

Exotic spiders (Araneae): Verified reports from Belgium of imported species (1976-2006) and some notes on apparent neozoan invasive species

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Summary

For the first time, an overview is given of the verified reports of exotic spiders imported into Belgium during the period 1976-2006. 36 species belonging to 15 different families, have been reported by arachnologists. The author tries to distinguish the established from the non established species, based on the current data.

Samenvatting

Er wordt voor het eerst een overzicht gegeven van de geverifieerde meldingen van exotische spinnen in België gedurende de periode 1976-2006. Arachnologen meldden 36 soorten die tot 15 verschillende spinnenfamilies behoren. De auteur poogt op basis van de huidige gegevens een onderscheid te maken tussen ingeburgerde en niet-ingeburgerde soorten.

Résumé

Pour la première fois, une revue des mentions vérifiées d'araignées exotiques en Belgique pendant la période 1976-2006 est donnée. Des arachnologues ont mentionné 36 espèces appartenant à 15 familles différentes. L'auteur tente de distinguer les espèces établis des espèces non-établis à base des données disponibles.

Introduction

Terminology and definition of research subject

The concept "exotic species" is seldom used unambiguously, but the internationally accepted definition of the Convention on Biological Diversity (CBD, 2002) may serve as a guideline. This defines an exotic species as one that occurs outside its natural range. For Belgium, this means that all species which have not arrived here "on their own" (i.e. have come in by human transportation) are exotic. Thus species that expand their area of distribution northward by natural colonization, be it under influence of climate change, are not regarded as exotic species under this definition. Exotic species that are established, even if for tens or hundreds of years, remain exotic species.

We therefore restrict ourselves in this article to the past thirty years (the age of the Belgian Arachnological Society ARABEL at the time of writing). For many spider species it has become difficult or impossible to establish whether they were imported by humans. For a number of species, like *Pholcus phalangioides*, *Scytodes thoracica* and many other spiders which are eusynanthropic in Belgium, multiple factors point to human importation in the past and consequently these species might be regarded as exotic to Belgium. This might very well be the case, but the truth is that we do not have enough data to positively conclude this.

The above definition is not so clear on the criteria used to determine when a species occurs outside its normal range. Does a single individual found outside its range qualify, or only when reproduction and/or the spread of the species is established after being imported (as in neozoan species)? In this article, we apply the broadest interpretation, in other words: we include all imported individuals, even when settling has not been established.

Besides the restriction in time, we apply an important geographical restriction: we are forced to isolate Belgium as a geographic area in this study. The logical application of this principal may lead to strange consequences. For instance, of the two *Eperigone* species, *E. eschatologica* and *E. trilobata*, which both originate from America and have recently been found in our country, only *Eperigone eschatologica* is included in the attached species list. The first and only record of this species in our country concerns an importation via an exotic plant (BOSMANS & VANUYTVEN, 1998). The known captures in the Netherlands (PRINSEN, 1996) and Germany (KLEIN et al., 1994) were also made in heated greenhouses. All twelve individuals of *Eperigone trilobata* that were found in our country up to now however, have been captured in natural environments (VAN KEER et al., 2006 & VANUYTVEN pers. comm.) and consequently, importation by human transportation is uncertain for Belgium. An overview of European exotic spiders would therefore provide a different and more accurate image.

For a number of spider species which were added to the Belgian checklist during the past 30 years, the suspicion exists that they were imported. Such a suspicion however is not sufficient to include the species in the list below. The importation has to be proven or highly likely on the basis of the known distribution of the species at the time of its discovery in Belgium. An additional criterion can be the habitat in which the species is found in our country. Occurrence only in greenhouses or other heated buildings supports the assumption of importation.

The countless spider species which are imported for commercial or breeding purposes and are kept in captivity, are of course not included in our list.

The aim of this article is to set a benchmark in time, a snapshot -however incomplete- by which future or current invasions can be assessed.

Data collection

In looking for data, it soon became clear that, in the past, information on imported spiders was followed up very poorly in our country. This contrasts with e.g. the Netherlands, where L. van der Hammen had already published several articles on imported spiders (e.g. found in heated greenhouses) between 1949 and 1969 (VAN DER HAMMEN, 1949a ; 1949b ; 1969). Older Belgian scientific articles on imported spiders are very rare, with the exception of a remarkable case of importation of several *Latrodectus* specimens, which was followed up at the time by scientists (BENOIT, 1968 : 1969) as well as by the popular press. There seemed and seems to exist little interest in Belgium for the issue of imported spiders. Of all the Belgian institutions consulted, only the Antigifcentrum (*Anti Poison Centre*) thought it relevant to register data concerning exotic spiders.

For this study, we consulted: the Antwerp Zoo, the Instituut voor Tropische Geneeskunde (ITG, *Institute of Tropical Medicine*), the Antigifcentrum (*Anti Poison Centre*), the Koninklijk Belgisch Instituut voor Natuurwetenschappen (KBIN, *Royal Belgian Institute for Natural Sciences*), the Koninklijk Museum voor Midden-Afrika (KMMA, *Royal Museum for Central Africa*), the members of the Belgian Arachnological Society ARABEL, the members of Spinnen In Terraria/Werkgroep Inheemse Spinnen (SIT/WIS, *Spiders in Terraria/Study group indigenous Spiders*) and the members of the Koninklijke Antwerpse Vereniging voor Entomologie (KAVE, *Royal Antwerp Society of Entomology*). On inquiry it appears that most of the exotic spiders found by non-arachnologists are reported to the Antwerp Zoo. From there, people are referred for determination to the KBIN, up to 2006. The same was done for reports to the ITG and the Anti Poison Centre. At the KBIN we learn that only very occasionally is a spider specimen physically presented to them. The information on these rare cases was not systematically archived.

An important reason for the poor record keeping on exotic spiders is probably that the problematic nature of the issue was perceived as marginal until recently. It's only by linking the growth in this phenomenon with climate warming and the threat to indigenous biodiversity that it has gained relevance for many. In a rare case (the import of Black Widows), authorities like the Department for Health Inspection have also shown an interest.

As a result of these factors, the collected data for this article are very incomplete. Also only reports which have been verified by arachnologists, are included. That is why the reports by the Belgian Anti Poison Centre could not be included in the list. These reports were made by telephone and by non-arachnologists. Between 1/1/1991 and 13/7/2006, this centre received 180 calls in total with mention of an exotic spider. This included 132 requests for information and 48 reports of bites (LILIANE KESTEMONT, pers. comm.). The "determination" was always done by the reporting person and is consequently utterly unreliable.

Results

Family:	number of species	number of different sites
Araneidae	1	1
Ctenidae	2	3
Erigonidae	1	1
Gnaphosidae	1	1
Nephilidae	1	1
Oecobiidae	1	2
Oonopidae	1	1
Pholcidae	6	15
Salticidae	7	6
Selenopidae	1	1
Sparassidae	2	5
Theraphosidae	1	1
Theridiidae	9	11
Uloboridae	1	7
Zoropsidae	1	2
Total	36	47 (different species were sometimes found in the same site)

Table 1: Number of species and different sites per family

Discussion

Some of the explanations for a higher relative representation of families or locations are obvious. Species which live near humans are bound to travel more often with them in luggage or freight. This partly explains the high representations of *Pholcidae* and *Theridiidae*. It is well-known that the *Latrodectus* species *mactans* and *hasselti* are synanthropic in their region of origin. I don't know of any importation of *Latrodectus tredecimguttatus*, although the traffic of goods and people from the Mediterranean (where the species is indigenous) is very heavy and ancient. *L. tredecimguttatus* however doesn't usually live in the direct vicinity of buildings, with the exception of Israel, where the species has been reported from this habitat (MARETIC, 1975). One of the most well-known and widespread synanthropic imported species is the spectacular *Heteropoda venatoria* (Araneae: *Sparassidae*). Although not (yet) established in our country, several specimens have been caught here, as well as in neighbouring countries. In the Netherlands, the first record dates from 1949 (VAN DER HAMMEN, 1949b). The species which was reported the most in Belgium, is *Holocnemus pluchei*. Several hundreds to thousands of specimens were reported from 11 different locations (e.g. VAN KEER & VAN KEER, 2001 ; VAN KEER & VAN KEER, 2003). The intensive transport between our region and the region of origin of this species (the Mediterranean) probably results in multiple importation. The fact that despite this ancient heavy traffic, the species seems to have become established only within the past ten to fifteen years, may be due to a recent climate warming in our region. Moreover, the climate in the original area of distribution differs relatively little from ours, which will probably help the success

of the species in our country. To conclude, *Holocnemus* almost always looks for sheltered places where it is less exposed to the West-European winter cold.

The relatively high number of *Salticidae* (7 species) might surprise at first sight, but their high mobility and small size make them easy to transport unnoticed with luggage or freight.

With *Uloborus plumipes* the current sites (almost always on plants in heated greenhouses) still point towards an original importation on exotic plants.

Neozoan species

GEITER et al. (2002) defines a neozoan animal as one introduced by direct or indirect human mediation, to a region to which it is not native and where it has established a population. Only for a few spider species has reproduction on Belgian soil been established. Of the following species, one or more populations have been found:

- *Achaearanea acoorensis*
- *Crossopriza lyoni*
- *Heliophanus kochii**
- *Holocnemus pluchei*
- *Oecobius navus*
- *Pholcus opilionoides**
- *Uloborus plumipes*
- *Zoropsis spinimana*

(the species with * are "very likely imported", but were exclusively found in the open air and consequently further investigation may uncover natural colonization from neighbouring regions)

Some of the populations such as those of *Achaearanea acoorensis*, *Oecobius navus* and *Uloborus plumipes* are probably not viable outside the protected environment of heated greenhouses or other buildings for the present. The remainder of the species above quite possibly stand a good chance of long-term establishment in Belgium, be it often in a synanthropic environment.

The most promising "candidate-settler" at the moment is *Holocnemus pluchei*. This spider was not only found the most commonly and in the most locations, but preliminary observations show that the species reproduces massively in several locations and there seems to displace *Pholcus phalangoides* (VAN KEER & VAN KEER, 2001). During the mild Belgian winter of 2006-2007, *H. pluchei* even succeeded in hibernating in the open air (VAN KEER, pers. observation: Antwerp, 3/3/2007, tens of specimens in empty truck tyres next to building).

Very recent finds (not included in the list) (BART LUTIN-SMET, pers. comm. ; ROBERT BOSMANS, pers. comm.) of several specimens of *Zoropsis spinimana*, seem to indicate that the species has established a population in the city of Ghent. The spider has been caught in three different locations (several specimens in one location), with a maximum distance of 3.3 km between them. Also other reports (supported by photographs) from the Netherlands (RADBOUD KLOOS, pers. comm. ; ED NIEUWENHUYNS, pers. comm.) suggest this species may be establishing itself in our countries.

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Appendix: species list (P.C. = Personal communication, sometimes by finder but mostly by determiner; coll. JVK = Collection Johan Van Keer)

Species name	m	f	Date	Place	Circumstances	Leg.	Det.	Ref.
<i>Achaearanea acoreusis</i>	2		sept. 2002	Schoon	On Ceropetalas, bought on plant fair	H. Vanuytven	H. Vanuytven	17
"	2	3	22-10-2005	Antwerpen	Heated greenhouses Antwerp Zoo	K. Van Keer	J. Van Keer	coll. JVK
<i>Achaearanea venustiflora</i>	2	2	9-07-1992	Triselt	In drainage ditch	J. Van Keer	J. Van Keer	5
<i>Arctea atlanta</i>	1	1	14/11/2001	Antwerpen	On ceiling in barbourshed (along 5th dock)	J. Van Keer	J. Van Keer	15
<i>Brachypelma albopilosum</i>	1	1	1986	Antwerpen	With banana shipment	J. Van Keer	J. Van Keer	coll. JVK
<i>Cerbalus sp.</i>	1	1	Jun. 2000	Tessenderlo	Pitfall on dense slope with heather	J. Lambrechts	P. Jäger	11
<i>Crossopriza kyoni</i>	7	7	oct-nov 2001	Antwerpen	In and on warehouses in drains along roadside	K. Van Keer	B. Huber	15
"	4	7	2002-2003	Antwerpen	In and on warehouses in drains along roadside	K. Van Keer	J. Van Keer	16
"	1	2	10-11-2002	Duffel	In shed of aluminium works	J. Van Keer	J. Van Keer	16
"	2	2	27-09-2003	Gent	In transit warehouse of company trading American goods	J. Van Keer	J. Van Keer	16
"	1	1	28-10-2004	Duffel	In shed of aluminium works	J. Van Keer	J. Van Keer	coll. JVK
"	1	1	10-12-2004	Oudenaarde	In container from Vietnam (natural stone and tile company)	J. Van Keer	B. Gosshals	P.C.
"	7	7	12-09-2006	Antwerpen	In and on warehouses in drains along roadside	K. Van Keer, H. De Koninck	K. Van Keer	coll. JVK
<i>Cupimnius gestzi</i>	1	1	1991	Antwerpen	With banana shipment	H. Vanuytven	P. Stenwald	coll. JVK
<i>Eperigone eschatologica</i>	1	1	20-09-1997	Deturme	On Azalea (from Spain) bought in plant shop	H. Vanuytven	R. Bosmans	6
<i>Euryopis episcopioides</i>	2	2	30-07-2002	Duffel	In wood waste heap in shed of aluminium works	J. Van Keer	J. Van Keer	16
<i>Fanchia lucinda?</i>	1	1	7-05-1995	Melle	On external wall of house (resident just returned from France)	M. Alderweireldt	M. Alderweireldt	7
<i>Hadransius ornatius</i>	1	1	18-09-1999	Bree	In rubble in shed of tent company	J. Van Keer	J. Baerl	16
<i>Haplodrassus sp.</i>	1	1	aug. 1992	Waterschei	In pitfall on mine slag heap	M. Janssen	R. Bosmans	21
<i>Hasariella adamsi</i>	1	1	2002	Gent	Ghent University, TERIC, office Danny Van Acker	F. Hendricks, D. Vannacker	D. De Bakker, F. Hendricks	P.C.
<i>Heliophanus kochii?</i>	1	1	4-10-2006	Gent	Ghent University, botanical garden, greenhouse "Vietriokas"	B. D'hoedt	K. J. Lambrechts, F. Hendricks	P.C.
<i>Heteropoda venatoria</i>	10	15	4/5-15/6-2006	Antwerpen	South oriented slope in abandoned shunting-yard	K. Van Keer, H. De Koninck	J. Van Keer	12
"	1	1	1999	Mechelen	With wood shipment from Indonesia		G. Wychmans	9
"	1	1	6-01-2005	Oudenaarde	In container from Vietnam (natural stone and tile company)		B. Gosshals	P.C.
"	1	1	20-06-2005	Witrijk	In transit warehouse of company trading Asian goods	K. Van Keer	J. Van Keer	coll. JVK
"	1	1	8-09-2005	Antwerpen	In container from Georgia (USA)	K. Van Keer	J. Van Keer	coll. JVK
<i>Holcenus plichei</i>	7	7	1994-2000	Sleidinge	Dairy factory, imported with pallets from Italy and established	J. De Block	J. De Block	P.C.
"	1	1	autumn 2000	Oudenaarde	Dairy department of supermarket Delhaize	J. Gosshals	B. Gosshals	20
"	7	7	oct-nov 2001	Antwerpen	In and on warehouses in drains along roadside	K. Van Keer	J. Van Keer	15
"	7	7	2002-2003	Antwerpen	In and on warehouses in drains along roadside	K. Van Keer	J. Van Keer	16
"	7	7	2003	Antwerpen	On metal shed of barbour company	K. Van Keer	K. Van Keer	coll. JVK
"	1	1	14-07-2003	Antwerpen	On stone hut along river Scheldt	K. Van Keer	K. Van Keer	19
"	1	5	18-09-2003	Duffel	In shed of aluminium works	J. Van Keer	J. Van Keer	16
"	1	1	27-09-2003	Bree	In shed of tent rental company	K. Van Keer	J. Van Keer	16
"	7	7	27-09-2003	Gent	On transit warehouse of company trading American goods	K. Van Keer	J. Van Keer	16
"	3	3	4-08-2004	Ennepe	In building of drinks business	J. Van Keer	J. Van Keer	18
"	2	2	13-04-2005	Evere	In private house	H. Haenssens	K. Van Keer	P.C.
"	2	2	16-09-2005	Antwerpen	In printing company	K. Van Keer	K. Van Keer	19
"	7	7	12-09-2006	Antwerpen	In and on warehouses	K. Van Keer, H. De Koninck	K. Van Keer	coll. JVK
<i>Latreutes geometricus</i>	1	1	7-06-2006	Antwerpen	Harbour, in container from South America	J. Van Keer	J. Van Keer	coll. JVK

