*Bulletin S.R.B.E./K.B.V.E., 138 (2002) : 38-44*

# The spider fauna (Araneae) of the forest reserve 'Beiaardbos' (Eastern Flanders, Belgium)

Domir DE BAKKER[1], Jean-Pierre MAELFAIT[1,2] & Léon BAERT[3]

1 Ghent University, Department of Biology, Unit of Animal Ecology, Zoogeography and Nature Conservation, K.L. Ledeganckstraat 35, B-9000 Ghent (e-mail: Domir.Debakker@rug.ac.be).
2 Institute of Nature Conservation, Kliniekstraat 25, B-1070 Brussels.
3 Royal Belgian Institute of Natural Sciences, Department of Entomology, Vautierstraat 29, B-1000 Brussels.

**Summary**

In the forest reserve 'Beiaardbos', 4 stations were sampled for spiders during a consecutive year (April 2000-April 2001) by means of pitfall traps. Furthermore, one station was sampled using different sampling techniques, primarily to catch saproxylic beetles. The spider catches using these techniques were also identified. In total 1793 individuals were identified belonging to 89 species. Of these species, *Diplocephalus graecus* is the most impressive, because it has never been collected previously in Belgium and is therefore new for the Belgian fauna. The results show that the use of different sampling techniques can significantly increase the observed diversity.

**Keywords**: sampling techniques, eclector traps, pitfall traps, Beiaardbos, *Diplocephalus graecus*.

**Samenvatting**

In het bosreservaat 'Beiaardbos' werden in de periode April 2000-April 2001 4 stations bemonsterd aan de hand van bodemvallen. Tevens werden in één station, in het kader van een gedetailleerd onderzoek naar houtgebonden kevers, verschillende bemonsteringstechnieken gebruikt en hiervan werden eveneens de spinnen gedetermineerd. In totaal werden in de vier stations met verschillende bemonsteringstechnieken 1793 adulte individuen gevangen behorende tot 89 soorten. Veel soorten zijn bij deze bemonstering uitsluitend gevangen in andere technieken dan bodemvallen. *Diplocephalus graecus* is hiervan de meest opmerkelijke, vermits ze onlangs in onze kustduinen als nieuw voor de Belgische fauna werd gevonden. Onze resultaten laten zien dat verschillende bemonsteringstechnieken inderdaad de door bodemvallen waargenomen diversiteit serieus kunnen opdrijven.

**Résumé**

Dans la réserve naturelle forestière de 'Beiaardbos', quatre stations ont été échantillonnées à l'aide de pièges à Barber pendant la période allant d'Avril 2000 à Avril 2001. Une des stations a été échantillonnée en utilisant plusieurs techniques de piègeage dont un piège spécialement conçu pour capturer des coléoptères xylobiontes. Les araignées capturées par ces différentes techniques ont été identifiées et sont le sujet de cet article. Au total, 1793 individus appartenant à 89 espèces, ont été capturés dans les quatre stations. Plusieurs espèces ont été uniquement capturées par des techniques de capture autres que les pièges à Barber. *Diplocephalus graecus* est l'espèce la plus remarquable, car elle a été récemment capturée comme nouvelle pour notre faune dans les dunes. Les résultats nous montrent que l'utilisation de différentes techniques d'échantillonnage augmente la diversité observée par pièges à Barber.

## Introduction

In the framework of a larger research investigating the presence and diversity of saproxylic beetles in Flanders (VERSTEIRT *et al.*, 2000; HEIRBAUT *et al.*, 2001), we were able to sample the integral forest reserve 'Beiaardbos' using several sampling techniques (including pitfall

traps). Because the forest has never been investigated for its arachnofauna, we chose three supplementary stations and sampled them also, but only with pitfall traps. This article deals with the species list for the four pitfall stations and the other sampling techniques used.

**Study area (based on ECONNECTION, 2000)**

The forest is situated in the province of Eastern Flanders (Belgium) northwest of the city Ronse and south of Zulzeke (Fig. 1).

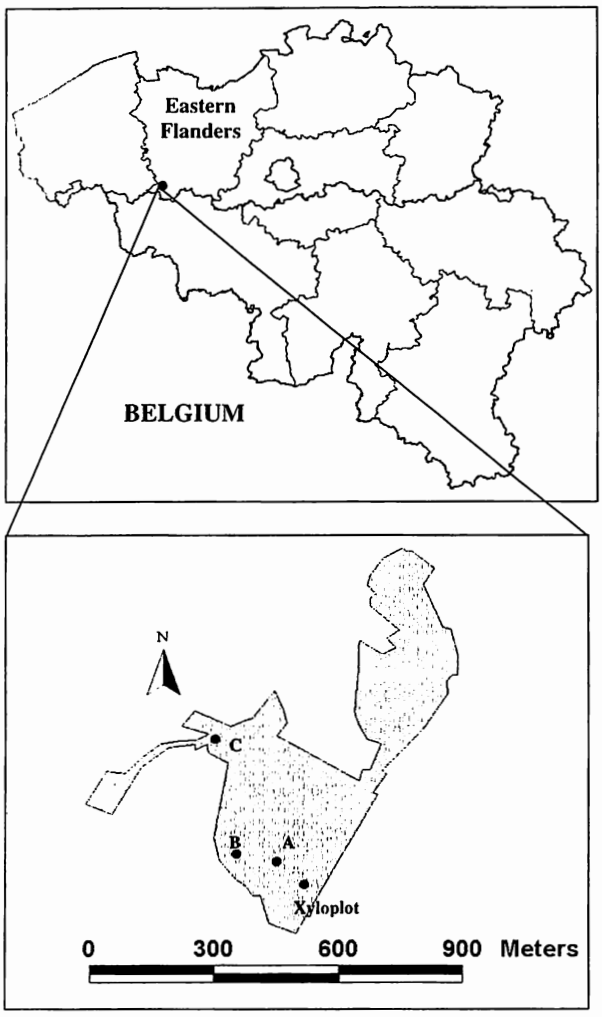


Fig. 1. Position of the forest reserve 'Beiaardbos' in Belgium (upper graph) and the position of the sampled stations in the forest (lower graph).

The forest is situated on a clay soil with a very thin loam layer on top (typical for most of our beech (*Fagus sylvatica*) forests). Furthermore, several wells are present with the formation of typical vegetations associated with upwelling groundwater (*Alno-Padion*). The forest is divided in two parts (a larger southern part and a smaller northern part), which are connected by a small forest fringe which is private property. The whole area is surrounded by arable lands (fields and grass-lands). The total surface of the forest is about 17 ha while 6 ha is still private property of which a small part is owned by a environmental group ('Natuurpunt vzw') and managed as coppice woodland. The forest 'Beiaardbos' was assigned as a forest reserve in 1997 and has been managed as an integral forest reserve. The protection of this forest is worthwhile because it is considered being an extension of the larger 'Kluisbos' (300 ha) and also forms a transition to other valuable forests in the region.

On the map of Count de Ferraris (1770-1780), the 'Beiaardbos' is on the edge of a larger forest complex (of which, nowadays, some remnants still remain). It had been separated from the complex in around 1850 when it obtained its present boundaries and form. Nevertheless, it was then still larger than now. Subsequently further deforestation took place, which resulted in a separation in two parts (still connected by a small fringe) in around 1884. Simultaneously, a reconversion took place from mixed forest to a uniform beech-forest (*Endymio-Carpinetum*). The years before installation as a reserve, the forest was used for hunting and endured minimal forest exploitation. Consequently, the original vegetation of the forest is still intact. The two parts differ in vegetation: the northern part is better developed (mixed forest type) and contains some valuable forest plant species (such as wood anemone *Anemone nemorosa*, wild bluebell *Hyacinthioides non-scripta*, enchanter's nightshade *Circaea lutetiana* and forest speed-well *Veronica montana*). The tree cover of the southern part is more uniform (beech) and the undergrowth consists mainly of blackberry (*Rubus spec.*) indicating a greater amount of disturbance. Forest plants are almost absent, with the exception of bitter cress *Cardamine amara*, pendulous sedge *Carex pendula* and giant horsetail *Equisetum telmateia* (more commonly around the wells in the *Alno-Padion* forest-type). Other interesting plants are: *Gagea spathacea*, *Sanicula europaea*, *Paris quadrifolia* and *Melica uniflora*.

**Description of the sampled stations**

In total, 4 stations were sampled. The tree cover of station A consists mainly of beech, has a well developed litter layer and the herb layer consists, in spring only, almost entirely of wild

bluebell. Station B is a very humid station with Canadian poplar (*Populus x canadensis*) and Ash (*Fraxinus excelsior*) as the main tree species; it has a very poorly developed litter layer (due to a high rate of litter decomposition) and a well-developed herb layer (consisting, mainly of yellow dead nettle *Lamium galeobdolon* and lesser celandine *Ranunculus ficaria*). Station C is also a humid station being situated near the edge of the forest with mainly Ash and Alder (*Alnus glutinosa*) as the main tree species, an intermediately developed litter layer, a shrub layer consisting mainly of hazel (*Corylus avellana*) and a herb layer consisting of forest anemone, lesser celandine and cleavers (*Galium aparine*). The 'xyloplot' was a humid station (due to the fact that the station was situated at the bottom of a slope near the edge of the forest) with beech as the main tree species, a large quantity of common elder (*Sambucus nigra*) in the shrub layer and many plant species linked to a greater amount of disturbance, with plants such as blackberry and stinging netlle (*Urtica dioica*). Percentage coverage of tree, schrub and herb layer is shown in Table 1.

Table 1. Percentage of coverage of the tree, schrub and herb layer in the three sampled stations of the Beiaardbos

| Parameters | A | B | C | Xylo |
|---|---|---|---|---|
| Tree coverage (%) | 90 | 80 | 90 | 35 |
| Shrub coverage (%) | 10 | 40 | 85 | 60 |
| Herb coverage (%) | 90 | 96 | 100 | 70 |
| Average litter depth (cm) | 1,8 | 0,9 | 0,3 | 0,7 |

## Material and Method

The trapping type in common for all four stations was pitfall trapping. In the 'xyloplot' several other trapping techniques (eclector trap, fly traps, window trap and dung trap) were located around or in the proximity of a dead beech tree (*Fagus sylvatica*) in order to catch saproxylic beetles. A detailed description of these techniques, together with a summary on their advantages and disadvantages, is described in VERSTEIRT *et al.* (2000) and DE BAKKER *et al.* (2001). Pitfall trapping is discussed in detail in DE BAKKER *et al.* (2000).

## Results

In total (from all trap types and stations), 1793 spider specimens were collected and identified. These belong to 89 species. Table 2 gives an overview of the captured species and their numbers for the sampling year. In the pitfalls alone, 1330 individuals, belonging to 62 species, were collected. This means that an additional 27 species were collected using other sampling techniques (=30.3% of all species collected). In many studies, the diversity is often assessed by using only one trap type (often pitfall traps), but our results show, indeed, that the combination of several sampling techniques lead to a significant increase in the observed diversity. For example, all three species of the Araneidae, and almost all members of the Theridiidae, are found exclusively by other techniques (mostly eclector traps), other than pitfall traps. People responsible for forest conservation policy (and perhaps all nature conservation policy) should be made aware that a given species list of habitats based on the use of a single trap type does not give a complete picture of the diversity in these habitats. The overall spider diversity of this forest is not particulary high, but this could be due to the low sampling effort or to the absence of more differently structured forest types (absence of heterogeneity in the forest). The most frequently collected species are *Coelotes terrestris*, *C. inermis* and *Macrargus rufus*. All species are typical for habitats with a good developed litter layer (mostly in beech stands) and this observation is in agreement with our findings: all of these species were mostly collected at station A.

Looking at data from pitfalls alone, we could not detect strong differences in species diversity between stations. Nevertheless, we observed a greater diversity at stations C and the 'xyloplot', and a lower species richness at station A. Other studies have also showed that beech-stations with a good developed litter layer are sometimes poorer in species than from mixed, more humid forest stands (DE BAKKER *et al.*, 2000). Nevertheless, beech stands are often richer in stenotopic woodland species (DE BAKKER *et al.*, in press).

Table 2. Number of spiders (males + fermales) caught per species and sampling station in the forest reserve 'Beiaardbos' during a complete year cycle (April 2000-April 2001). Species in bold are exclusively caught in the 'xyloplot' in other techniques than pitfall traps.

| Species | A | B | C | Xylo | Total |
|---|---|---|---|---|---|
| **Family Amaurobiidae** | | | | | |
| ***Amaurobius fenestralis* (STROEM, 1768)** | | | | 1 | 1 |
| ***Amaurobius similis* (BLACKWALL, 1845)** | | | | 23 | 23 |
| *Coelotes inermis* (L. KOCH, 1855) | 81 | 32 | 29 | 28 | 170 |
| *Coelotes terrestris* (WIDER, 1834) | 206 | 22 | 55 | 28 | 311 |
| Family Dictynidae | | | | | |
| *Cicurina cicur* (FABRICIUS, 1793) | | 2 | | 3 | 5 |
| **Family Dysderidae** | | | | | |
| *Dysdera erythrina* (WALCKENAER, 1802) | 1 | | | 2 | 3 |
| **Family Clubionidae** | | | | | |
| ***Clubiona brevipes* BLACKWALL, 1841** | | | | 5 | 5 |
| ***Clubiona compta* C.L. KOCH, 1839** | | | | 1 | 1 |
| *Clubiona lutescens* WESTRING, 1851 | | | 1 | | 1 |
| *Clubiona terrestris* WESTRING, 1862 | 5 | | 1 | 3 | 9 |
| **Family Liocranidae** | | | | | |
| *Apostenus fuscus* WESTRING, 1851 | 6 | 3 | | | 9 |
| **Family Anyphaenidae** | | | | | |
| *Anyphaena accentuata* (WALCKENAER, 1802) | | | | 5 | 5 |
| **Family Thomisidae** | | | | | |
| *Ozyptila praticola* (C.L. KOCH, 1837) | | | 2 | | 2 |
| Ozyptila trux (BLACKWALL, 1846) | | | 7 | | 7 |
| *Xysticus cristatus* (CLERCK, 1757) | 2 | | | | 2 |
| ***Xysticus lanio* C.L. KOCH, 1824** | | | | 7 | 7 |
| **Family Philodromidae** | | | | | |
| ***Philodromus praedatus* O.P.-CAMBRIDGE, 1871** | | | | 1 | 1 |
| **Family Salticidae** | | | | | |
| ***Ballus chalybeius* WALCKENAER, 1802** | | | | 1 | 1 |
| Family Lycosidae | | | | | |
| *Arctosa leopardus* (SUNDEVALL, 1833) | | | | 1 | 1 |
| *Pardosa amentata* (CLERCK, 1757) | | | 4 | 2 | 6 |
| *Pirata hygrophilus* THORELL, 1872 | | | 2 | | 2 |
| *Trochosa ruricola* (DEGEER, 1778) | | | 1 | | 1 |
| *Trochosa terricola* THORELL, 1856 | | | | 1 | 1 |
| **Family Agelenidae** | | | | | |
| Histopona torpida (C.L. KOCH, 1834) | 37 | 3 | 1 | 2 | 43 |
| ***Tegenaria ferruginea* (PANZER, 1804)** | | | | 1 | 1 |
| **Family Hahniidae** | | | | | |
| *Antistea elegans* (BLACKWALL, 1841) | 1 | 17 | | 5 | 23 |
| ***Ero furcata* (VILLERS, 1789)** | | | | 1 | 1 |
| *Hahnia helveola* SIMON, 1875 | | | | 1 | 1 |
| **Family Theridiidae** | | | | | |
| Achaearanea tepidariorum **(C.L. KOCH, 1841)** | | | | 2 | 2 |
| ***Enoplognata pallens* BLACKWALL, 1834** | | | | 1 | 1 |
| ***Enoplognatha ovata* (CLERCK, 1757)** | | | | 62 | 62 |
| *Robertus lividus* (BLACKWALL, 1836) | | 6 | 9 | 73 | 88 |
| ***Theridion varians* HAHN, 1833** | | | | 1 | 1 |

| | | | | | |
|---|---|---|---|---|---|
| **Family Tetragnathidae** | | | | | |
| *Pachygnatha clercki* SUNDEVALL, 1823 | 2 | 10 | 13 | 3 | 28 |
| *Pachygnatha degeeri* SUNDEVALL, 1830 | 1 | | 1 | 2 | 4 |
| *Tetragnatha montana* SIMON, 1874 | | | | 1 | 1 |
| **Family Metidae** | | | | | |
| *Metellina mengei* (BLACKWALL, 1869) | 1 | | 1 | 9 | 11 |
| ***Metellina merianae* (SCOPOLI, 1773)** | | | | 2 | 2 |
| *Metellina segmentata* (CLERCK, 1757) | | 2 | 2 | 14 | 18 |
| Family Araneidae | | | | | |
| ***Araneus diadematus* CLERCK, 1757** | | | | 2 | 2 |
| ***Atea sturmi* (HAHN, 1831)** | | | | 1 | 1 |
| ***Nuctenea umbratica* (CLERCK, 1757)** | | | | 2 | 2 |
| **Family Linyphiidae** | | | | | |
| **Subfamily Erigoninae** | | | | | |
| *Ceratinella scabrosa* (O.P.-CAMBRIDGE, 1871) | | | 1 | | 1 |
| *Dicymbium tibiale* (BLACKWALL, 1836) | | 10 | | 2 | 12 |
| ***Diplocephalus cristatus* (BLACKWALL, 1833)** | | | | 1 | 1 |
| ***Diplocephalus graecus* (O.P.-CAMBRIDGE, 1872)** | | | | 1 | 1 |
| *Diplocephalus latifrons* (O.P.-CAMBRIDGE, 1863) | 2 | | | 16 | 18 |
| *Diplocephalus picinus* (BLACKWALL, 1841) | | 4 | 4 | | 8 |
| *Erigone atra* (BLACKWALL, 1841) | 2 | 2 | 12 | 33 | 49 |
| *Gonatium rubellum* (BLACKWALL, 1841) | | 1 | | 1 | 2 |
| *Gongylidiellum vivum* (O.P.-CAMBRIDGE, 1875) | | | 2 | 2 | 4 |
| ***Gongylidium rufipes* (SUNDEVALL, 1829)** | | | | 7 | 7 |
| *Maso sundevalli* (WESTRING, 1851) | | | | 1 | 1 |
| *Micrargus herbigradus* (BLACKWALL, 1854) | 1 | 2 | | 22 | 25 |
| *Milleriana inerrans* (O.P.-CAMBRIDGE, 1884) | | | | 1 | 1 |
| *Monocephalus fuscipes* (BLACKWALL, 1836) | | 4 | 18 | 7 | 29 |
| *Oedothorax apicatus* (BLACKWALL, 1850) | | 1 | 1 | 1 | 3 |
| *Oedothorax fuscus* (BLACKWALL, 1834) | | | 3 | 2 | 5 |
| *Oedothorax gibbosus* (BLACKWALL, 1841) | 2 | | 5 | 34 | 41 |
| *Oedothorax retusus* (WESTRING, 1851) | | | | 1 | 1 |
| ***Prinerigone vagans* AUDOUIN, 1826** | | | | 1 | 1 |
| *Walckenaeria acuminata* BLACKWALL, 1833 | 3 | 7 | 4 | 9 | 23 |
| *Walckenaeria atrotibialis* (O.P.-CAMBRIDGE, 1878) | | 3 | 16 | | 19 |
| *Walckenaeria mitrata* (MENGE, 1868) | | | 4 | | 4 |
| *Walckenaeria nudipalpis* (WESTRING, 1851) | | 3 | 1 | 7 | 11 |
| **Family Linyphiidae** | | | | | |
| **Subfamily Linyphiinae** | | | | | |
| ***Agyneta decora* (O.P.-CAMBRIDGE, 1870)** | | | | 1 | 1 |
| *Bathyphantes gracilis* (BLACKWALL, 1841) | 11 | 2 | 4 | 18 | 35 |
| *Bathyphantes nigrinus* (WESTRING, 1851) | | 1 | | 1 | 2 |
| *Centromerus sylvaticus* (BLACKWALL, 1841) | 9 | 21 | 1 | 21 | 52 |
| *Diplostyla concolor* (WIDER, 1834) | | 15 | | 16 | 31 |
| *Drapetisca socialis* (SUNDEVALL, 1832) | | | 1 | 7 | 8 |
| *Helophora insignis* (BLACKWALL, 1841) | | 5 | 7 | 120 | 132 |
| *Lepthyphantes ericaeus* (BLACKWALL, 1853) | 1 | | | 1 | 2 |
| ***Lepthyphantes insignis* O.P.-CAMBRIDGE, 1913** | | | | 1 | 1 |
| ***Lepthyphantes minutus* (BLACKWALL, 1833)** | | | | 31 | 31 |
| *Lepthyphantes pallidus* (O.P.-CAMBRIDGE, 1871) | 1 | 1 | 3 | 2 | 7 |

| | | | | | |
|---|---|---|---|---|---|
| *Lepthyphantes tenuis* (BLACKWALL, 1852) | 6 | 2 | 1 | 16 | 25 |
| *Lepthyphantes zimmermanni* BERTKAU, 1890 | 5 | 15 | 5 | 11 | 36 |
| *Leptorhoptrum robustum* (WESTRING, 1851) | 1 | 2 | 4 | 9 | 16 |
| *Linyphia hortensis* SUNDEVALL, 1829 | 1 | | | 1 | 2 |
| *Linyphia triangularis* (CLERCK, 1757) | 3 | 3 | | 35 | 41 |
| *Macrargus rufus* (WIDER, 1834) | 150 | 3 | | 8 | 161 |
| *Microneta viaria* (BLACKWALL, 1841) | 6 | 2 | | 16 | 24 |
| ***Neriene emphana* (WALCKENAER, 1837)** | | | | 1 | 1 |
| ***Neriene montana* (CLERCK, 1757)** | | | | 5 | 5 |
| *Porrhomma egeria* SIMON, 1884 | 1 | | | 4 | 5 |
| ***Porrhomma pygmaeum* (BLACKWALL, 1834)** | | | | 1 | 1 |
| *Saaristoa abnormis* (BLACKWALL, 1841) | 4 | 5 | 11 | 20 | 40 |
| *Tallusia experta* (O.P.-CAMBRIDGE, 1871) | | | | 1 | 1 |
| **Total number of individuals per station** | **552** | **211** | **237** | **793** | **1793** |
| **Number of species** | **29** | **32** | **36** | **78** | **89** |

When we look at the Red list species (MAELFAIT *et al.*, 1998), we observe a similar pattern to the above. In total, 12 species are to a lesser or greater extent threatened in Flanders (Table 3).

Table 3. List of Red list species in all stations and sampling techniques of the 'Beiaardbos' (after MAELFAIT *et al.*, 1998) (used codes for habitat preferences are as follows: Fddd = dry deciduous forests with large quantities of dead wood, Fddv = verges of dry deciduous forests, Fdmo = open marshy deciduous forests, Gowt = wet oligotrophic grasslands with tussocks, Rb= riparian habitats with bare ground).

| Species | Red list Category | Habitat preference | A | B | C | Xylo | Total |
|---|---|---|---|---|---|---|---|
| *Apostenus fuscus* | Endangered | Fddd | 6 | 3 | | | 9 |
| *Arctosa leopardus* | Vulnerable | Gowt | | | | 1 | 1 |
| *Coelotes inermis* | Vulnerable | Fddd | 81 | 32 | 29 | 28 | 170 |
| *Coelotes terrestris* | Vulnerable | Fddd | 206 | 22 | 55 | 28 | 311 |
| *Diplocephalus graecus* | New for the Belgian fauna | | | | | 1 | 1 |
| *Dysdera erythrina* | Endangered | Fddd | 1 | | | 2 | 3 |
| *Hahnia helveola* | Vulnerable | Fddd | | | | 1 | 1 |
| *Histopona torpida* | Vulnerable | Fddd | 37 | 3 | 1 | 2 | 43 |
| *Leptorhoptrum robustum* | Vulnerable | Rb | 1 | 2 | 4 | 9 | 16 |
| *Nereine emphana* | Vulnerable | Fddv | | | | 1 | 1 |
| Oedothora gibbosus | Vulnerable | Fdmo | | | | 1 | 1 |
| *Philodromus praedatus* | Endangered | Fddv | | | | 1 | 1 |

If we consider only data from pitfall traps, we find 9 species. This means that 3 species were added (=25% of the total amount of Red list species) when we consider all trap types. The most remarkable species was *Diplocephalus graecus*, an erigonid spider which has been found recently in the nature reserve 'Westhoek' and in a saltmarsh at Nieuwpoort (BONTE *et al.*, in press). It is therefore new to the Belgian fauna. We found the species in the 'Beiaardbos' in the eclector trap. This is the first inland record for this species and this is presumably because of a good developed aeronautic behaviour. We believe that the species is moving northwards (due to climate change?) from the south and will probably be found more frequently in the future in other habitats. Most found Red list species are typical for dry deciduous forests.

**Acknowledgments**

We wish to thank the Government of the Flemish Community for the opportunity to sample the forest reserve and the financial support (AMINAL, Department 'Bos en Groen', Ir. DRIES GORISSEN). We thank especially KRIS VANDEKERKHOVE and PETER VAN DE KERCKHOVE (Institute for Forestry and Game Management) for all their help in installing the sampling techniques and providing essential back-ground information. Many thanks also to my colleague WANNES HEIRBAUT for his help in emptying the traps and sorting out the animals. Also, KONJEV DESENDER assisted and helped in various ways.

This study was possible through financial support (project number. B&G/19/99) of the Flemish Government.

**References**

BONTE D., CRIEL P., BAERT L. & DE BAKKER D., in press. - The invasive occurrence of the Mediterrean dwarfspider *Diplocephalus graecus* (O.P.-Cambridge, 1872) in Belgium (Araneae: Linyphiidae, Erigoninae): another southern invertebrate expanding to the north. *Belgian Journal of Zoology*.

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

DE BAKKER D., DESENDER K., GROOTAERT P. & BAERT L., 2001. - Inventarisatie en determinatie van ongewervelden als ecologische indicatoren in Vlaamse integrale bosreservaten. 1. Het belang van integrale bosreservaten voor arboricole en bodembewonende spinnen en loopkevers. Rapport ENT.2001.01. Onderzoeksopdracht B&G/19/99: 90pp + bijlagen.

DE BAKKER, D., MAELFAIT, J.-P., DESENDER, K., HENDRICKX, F. & DE VOS, B., in press. - Regional variation in spider diversity of Flemish forest stands. In: TOFT, S. & SCHARFF, N. (eds.). European Arachnology 2000. Aarhus University Press.

ECONNECTION, 2000. - Beheersplan Bosreservaat Beiaardbos. Opgesteld in opdracht van het Minsterie van de Vlaamse Gemeenschap (AMINAL, afdeling Bos & Groen): 64pp.

HEIRBAUT W., DESENDER K., DE BAKKER D. & GROOTAERT P., 2001. - Inventarisatie en determinatie van ongewervelden als ecologische indicatoren in Vlaamse integrale bosreservaten. Inventarisatie en evaluatie van bodembewonende en xylobionte arthropoden in integrale bosreservaten. Partim xylobionte arthropoden. Rapport ENT.2001.04. Onderzoeksopdracht B&G/18/99.

MAELFAIT J.-P., BAERT L., JANSSEN M. & ALDERWEIRELDT M., 1998. - A Red list for the spiders of Flanders. *Bulletin van het Koninklijk Belgisch Instituut voor Natuurwetenschappen* 67: 131-142.

VERSTEIRT V., DESENDER K., GEUDENS G. & GROOTAERT P., 2000. - Determinatie en bio-indicatie van bosgebonden ongewervelden. 3. Ecologische standplaatskarakterisatie van bossen aan de hand van keverfauna (Coleoptera). 4. Verkennend onderzoek naar de potentiële waarde van integrale bosreservaten voor het behoud van xylobionte arthropoden. Onderzoeksopdracht B&G/29/98, AMINAL. Rapport ENT.2000.03 en ENT.2000.04, KBIN, Brussel: 193 pp.