

On the arachnofauna of the Jean Massart botanical garden (Brussels-Capital Region, Belgium)

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Abstract

An overall entomological inventory of the Jean Massart botanical garden was performed in the period 2013-2021. In the frame of this project, supported by "Bruxelles Environnement / Leefmilieu Brussel", the arachnofauna diversity was also studied. This article presents the results of research on the spiders (Araneae), harvestmen (Opiliones), and pseudoscorpions (Pseudoscorpiones) found on this site. A total of 239 species were recorded: 222 spiders, 11 harvestmen and 6 pseudoscorpions. Species lists for all these groups are provided, and some "remarkable" species are briefly discussed. One species of Pseudoscorpiones, *Lamprochernes chyzeri* (Tömösváry, 1883), is new to the Belgian fauna.

Samenvatting

Een algemene entomologische inventarisatie van de botanische tuin Jean Massart werd uitgevoerd in de periode 2013-2021. In het kader van dit project, gesteund door Leefmilieu Brussel, werd ook de diversiteit van de arachnofauna bestudeerd. Dit artikel presenteert de resultaten van onderzoek naar de spinnen (Araneae), hooiwagens (Opiliones) en pseudoschorpioenen (Pseudoscorpiones) die op deze site te vinden zijn. In totaal werden 239 soorten geregistreerd: 222 spinnen, 11 hooiwagens en 6 pseudoschorpioenen. Voor al deze groepen worden soortenlijsten gegeven en enkele opmerkelijke soorten worden kort besproken. Eén soort pseudoschorpioen, *Lamprochernes chyzeri* (Tömösváry, 1883), is nieuw voor de Belgische fauna.

Résumé

Un inventaire entomologique global du Jardin Botanique Jean Massart a été réalisé sur la période 2013-2021. Dans le cadre de ce projet, soutenu par Bruxelles Environnement, la diversité de l'arachnofaune a également été étudiée. Cet article présente les résultats des recherches sur les araignées (Araneae), les faucheux (Opiliones) et les pseudoscorpions (Pseudoscorpiones) rencontrés sur ce site. Au total, 239 espèces ont été recensées : 222 araignées, 11 faucheux et 6 pseudoscorpions. Des listes d'espèces pour tous ces groupes sont fournies et certaines espèces "remarquables" sont brièvement discutées. Une espèce de pseudoscorpion, *Lamprochernes chyzeri* (Tömösváry, 1883), est découverte comme étant nouvelle en Belgique.

Introduction

For several years, continuous entomological inventories have been carried out in the Jean Massart botanical garden located on the edge of the Forêt de Soignes in Auderghem, in the Brussels-Capital Region, Belgium (Fig. 1A). It was created in 1922 by the ecologist Jean Massart, considered as a classified site since 29 May 1997 and the entire site is now a Natura 2000 zone. It includes some habitats of community interest, including shreds of oak-hornbeam, alluvial forest, or even lean hay meadows.

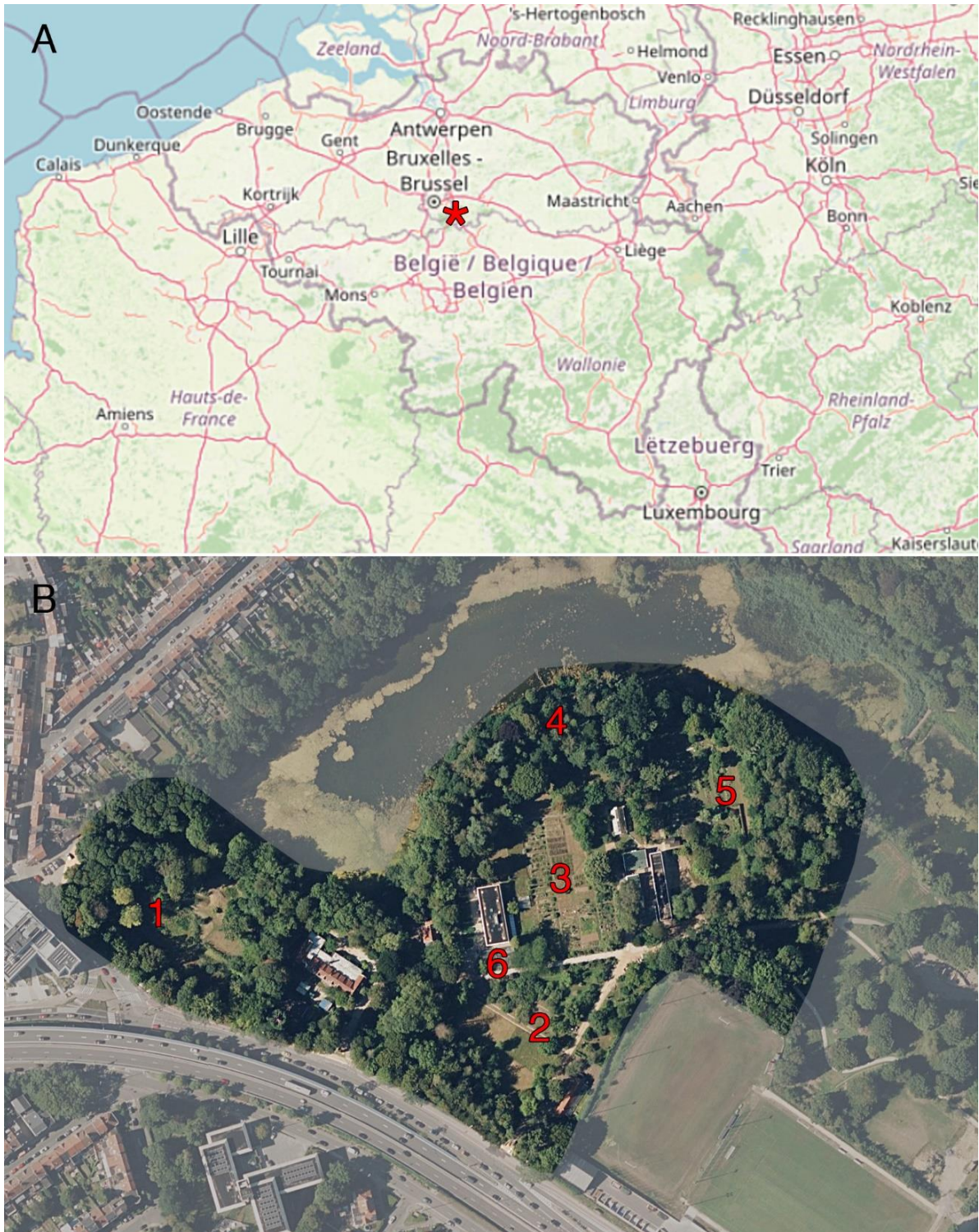


Figure 1. The Jean Massart botanical garden. A. Location in Belgium, on the outskirts of Brussels (red star). B. Satellite view of the site (surroundings manually shaded). Numbers point to the different habitats of the Jean Massart botanical garden: 1. wetland, 2. orchard, 3. medicinal plants, 4. arboretum, 5. evolutionary garden, 6. tropical greenhouses.

It also presents a wide botanical diversity (including more than 1,500 plant species) spread over its 5.2 hectares, which is divided into a number of biotopes such as a wet zone with ponds in the west of the site, an arboretum in the north, an evolutionary garden in the east, an apple orchard in the south, and in the center some plots with aromatic and medicinal plants and some meadows (Fig. 1B). The garden also contains some greenhouses and experimental plots for students of the Université Libre de Bruxelles (ULB). The first entomological prospecting started around 2013-2014, led by the Royal Belgian Institute of Natural Sciences (RBINS) in order to get a first glimpse of the arthropod diversity of the site. In 2015, the "Objective 1000" project was launched in collaboration with "Bruxelles Environnement / Leefmilieu Brussel", with the aim of inventorying a thousand species (insects and spiders) on the site, and due to the success of the rich arthropod samplings and the collective enthusiasm, the operation was conducted each year until 2021 (excepted during the year 2020 due to COVID-19 pandemic). Those entomological inventories carried out on the site have demonstrated the presence of exceptional biodiversity for certain groups of insects in this peri-urban environment, including very rare species or even new species for sciences (e.g. DELBOL et al. 2013, 2017; GROOTAERT 2016; KURINA & GROOTAERT 2016; THOMAES et al. 2016; TROUKENS et al. 2016, 2017a, b, 2019a, b, 2020a, b; LOCK & DRUMONT 2017; DRUMONT et al. 2018, 2020; MAQUET et al. 2018; MOIUCHERON et al. 2018, 2019; LIBERT 2019; PAULY 2019; GROOTAERT et al. 2020; FAGOT et al. 2021; SCHILTHUIZEN et al. 2021; DE PRINS et al. 2022). More than 4000 arthropod species were reported (GROOTAERT & DRUMONT 2022), which is astoundingly remarkable for such a small site so close to the city.

The present report intends to present the diversity of some arachnid taxa and provides species lists for spiders (Araneae), harvestmen (Opiliones), and pseudoscorpions (Pseudoscorpiones) that were observed and collected during the entomological inventories that occurred at the Jean Massart botanical garden.

Materials and methods

The sampling was carried out with a wide variety of techniques typical for the collection of insects and other invertebrates: sight collection, sweeping, beating, multiple trappings (pitfall trap, passive or with bait, tree trunk bottle trap, malaise trap, ...), sieving of soil or leaf litter, collecting using a thermal vacuum (a leaf blower set to suction mode), ... At least a few specimens of each species have been retained as a reference collection (deposited at RBINS). Thus, excluding trappings, spiders easily recognizable on sight (e.g. *Argiope bruennichi* (Scopoli, 1772), *Araneus diadematus* Clerck, 1757, *Uloborus plumipes* Lucas, 1846, *Marpissa muscosa* (Clerck, 1757), etc.) were not systematically sampled. The majority of the specimens collected at the Jean Massart botanical garden were studied and identified under stereomicroscopes. Most of the spiders were identified by Léon Baert. Arnaud Henrard, Rudy Jocqué, Pierre Oger, and Robert Kekenbosch also contributed to the identification of some batches of spider collections. Luc Vanhercke and Pallieter De Smedt identified the harvestmen. Giulio Gardini identified the pseudoscorpions. Samples are mainly deposited in the collections of the Royal Belgian Institute of Natural Sciences (RBINS), except when noted differently.

Results

Araneae

The intensive sampling effort carried out from 2013 to 2021 provided a total of 222 spider species spread over 24 families and 124 genera, representing about 30% of the Belgian araneofauna. The present article provides the complete list of species accumulated during this long-term inventory (Table 1). So far, there is no Red List of spiders of Brussels-Capital region and Wallonia. Therefore, we mainly refer to the tentative "Red List for the spiders of Flanders" (MAELFAIT et al. 1998) to evaluate the status of some species.

In total, 39 species are concerned by the Flanders Red List: 9 spiders are considered as "rare geographically restricted species" (RG), 14 are "Vulnerable" (VU), 13 are "Endangered", 2 are "Critically Endangered" (CR) and one species is "Indeterminate" (IN) (see MAELFAIT et al. 1998 for details). Seven species were not yet reported to Belgium at the time of MAELFAIT et al. (1998) (Table 1).

Table 1. List of spider species found at the Jean Massart botanical garden. Species concerned by the Red List of spiders of Flanders (MAELFAIT et al. 1998) are shaded in red (VU: Vulnerable, EN: Endangered, CR: Critically Endangered, RG: Restricted Geographically). Species that were not yet reported to Belgium at the time of MAELFAIT et al. (1998) are indicated with an asterisk.

Agelenidae	Linyphiidae (continued)	Philodromidae
<i>Agelena labyrinthica</i> (Clerck, 1757)	<i>Diplocephalus latifrons</i> (O.P.-Cambridge, 1863)	<i>Philodromus albidus</i> Kulczynski, 1911 - EN
<i>Coelotes terrestris</i> (Wider, 1834) - VU	<i>Diplocephalus permixtus</i> (O.P.-Cambridge, 1871)	<i>Philodromus aureolus</i> (Clerck, 1757)
<i>Eratigena saeva</i> (Blackwall, 1844)	<i>Diplocephalus picinus</i> (Blackwall, 1841)	<i>Philodromus collinus</i> C.L. Koch, 1835
<i>Histopona torpida</i> (C.L. Koch, 1834)	<i>Diplostyla concolor</i> (Wider, 1834)	<i>Philodromus dispar</i> Walckenaer, 1826
<i>Inermocoelotes inermis</i> (L. Koch, 1855) - RG	<i>Donacochara speciosa</i> (Thorell, 1875) - VU	<i>Philodromus histrio</i> (Latreille, 1819) - VU
<i>Tegenaria ferruginnea</i> (Panzer, 1804)	<i>Drapetisca socialis</i> (Sundevall, 1833)	<i>Philodromus longipalpis</i> Simon, 1870 *
<i>Tegenaria silvestris</i> L. Koch, 1872 - VU	<i>Entelecara acuminata</i> (Wider, 1834)	<i>Philodromus praedatus</i> O.P.-Cambridge, 1871 - EN
Amaurobiidae	<i>Entelecara congenera</i> (O.P.-Cambridge, 1879) - RG	<i>Philodromus rufus</i> Walckenaer, 1826 - RG
<i>Amaurobius ferox</i> (Walckenaer, 1830)	<i>Erigone atra</i> Blackwall, 1833	Pholcidae
<i>Amaurobius similis</i> (Blackwall, 1861)	<i>Erigone dentipalpis</i> (Wider, 1834)	<i>Pholcus phalangioides</i> (Fuessly, 1775)
Anyphaenidae	<i>Erigonella hiemalis</i> (Blackwall, 1841) - RG	<i>Psilochorus simoni</i> (Berland, 1911)
<i>Anyphaena accentuata</i> (Walckenaer, 1802)	<i>Gnathonarium dentatum</i> (Wider, 1834)	Phrurolithidae
Araneidae	<i>Goniatium rubellum</i> (Blackwall, 1841)	<i>Phrurolithus festivus</i> (C.L. Koch, 1835)
<i>Araneus angulatus</i> Clerck, 1757 - EN	<i>Gongylidiellum latebricola</i> (O.P.-Cambridge, 1871)	Pisauridae
<i>Araneus diadematus</i> Clerck, 1757	<i>Gongylidiellum vivum</i> (O.P.-Cambridge, 1875)	<i>Pisaura mirabilis</i> (Clerck, 1757)
<i>Araneus sturmi</i> (Hahn, 1831)	<i>Gongylidium rufipes</i> (Linnaeus, 1758)	Salticidae
<i>Araneus triguttatus</i> (Fabricius, 1793)	<i>Helophora insignis</i> (Blackwall, 1841)	<i>Ballus chalybaeus</i> (Walckenaer, 1802)
<i>Araniella alpica</i> (L. Koch, 1869)	<i>Hylyphantes graminicola</i> (Sundevall, 1830)	<i>Euophrys frontalis</i> (Walckenaer, 1802)
<i>Araniella cucurbitina</i> (Clerck, 1757)	<i>Hylyphantes nigritus</i> (Simon, 1881) - RG	<i>Evarcha arcuata</i> (Clerck, 1757)
<i>Araniella opisthographa</i> (Kulczynski, 1905)	<i>Hypomma bituberculatum</i> (Wider, 1834)	<i>Heliophanus cupreus</i> (Walckenaer, 1802)
<i>Argiope bruennichi</i> (Scopoli, 1772) - RG	<i>Hypomma cornutum</i> (Blackwall, 1833)	<i>Heliophanus flavipes</i> (Hahn, 1832)
<i>Cercidia prominens</i> (Westring, 1851)	<i>Lepthyphantes minutus</i> (Blackwall, 1833)	<i>Marpissa muscosa</i> (Clerck, 1757)
<i>Cyclosa conica</i> (Pallas, 1772)	<i>Linyphia hortensis</i> Sundevall, 1830	<i>Neon reticulatus</i> (Blackwall, 1853)
<i>Gibbaranea gibbosa</i> (Walckenaer, 1802)	<i>Linyphia triangularis</i> (Clerck, 1757)	<i>Phlegra fasciata</i> (Hahn, 1826) - VU
<i>Larinioides cornutus</i> (Clerck, 1757)	<i>Macrargus rufus</i> (Wider, 1834)	<i>Pseudeuophrys lanigera</i> (Simon, 1871)
<i>Larinioides patagiatus</i> (Clerck, 1757)	<i>Maso sundevalli</i> (Westring, 1851)	<i>Saitis barbipes</i> (Simon, 1868) *
<i>Mangora acalypha</i> (Walckenaer, 1802)	<i>Mermessus trilobatus</i> (Emerton, 1882) *	<i>Salticus scenicus</i> (Clerck, 1757)
<i>Nuctunea umbratica</i> (Clerck, 1757)	<i>Microneta viaria</i> (Blackwall, 1841)	<i>Salticus zebraneus</i> (C.L. Koch, 1837)
<i>Zilla diodia</i> (Walckenaer, 1802)	<i>Monocephalus fuscipes</i> (Blackwall, 1836)	<i>Synageles venator</i> (Lucas, 1836)
<i>Zygiella atrica</i> (C.L. Koch, 1845) *	<i>Neriene clathrata</i> (Sundevall, 1830)	Segestriidae
<i>Zygiella x-notata</i> (Clerck, 1758)	<i>Neriene emphana</i> (Walckenaer, 1841) - VU	<i>Segestria bavaria</i> C.L. Koch, 1843
Clubionidae	<i>Neriene montana</i> (Clerck, 1757)	<i>Segestria senoculata</i> (Linnaeus, 1758)
<i>Clubiona brevipes</i> Blackwall, 1841	<i>Neriene peltata</i> (Wider, 1834)	Tetragnathidae
<i>Clubiona comta</i> C.L. Koch, 1867	<i>Neriene radiata</i> (Walckenaer, 1841) - CR	<i>Metellina mengei</i> (Blackwall, 1870)
<i>Clubiona corticalis</i> (Walckenaer, 1802)	<i>Oedothorax fuscus</i> (Blackwall, 1834)	<i>Metellina merianae</i> (Scopoli, 1763)
<i>Clubiona germanica</i> Thorell, 1871	<i>Oedothorax gibbosus</i> (Blackwall, 1841) - VU	<i>Metellina segmentata</i> (Clerck, 1757)
<i>Clubiona lutescens</i> Westring, 1851	<i>Oedothorax retusus</i> (Westring, 1851)	<i>Pachygnatha clercki</i> Sundevall, 1823
<i>Clubiona pallidula</i> (Clerck, 1757)	<i>Ostearius melanopygius</i> (O.P.-Cambridge, 1879)	<i>Pachygnatha degeeri</i> Sundevall, 1830
<i>Clubiona phragmitis</i> C.L. Koch, 1843	<i>Palliduphantes ericaeus</i> (Blackwell, 1853)	<i>Tetragnatha extensa</i> (Linnaeus, 1758)
<i>Clubiona reclusa</i> O.P.-Cambridge, 1862	<i>Palliduphantes insignis</i> (O.P.-Cambridge, 1913)	<i>Tetragnatha montana</i> Simon, 1874
<i>Clubiona terrestris</i> Westring, 1851	<i>Palliduphantes pallidus</i> (O.P.-Cambridge, 1871)	<i>Tetragnatha obtusa</i> C.L. Koch, 1837
Dictynidae	<i>Pelecopis parallela</i> (Wider, 1834)	<i>Tetragnatha pinicola</i> L. Koch, 1870
<i>Brigittea latens</i> (Fabricius, 1775) - EN	<i>Pocadicnemis juncea</i> Locket & Millidge, 1953	Theridiidae
<i>Dictyna arundinacea</i> (Linnaeus, 1758)	<i>Pocadicnemis pumila</i> (Blackwall, 1841)	<i>Anelosimus vittatus</i> (C.L. Koch, 1836)
<i>Dictyna pusilla</i> Thorell, 1856 - EN	<i>Porrhomma egeria</i> Simon, 1884	<i>Asagena phalerata</i> (Panzer, 1801) - VU
<i>Dictyna uncinata</i> Thorell, 1856	<i>Porrhomma pallidum</i> Jackson, 1913	<i>Cryptachaea blattea</i> (Urquhart, 1886) *
<i>Lathys humilis</i> (Blackwall, 1855)	<i>Prinerigone vagans</i> (Audouin, 1826)	<i>Cryptachaea riparia</i> (Blackwall, 1834) - VU
<i>Nigma flavescens</i> (Walckenaer, 1830)	<i>Saaristoa abnormis</i> (Blackwall, 1841)	<i>Dipoena melanogaster</i> (C.L. Koch, 1837) - EN
<i>Nigma puella</i> (Simon, 1870)	<i>Tapinocyba insecta</i> (L. Koch, 1869)	<i>Enoplognatha latimana</i> Hippa & Oksala, 1982

Dysderidae	Linyphiidae (continued)	Theridiidae (continued)
<i>Dysdera erythrina</i> (Walckenaer, 1802) - EN	<i>Tenuiphantes flavipes</i> (Blackwall, 1854)	<i>Enoplognatha ovata</i> (Clerck, 1757)
<i>Harpactea hombergi</i> (Scopoli, 1763) - EN	<i>Tenuiphantes tenebricola</i> (Wider, 1834)	<i>Enoplognatha thoracica</i> (Hahn, 1833)
Gnaphosidae	<i>Tenuiphantes tenuis</i> (Blackwall, 1852)	<i>Episinus angulatus</i> (Blackwall, 1836)
<i>Drassodes cupreus</i> (Blackwall, 1834)	<i>Tenuiphantes zimmermanni</i> (Bertkau, 1890)	<i>Neottiura bimaculata</i> (Linnaeus, 1767)
<i>Drassyllus lutetianus</i> (L. Koch, 1866) - EN	<i>Thyreosthenius parasiticus</i> (Westring, 1851)	<i>Paidiscura pallens</i> (Blackwall, 1834)
<i>Drassyllus pumilus</i> (C.L. Koch, 1839)	<i>Tiso vagans</i> (Blackwall, 1934)	<i>Parasteatoda lunata</i> (Clerck, 1757)
<i>Drassyllus pusillus</i> (C.L. Koch, 1833)	<i>Troxochrus scrobiculus</i> (Westring, 1851)	<i>Parasteatoda tepidariorum</i> (C.L. Koch, 1841)
<i>Scotophaeus scutulatus</i> (L. Koch, 1866)	<i>Walckenaeria acuminata</i> Blackwall, 1833	<i>Platnickina tinctoria</i> (Walckenaer, 1802)
<i>Trachyzelotes pedestris</i> (C.L. Koch, 1837) - EN	<i>Walckenaeria antica</i> (Wider, 1834)	<i>Rugathodes instabilis</i> (O.P.-Cambridge, 1871) - EN
Hahniidae	<i>Walckenaeria atrotibialis</i> (O.P.-Cambridge, 1878)	<i>Steatoda bipunctata</i> (Linnaeus, 1758)
<i>Antistea elegans</i> (Blackwall, 1841)	<i>Walckenaeria furcillata</i> (Menge, 1869)	<i>Steatoda triangulosa</i> (Walckenaer, 1802)
<i>Cicurina cicur</i> (Fabricius, 1793)	Lycosidae	<i>Theridion asopi</i> Vanuytven, 2014 *
<i>Hahnina nava</i> (Blackwall, 1841) - EN	<i>Alopecosa pulverulenta</i> (Clerck, 1757)	<i>Theridion melanurum</i> Hahn, 1831
<i>Hahnina pusilla</i> C.L. Koch, 1841 - IN	<i>Arctosa leopardus</i> (Sundevall, 1833) - VU	<i>Theridion mystaceum</i> L. Koch, 1870
Linyphiidae	<i>Pardosa amentata</i> (Clerck, 1757)	<i>Theridion pictum</i> (Walckenaer, 1802)
<i>Agyneta decora</i> (O. Pickard-Cambridge, 1871)	<i>Pardosa hortensis</i> (Thorell, 1872) - RG	<i>Theridion pinastri</i> L. Koch, 1872
<i>Agyneta innotabilis</i> (O. Pickard-Cambridge, 1863)	<i>Pardosa palustris</i> (Linnaeus, 1758)	<i>Theridion varians</i> Hahn, 1833
<i>Agyneta rurestris</i> (C.L. Koch, 1836)	<i>Pardosa prativaga</i> (L. Koch, 1870) - VU	Thomisidae
<i>Bathypantes gracilis</i> (Blackwall, 1841)	<i>Pardosa pullata</i> (Clerck, 1757)	<i>Diaea dorsata</i> (Fabricius, 1777)
<i>Bathypantes nigrinus</i> (Westring, 1851)	<i>Pardosa saltans</i> Töpfer-Hofmann, 2000 - VU	<i>Misumena vatia</i> (Clerck, 1757) - VU
<i>Bathypantes parvulus</i> (Westring, 1851)	<i>Pirata piraticus</i> (Clerck, 1758)	<i>Ozyptila praticola</i> (C.L. Koch, 1837)
<i>Centromerita bicolor</i> (Blackwall, 1833)	<i>Piratula hygrophilus</i> (Thorell, 1872)	<i>Ozyptila sanctuararia</i> (O. Pickard-Cambridge, 1871) - EN
<i>Centromerita concinna</i> (Thorell, 1875)	<i>Piratula latitans</i> (Blackwall, 1841)	<i>Ozyptila simplex</i> (O. Pickard-Cambridge, 1862)
<i>Centromeris brevipalpus</i> (Menge, 1866) *	<i>Trochosa ruricola</i> (DeGeer, 1778)	<i>Ozyptila trux</i> (Blackwall, 1846)
<i>Centromeris serratus</i> (O. Pickard-Cambridge, 1875) - RG	<i>Trochosa terricola</i> Thorell, 1856	<i>Xysticus acerbus</i> Thorell, 1872 - CR
<i>Centromeris sylvaticus</i> (Blackwall, 1841)	<i>Xerolycosa nemoralis</i> (Westring, 1861) - VU	<i>Xysticus cristatus</i> (Clerck, 1757)
<i>Ceratinella brevipes</i> (Westring, 1851)	Mimetidae	<i>Xysticus kochi</i> Thorell, 1872
<i>Ceratinella brevis</i> (Wider, 1834)	<i>Ero aphana</i> (Walckenaer, 1802) - RG	<i>Xysticus lanio</i> C.L. Koch, 1835
<i>Ceratinella scabrosa</i> (O.P. Cambridge, 1871)	<i>Ero furcata</i> (Villers, 1789)	<i>Xysticus lineatus</i> (Westring, 1851) - EW
<i>Cnephalocotes obscurus</i> (Blackwall, 1834)	<i>Ero tuberculata</i> (DeGeer, 1778) - VU	<i>Xysticus ulmi</i> (Hahn, 1831)
<i>Collinsia inerrans</i> (O.P.-Cambridge, 1884)	Nesticidae	Uloboridae
	<i>Nesticus cellulanus</i> (Clerck, 1758)	<i>Uloborus plumipes</i> Lucas, 1846

Short notes about some remarkable spiders

Cryptachaea blattea (Urquhart, 1886) - THERIDIIDAE

The discovery of this species in the Jean Massart botanical garden is remarkable as it was just recently discovered to occur outdoors, on a green roof in Antwerp (JACOBS et al. 2021). Previous sightings of this species in Belgium were limited to heated greenhouses, and it was also the case at the Jean Massart botanical garden: a unique male specimen was collected by pitfall trapping in the tropical greenhouse. *Cryptachaea blattea* (Fig. 2) is actually considered an imported species that is able to breed in Belgium (BOSMANS et al. 2017). This species probably originated in Macaronesia and is not native to Europe (NENTWIG et al. 2022). It should be noted that the other species of this genus occurring naturally in Belgium, *C. riparia* (Blackwall, 1834), also found on the site, is considered as vulnerable on the Flanders Red List.

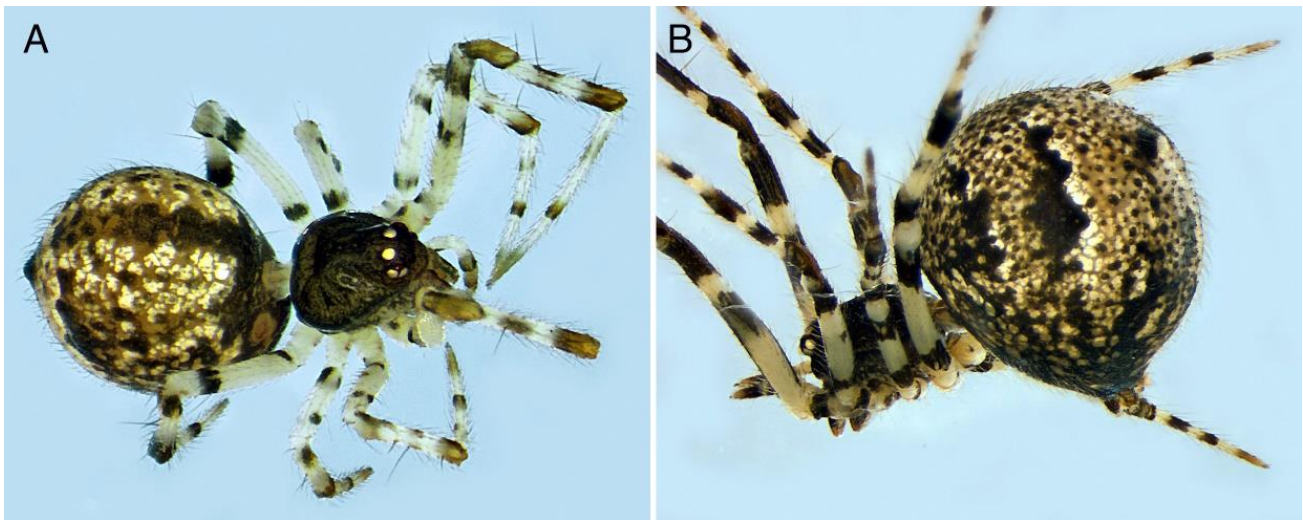


Figure 2. *Cryptachaea blattea* (Urquhart, 1886), represented here by two females from A. Putte (Coll. H. Vanuytven) and B. Naninne (Coll. Pierre Oger). (no scale provided). © Pierre Oger.

Neriene radiata (Walckenaer, 1841) - LINYPHIIDAE

The status of this spider is considered critical, threatened with extinction in Flanders (MAELFAIT et al. 1998). *Neriene radiata* (Fig. 4) is mainly found in the vegetation, on bushes and trees of half-shadowed habitats, such as verges of dry deciduous forests.



Figure 4. *Neriene radiata* (Walckenaer, 1841), a quite rarely observed linyphiid spider. Here a female photographed among ornamental plants at the Jean Massart botanical garden. © Arnaud Henrard.

Donacochara speciosa (Thorell, 1875) - LINYPHIIDAE

This linyphiid species is considered vulnerable on the Flanders Red List and is typical of humid habitats. It can be found in the vegetation of ponds or lakes and adjacent swamp meadows. The specimens found in the Jean Massart botanical garden (Fig. 3) were collected in reed vegetation bordering a pond.

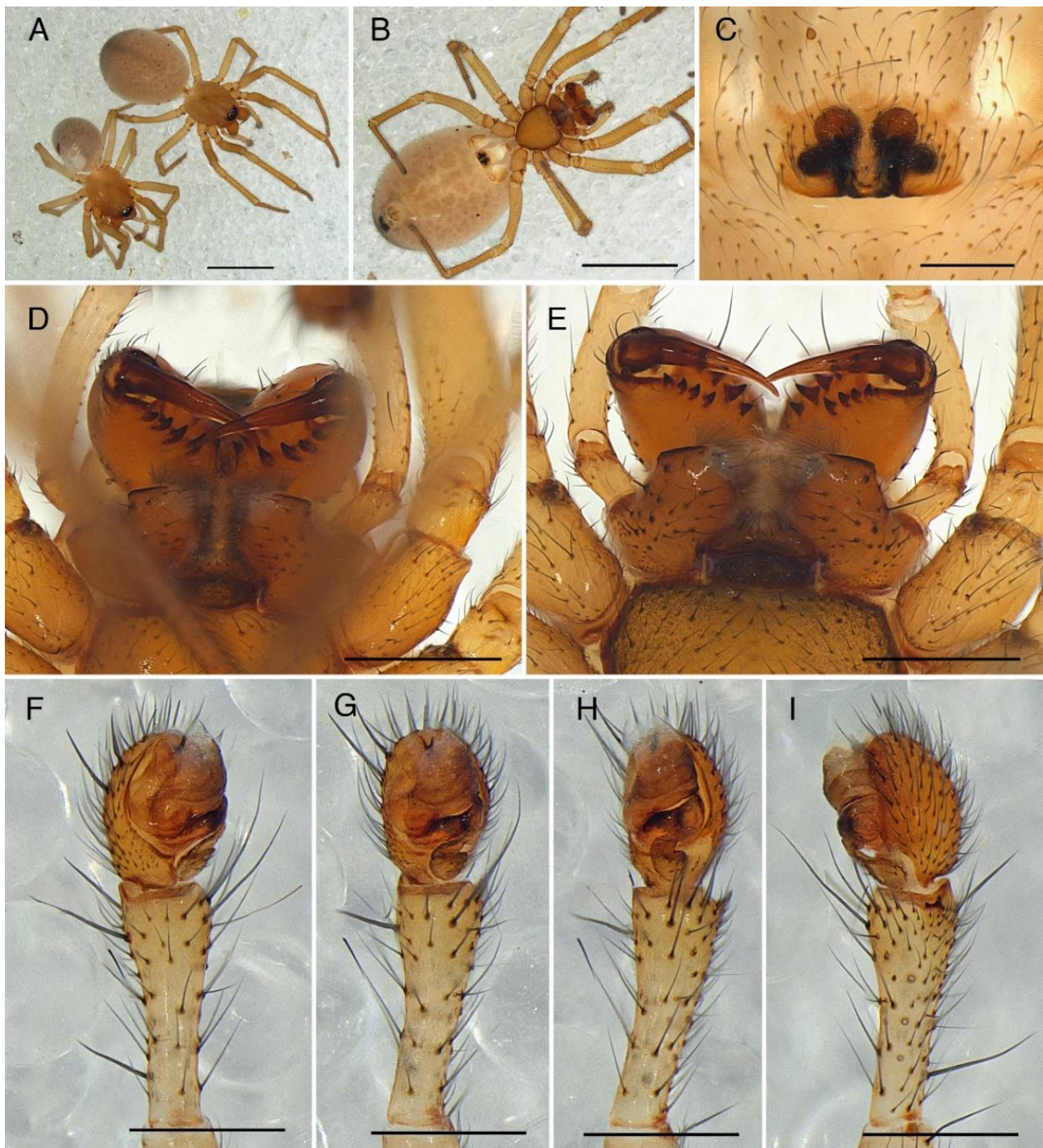


Figure 3. *Donacochara speciosa* (Thorell, 1875), a couple collected among reeds bordering a pond in the Jean Massart botanical garden. A. Habitus of male (bottom left) and female (upper right), dorsal view. B. Habitus of female, ventral view. C. Epigyne, ventral view. D. Chelicerae of male, ventral view. E. Chelicerae of female, ventral view. F. Male palp, prolateral view. G. Idem, ventral view. H. Idem, retro-ventral view. I. Idem, retrolateral view. © Arnaud Henrard. Scale bars: A-B = 2 mm; C, F-I = 0.2 mm; D-E = 0.5 mm.

Saitis barbipes (Simon, 1868) - SALTICIDAE

This jumping spider, first found in Belgium in 2006 (LAMBEETS et al. 2007) is actually native to the Mediterranean region. For some decades, this species has clearly spread northwards within Europe and appears now to be naturalised in Belgium (NENTWIG et al. 2022; HENRARD & DRUMONT 2022). In the Jean Massart botanical garden, the spider was first observed in 2009 (VAN KEER 2010). Exactly 13 years later, the species was found again at the same locality (Fig. 5) (HENRARD & DRUMONT 2022). *S. barbipes* can be considered a rare, geographically restricted species in Belgium.



Figure 5. *Saitis barbipes* (Simon, 1868). Here a female specimen found at the Jean Massart botanical garden. © Arnaud Henrard.

***Theridion asopi* Vanuytven, 2014 - THERIDIIDAE**

This theridiid was quite recently described from Belgium by VANUYTVEN (2014). The species is distributed in Western and Central Europe, including Italy (WSC 2022). While this spider is quite rarely observed, it seems rather widespread in Belgium and its surroundings. According to VANUYTVEN (2014), *T. asopi* (Fig. 6) is mainly found in sunny and rocky areas, making small webs against sun-exposed rocks, cracks, or other irregularities.

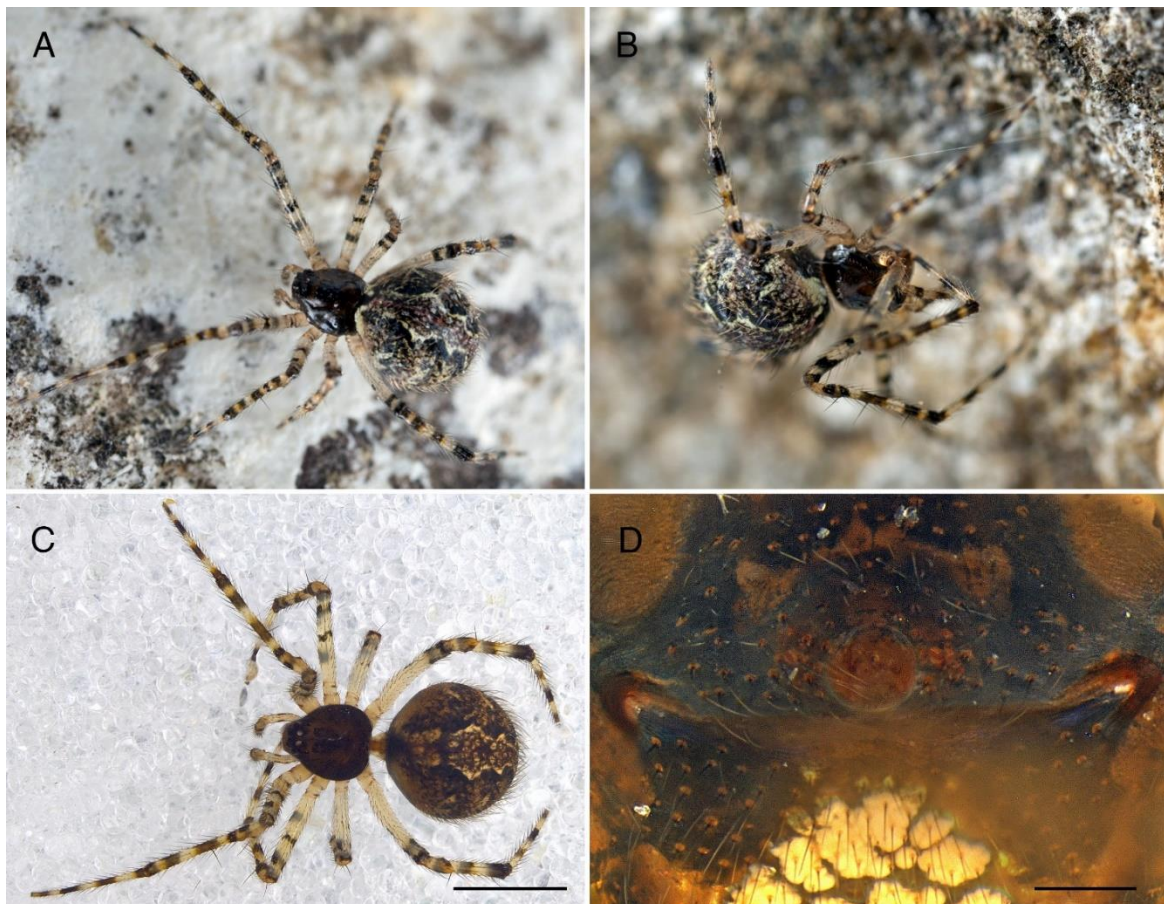


Figure 6. *Theridion asopi* Vanuytven, 2014. Here a female specimen found under a stone in the Jean Massart botanical garden. A-B. Habitus in vivo. C. Habitus in alcohol, dorsal view. D. Epigyne, ventral view. © Arnaud Henrard. Scale bars: C = 1 mm; D = 0.1 mm.

Uloborus plumipes Lucas, 1846 - ULOBORIDAE

This species was reported for the first time in Belgium by SEGERS (1986). In our country, this exotic species only survives indoors in heated constructions like greenhouses, nurseries, or flower halls. The species appears well-established in the tropical greenhouses of the Jean Massart botanical garden (Figure 6). Based on the genitals only, *U. plumipes* is hardly distinguishable from its congener *U. walckenaerius* Latreille, 1806. However, somatic features (such as the long brush of setae on the female's first legs) and the habitus pattern are more efficient characters to separate these two closely related species (Fig. 7).

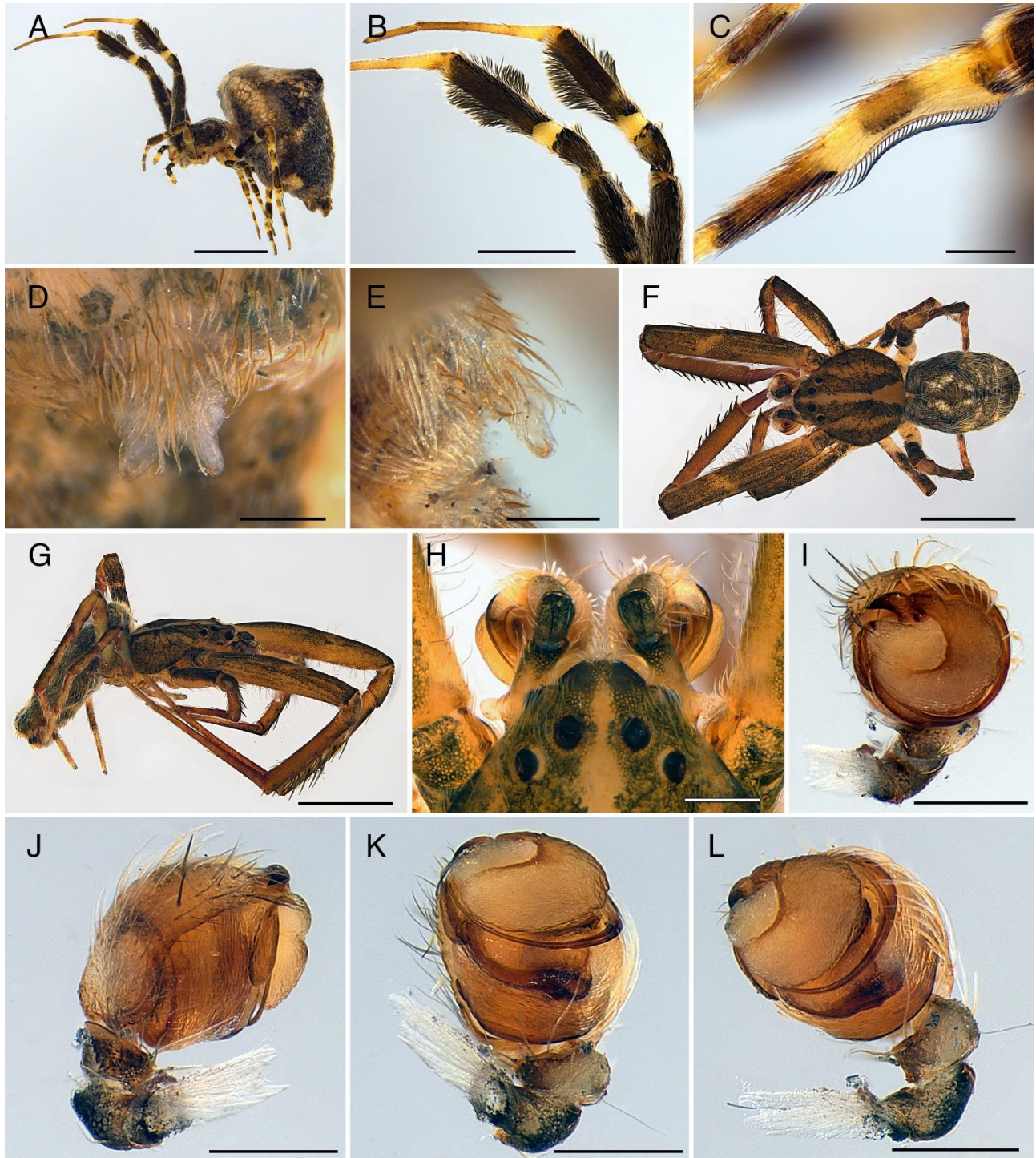


Figure 7. *Uloborus plumipes* Lucas, 1846. Here a couple found in the tropical greenhouses of the Jean Massart botanical garden. A. Female habitus, lateral view. B. Detail of female first legs showing the long modified setae on the tibia. C. Female leg IV, detail of the calamistrum on the upper metatarsus margin, lateral view. D. Epigyne, ventral view. E. Idem, lateral view. F. Male habitus, dorsal view. G. Idem, lateral view. H. Idem, eye region, dorsal view. I. Male palp, anterior view. J. Idem, prolateral view. K. Idem, ventral view. L. Idem, retrolateral view. © Arnaud Henrard. Scale bars: A = 2 mm; B, F-G = 1 mm; C, D-E, H-L = 0.2 mm.

Xysticus acerbus Thorell, 1872 - THOMISIDAE

The crab spider *X. acerbus* (Fig. 8) is considered rare and threatened with extinction in Flanders (MAELFAIT et al. 1998, LAMBRECHTS et al. 2021). This species is quite widely distributed in Europe to Central Asia, Russia (Europe to Far East) (WSC 2022). The habitat of *X. acerbus* is mostly linked to a variety of dry to moist grasslands and heathlands (MAELFAIT et al. 1998; LAMBRECHTS & JANSSEN 2005; LAMBRECHTS et al. 2013, 2021). In the Jean Massart botanical garden, the spider was collected by pitfall traps in dry meadows.



Figure 8. *Xysticus acerbus* Thorell, 1872. A specimen female (probably from Antwerp Campines) identified by Herman De Koninck. © Gilbert Loos - image bank ARABEL).

Opiliones

The harvestmen fauna of Jean Massart botanical garden counts 11 species distributed in three families and 10 genera (Table 2). The species number is about a third of the Belgian fauna. All species are relatively common in Belgium. The most remarkable species is *Anelasmaocephalus cambridgei* (Westwood, 1874) (Fig. 9), which is an elusive species living underneath the litter layer and rarely found. Surprising is the absence of species from the Nemastomatidae family. Small litter-dwelling species from this family, such as *Nemastoma bimaculatum* (Fabricius, 1775) and *N. lugubre* (Müller, 1776) are not rare in the region and easily caught using pitfall traps (e.g. see DE SMEDT & VAN DE POEL 2017). It is unclear why these species are absent from Jean Massart botanical garden.

Table 2. List of harvestmen found at the Jean Massart botanical garden.

Phalangiidae	Sclerosomatidae
<i>Dicranopalpus ramosus</i> (Simon, 1909)	<i>Leiobunum rotundum</i> (Latreille, 1798)
<i>Oligolophus tridens</i> (C.L.Koch, 1836)	<i>Homalenotus quadridentatus</i> (Cuvier, 1795)
<i>Opilio canestrinii</i> (Thorell, 1876)	Trogulidae
<i>Paroligolophus agrestis</i> (Meade, 1855)	<i>Anelasmaocephalus cambridgei</i> (Westwood, 1874)
<i>Platybunus pinetorum</i> (C.L.Koch, 1839)	<i>Trogulus closanicus</i> Avram, 1971
<i>Rilaena triangularis</i> (Herbst, 1799)	<i>Trogulus nepaeformis</i> (Scopoli, 1763)

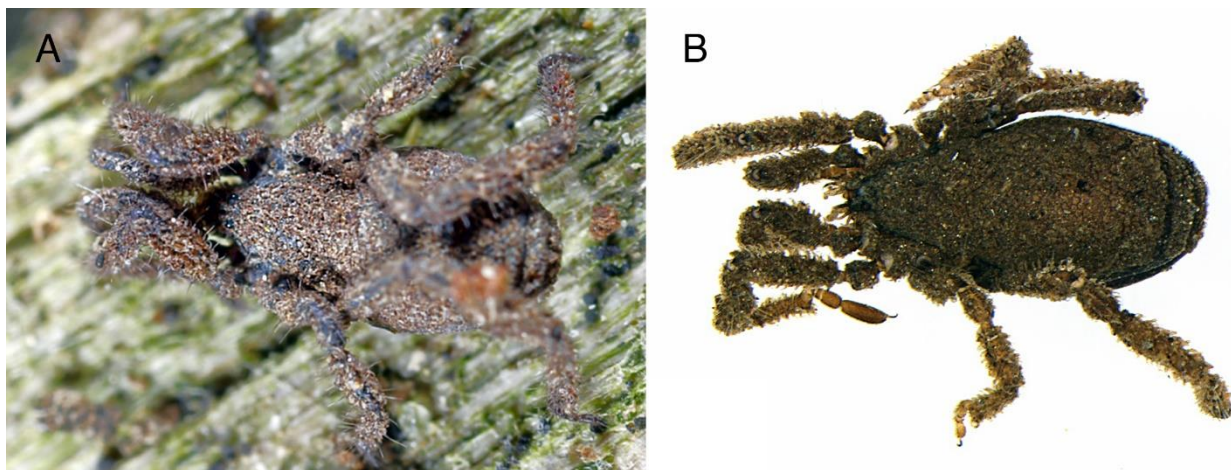


Figure 9. *Anelasmacephalus cambridgei* (Westwood, 1874). A. Photos in vivo. © Jan van Duinen. B. Photos in alcohol (no scale provided). © Pierre Oger.

Pseudoscorpiones

The Jean Massart botanical garden was found to harbor six species of Pseudoscorpiones, belonging to five different genera and distributed in two families (Table 3, Appendix). Twenty-two nominal species of Pseudoscorpions were known from Belgium (HENDERICKX 1999; HENDERICKX & VETS 1999; WPC 2022). With the addition of the new finds of *Lamprochernes chyzeri* (Tömösváry, 1883), which represents a new species for Belgium, it now stands at 23. It should be noted that this species was also found in 2011 by Paul Limbourg in Luttre (Belgium), identified by the second author, and illustrated on Pierre Oger’s website (<https://arachno.piwigo.com/>) (Fig. 10). *Pselaphochernes scorpioides* (Hermann, 1804) was the most abundantly collected species at the Jean Massart botanical garden (Appendix). Globally, the chernetological fauna of the Jean Massart botanical garden is represented by species with a wide distribution, mostly common in anthropized environments in central Europe and in the Western Palaearctic Region.

Table 3. List of *Pseudoscorpiones* species found at the Jean Massart botanical garden (* = new species for Belgium).

Chernetidae	Chthoniidae
<i>Chernes hahnii</i> L. Koch, 1873	<i>Chthonius ischnocheles</i> (Hermann, 1804)
<i>Lamprochernes chyzeri</i> (Tömösváry, 1882)*	<i>Ephippiochthonius tetrachelatus</i> (Preyssler, 1790)
<i>Lamprochernes nodosus</i> (Schrank, 1803)	
<i>Pselaphochernes scorpioides</i> (Hermann, 1804)	

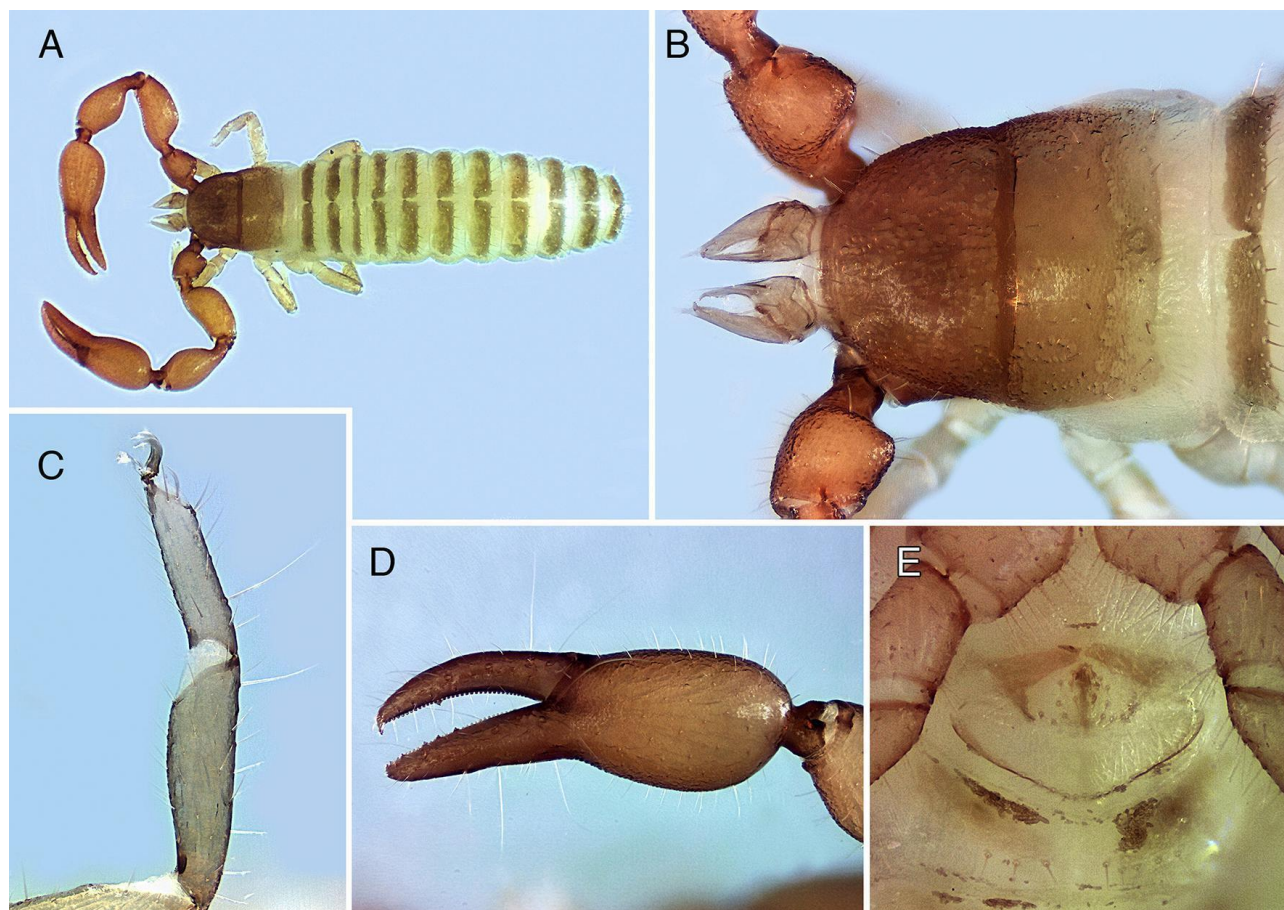


Figure 10. Female specimen of *Lamprochernes chyzeri* (Tömösváry, 1883) collected by Paul Limbourg in Luttre by Malaise trap, 17.V-03.VI.2011 (Coll. IRSNB, det. G. Gardini, IV.2014). A. Habitus, dorsal view. B. Cephalothorax, dorsal view. C. Tarsus IV, lateral view. D. Pedipalp, dorsal view. E. Genitalia, ventral view. (no scales provided but total body length = 2.59 mm). © Pierre Oger.

Discussion and conclusion

The entomological inventory carried out at the Jean Massart botanical garden not only shows a great diversity of insects. With 239 species of arachnids found (of which 93% are Araneae, Acari not studied), also the arachnological diversity is remarkable for such a small area. The project even revealed that *Lamprochernes chyzeri* (Tömösváry, 1883), although widely distributed in Europe, was actually a new species for Belgium. Concerning spiders, among the 39 species concerned by the Flanders' Red List, not less than 13 species are classified as "Endangered", and two species as "Critically Endangered" in Flanders. However, the Red List established by (MAELFAIT et al. 1998) is certainly obsolete. Many Belgian studies have been produced since, and the status of many species has to be revised. An update of the checklist, including information for the three Belgian regions would be welcome.

Whatever, healthy biotopes and micro-habitats in the region of Brussels and its surroundings are increasingly rare. To take just one example that occurred in Brussels-Capital Region, the sandy site of the old racecourse of Groenendaal (Brussels) has been partially razed from the map (Robert Kekenbosch, pers. comm.) while some sensitive species, such as *Arctosa leopardus* (Sundevall, 1833), *Ozyptila sanctuaria* (O.P.-Cambridge, 1871), *Xysticus acerbus*, *Rugathodes instabilis* O.P.-Cambridge, 1871, or *Phlegra fasciata* (Hahn, 1826) has been recorded there (KEKENBOSCH & VAN NIEUWENHOVE 2022). A place like the Jean Massart botanical garden is a boon! Indeed, the wealth of habitats offered by the site, and the sustainable management that maintains it, are essential because it provides a refuge for such remarkable species.

To conclude, the extraordinary richness of these inventories is probably related to the plant and habitat diversity present within the Jean Massart botanical garden, as well as their management. Still, it is also the result of the intensive and varied sampling effort delivered over several consecutive years (DRUMONT et al. 2020; FAGOT et al. 2021).

Acknowledgments

This publication is one of the project's outputs of the global inventory of the arthropod fauna of the Jean Massart botanical garden, a project supported by Bruxelles-Environnement. Therefore, we particularly thank Barbara Dewulf, Frédéric Fontaine, and Guy Rotsaert (Green Spaces Division, Biodiversity Department) as well as Olivier Beck (Project Director) for their encouragement and the granting of collection permits. We are also particularly indebted to the staff of the Jean Massart botanical garden: Thierry Bruffaerts (site manager, Brussels-Environment), Jean Vermader, Youri Rouge, and Hernando Silva Montenegro (Free University of Brussels), as well as to the entire technical team of gardeners for their always warm welcome and the constant interest in our research. We also thank an anonymous reviewer for proofreading this article.

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Appendix 1. Collection details and distribution of the Pseudoscorpiones samples collected at Jean Massart botanical garden

Family Chernetidae Menge, 1855

Chernes hahnii (C.L. Koch, 1839): 1♂, 5-26.VII.2018, bottle traps, station n°4, A. Drumont & H. Raemdonck leg. (coll. G. Gardini). Species known from Armenia, Austria, Azerbaijan, Belgium, Bosnia and Herzegovina, Belarus, Bulgaria, China, Czech Republic, France, Georgia, Germany, Hungary, Iran, Italy, Kazakhstan, Lithuania, Luxembourg, Moldova, Netherlands, Poland, Republic of North Macedonia, Romania, Russia, Slovakia, Switzerland, Turkey, Ukraine, (KRAJČOVIČOVÁ et al. 2018; ČERVENÁ et al. 2021; WPC 2022).

Lamprochernes chyzeri (Tömösváry, 1883): 2♂, 6.VI.2019, sieving compost and leaf litter, H. Raemdonck leg. (I.G.: 33.952). Species known from Albania, Austria, Bulgaria, Croatia, Czech Republic, Denmark, Finland, Georgia, Germany, Hungary, Italy, Kazakhstan, Latvia, Montenegro, Norway, Poland, Republic of North Macedonia, Romania, Serbia, Slovakia, Sweden, Switzerland, Turkey, Ukraine, United Kingdom (CHRISTOPHORYOVÁ & JABLONSKI 2018; ČERVENÁ et al. 2020; ČERVENÁ et al. 2021; WPC 2022). **New species for Belgium.**

Lamprochernes nodosus (Schrank, 1803): 1♀, 18.VI-1.VII.2019, A. Drumont & H. Raemdonck leg. (coll. G. Gardini). Species known from Albania, Armenia, Austria, Azerbaijan, Belgium, Bosnia and Herzegovina, Bulgaria, Congo, Czech Republic, Democratic Republic of Congo, Denmark, Finland, France, Georgia, Germany, Ghana, Greece, Hungary, India, Iran, Ireland, Israel, Italy, Kyrgyzstan, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Russia, Slovakia, Spain, Sri Lanka, Sweden, Switzerland, Tunisia, Turkey, United Kingdom (CHRISTOPHORYOVÁ et al. 2017; ČERVENÁ et al. 2020; WPC 2022).

Pselaphochernes scorpioides (Hermann, 1804): 1♀, 17.VI/1.VII.2015, ground pitfalls, A. Drumont & H. Raemdonck leg. (I.G.: 33.004); 1♀, 20-27.VIII.2015, malaise trap 1, A. Drumont & H. Raemdonck leg. (coll. G. Gardini); 1♀, 17.XII.2015, sieving compost and leaf litter, A. Drumont & H. Raemdonck leg. (I.G.: 33.004); 1♀, 14-21.IV.2016, malaise trap 1, A. Drumont & H. Raemdonck leg. (I.G.: 33.177); 1♀, 2-15.V.2018, trap 2019/2, A. Drumont & H. Raemdonck leg. (I.G.: 33.645); 1♂, 2-16.X.2018, A. Drumont & H. Raemdonck leg. (I.G.: 33.645); 1♀, 18.VI-1.VII.2019, vinegar trap, A. Drumont & H. Raemdonck leg. (coll. G. Gardini); 4♂ 4♀, 6.VI.2019, sieving compost and leaf litter, H. Raemdonck leg. (I.G.: 33.952). Species known from Albania, Algeria, Armenia, Austria, Azerbaijan, Belgium, Bosnia and Herzegovina, Bulgaria, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iran, Ireland, Israel, Italy, Latvia, Lebanon, Lithuania, Morocco, Netherlands, Norway, Pakistan, Poland, Portugal, Principality of Monaco, Romania, Russia, Slovakia, Spain, Sweden, Switzerland, Syria, Turkey, Ukraine, United Kingdom, U.S.A., Uzbekistan (LEMAIRE & RAFFALDI 2016; CHRISTOPHORYOVÁ & JABLONSKI 2017; KRAJČOVIČOVÁ et al. 2018.; ČERVENÁ et al. 2020; WPC 2022).

Family Chthoniidae Daday, 1889

Chthonius ischnocheles (Hermann, 1804): 1♀, 4-23.IV.2019, trap 2019/2, A. Drumont & H. Raemdonck leg. (I.G.:33.952). Species widespread throughout Europe, Macaronesia and Anatolia, introduced to the U.S.A. and St. Helena (GARDINI 2021; WPC 2022).

Ephippiochthonius tetrachelatus (Preyssler, 1790): 1♂, 18.VI-1.VII.2019, grotte, A. Drumont & H. Raemdonck leg. (I.G.: 33.952). Species known from Western Palaearctic Region, chiefly Mediterranean; introduced to eastern Canada, U.S.A. (including Hawaii), Cuba, Argentina, Seychelles and southwestern Australia (GARDINI 2013; WPC 2022).