de plus en plus fréquente en Belgique.