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Spiders (Araneae) Chapter 7.3

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Abstract

A total of 47 spider species are alien to Europe; this corresponds to 1.3 % of the native spider fauna. They belong to (in order of decreasing abundance) Theridiidae (10 species), Pholcidae (7 species), Sparassidae, Salticidae, Linyphiidae, Oonopidae (4–5 species each) and 11 further families. There is a remarkable increase of new records in the last years and the arrival of one new species for Europe per year has been predicted for the next decades. One third of alien spiders have an Asian origin, one fifth comes from North America and Africa each. 45 % of species may originate from temperate habitats and 55 % from tropical habitats. In the past banana or other fruit shipments were an important pathway of introduction; today potted plants and probably container shipments in general are more important. Most alien spiders established in and around human buildings, only few species established in natural sites. No environmental impact of alien species is known so far, but some alien species are theoretically dangerous to humans.

Keywords

Buildings, urban area, greenhouse, pathways, venomous spiders, Europe, alien

7.3.1 Introduction

Spiders are among the most diverse orders in arthropods with a world-wide distribution in all terrestrial habitats and more than 40,000 species, grouped in 109 families (Platnick 2008). The European spider fauna comprises nearly 3600 species of which 47 (= 1.3 %) are alien to Europe, i.e. their area of origin is outside Europe. An additional number of at least 50–100 species are alien within Europe, i.e. they originate, e.g., from the Mediterranean or from eastern parts of Europe and spread gradually into other parts of Europe. Such aliens within Europe are not considered here. Small scale spread, e.g., into an adjacent country, is also not considered here.

All spiders are predators and usually prey on arthropods, mainly insects. Since many insects are regarded as pests, spiders are often seen as beneficial. Spiders have unique features such as abdominal silk glands which are used in many ways (e.g., construction of retreat, cocoon, web or dragline) and venom glands to poison their prey (only two families deviate from this). Spiders developed many different ways to catch their prey. Roughly half of them build silken webs to subdue prey and they evolved a large variety of web types. Funnel webs are usually soil-born and closely connected to the retreat of the spider (such as Agelenidae and Amaurobiidae), sheet webs are more often found within the vegetation (examples are Linyphiidae and Theridiidae) and orb webs often bridge the open space between structures (Araneidae and Tetragnathidae). Spiders which do not build a web live as sit-and-wait predators (e.g., Clubionidae, Gnaphosidae, Lycosidae, Sparassidae, and Thomisidae) or actively hunt for prey (such as Salticidae).

For this compilation of alien spiders to Europe the DAISIE database (www.europe-aliens.org) was used. In addition a variety of further sources (cited below) was consulted. When speaking about alien species two main problems occur. (1) It may be unclear whether a species is native to Europe or not, e.g., because it is native in an area close to the European borders. This concerns primarily Mediterranean and North or East Palearctic species. We choose a very conservative attitude and did not consider such species. It may also be difficult to decide whether a Holarctic species originates in the Nearctic or in the Palearctic part of the Arctic. We tried to follow the most probable decision. (2) We included only established alien species. In some cases it may be difficult to decide on this because sometimes the discovery of an alien species is communicated but no follow-up reports on its establishment are available. Again, we tried to achieve the most probable point of view. For example, all the reports on tropical Ctenidae or Theraphosidae arriving with banana shipments in Europe never lead to an established population of these spiders and were therefore not included into our chapter.

7.3.2 Taxonomy of alien species

The 47 spider species alien to Europe belong to 17 families (Table 7.3.1) with Theridiidae (10 species) and Pholcidae (7 species) being the most species-rich families. Sparassidae comprise five species; Salticidae, Linyphiidae and Oonopidae comprise four species each. Eleven families are represented with only one or two species each. The most astonishing aspect of the composition of the alien spider fauna is that it neither reflects the structure of the global spider community nor the structure of the European spider fauna (Fig. 7.3.1).

Globally frequent families (such as Araneidae, Corinnidae, Lycosidae, Theraphosidae, and Zodariidae) are not represented at all among the alien species in Europe. This may be due to some specialisations or restrictions of most species in these families: Araneidae and Corinnidae are usually not associated with human infrastructure and have a rather low probability of becoming transported to foreign areas (see below). Most Theraphosidae ("tarantulas") depend on their specific microclimate and are among the largest spiders, thus easy to detect and avoid. Lycosidae were also not imported to Europe and the reason for this remains unknown.

Other families are overrepresented among the alien community: Sicariidae, Oonopidae, Sparassidae, Pholcidae, and Theridiidae. Their common feature is a preadaptation to human infrastructure, especially buildings. Many species from these families initially live on bark and rocks and/or in arid habitats, thus, they tolerate the dry climate in houses and in urban areas. They can easily sit at the vertical sides of containers (Sparassidae), hide at the underside of pallets or in cracks and cavities (Pholcidae, Theridiidae) or are simply so tiny that they fit everywhere in (Oonopidae).

The composition of the spider fauna in Europe will become strongly influenced by alien newcomers if the trend of the last decades continues. Eresidae, Prodidomidae, Scytodidae, and Oonopidae were so far rare families in Europe. Sparassidae and Pholcidae comprise only a few species and the alien add-on may lead to a situation where some families are dominated by alien species. Sicariidae did not even occur previously in Europe.

7.3.3 Temporal trends

In the past, there was hardly any systematic check for alien spiders in imported goods. In contrast to herbivores where damage to plants may be of economic importance, alien spiders were only occasionally recorded. Exceptions may be border controls of banana shipments and similar goods because such transports enabled large and dangerous animals to enter Europe. In general, information on arrival data of alien spiders is scarce and when using the date of a scientific publication as a proxy, this information may be considerably fuzzy because some publications compile data of a long period; e.g., for 26 years in Van Keer (2007).

12 first species records were collected in the 19th century, 24 records came from the 20th century and already 11 records were perceived in the first years of the 21st century. This in itself indicates a steep increase in recording alien species. Of course, it should not be overlooked that the public awareness of alien species and the number of experts increased in the last decades considerably. Both accelerate the probability of detecting new spider introductions.

Kobelt and Nentwig (2008) analysed the arrival of 87 alien spider species with known arrival date (alien to Europe and alien within Europe) and concluded that the known number of alien spider introductions still represents an underestimation. They predict a continuous trend of more alien species and give the figure of at least one additional alien spider species annually arriving in Europe in the near future.

7.3.4 Biogeographic patterns

One third of all alien spiders have an Asian origin. This may include Eastern Palearctic and Indo-Malayan, thus temperate and tropical areas. About one fifth of the species derive from North America and Africa each, and South America and Australia contribute only four species each. In a few cases the origin is not known or subjected to expert guess (Fig. 7.3.2). Such cosmopolitan species are not truly cosmopolitan because they have of course a defined area of origin, but due to early spread among many or all continents and due to lacking phylogeographical information, it is sometimes still impossible to solve such a puzzle. These results suggest that the closer a continent is (Palaearctic) and the more traffic and goods exchange exists (Asia, North America), the more alien species are also imported.

An analysis between temperate and tropical origins indicates that about 45 % of species may originate from temperate habitats and 55 % from tropical habitats. Uncertainty, however, is high because for many species nothing or not very much is known about the natural environment in which they live in their area of origin.

7.3.5 Main pathways to Europe

Kobelt and Nentwig (2008) analysed the origin of alien spider species in Europe and the intensity of trade between Europe and the native area of these alien spiders in a continent by continent comparison. By including trade volume, area size, and geographical distance, they clearly could demonstrate that trade volume, size of the area of origin, and the geographical distance to Europe are good indicators for the number of alien species transported to Europe. The volume per time curves of agricultural products and mining products fit the increase of alien spiders less well than the curve for manufactures, and therefore it is concluded that the first have a lower number of alien stowaways whereas manufactures have the highest potential to transport alien species (Fig. 7.3.3).

More in detail, spiders can survive shipment in or at containers or construction materials for periods long enough to reach most other continents. The rare collection notes on spiders which had been recorded during or after this voyage suggest that spiders frequently occur in container (e.g., with stones, wood, other products), in or at wooden boxes, at wooden pallets, and within shipments of logs or wood products. Consequently, many alien spiders are detected in a harbour, in buildings at or close to a harbour, and in or at warehouses (Van Keer 2007).

Up to the 1980s, many alien spiders were detected in banana or other fruit shipments (Forsyth 1962, Reed and Newland 2002). This does not only represent a pathway from a tropical area of origin to Europe, it also enables the spider to travel within Europe. With increasing technical standards to supply the fruits with optimal transport conditions (usually low temperature, oxygen reduction to 1–5 % and a carbon dioxide increase to 1–10 %, see also Hallman (2007)), spiders have less chances to survive this (but see Craemer 2006).

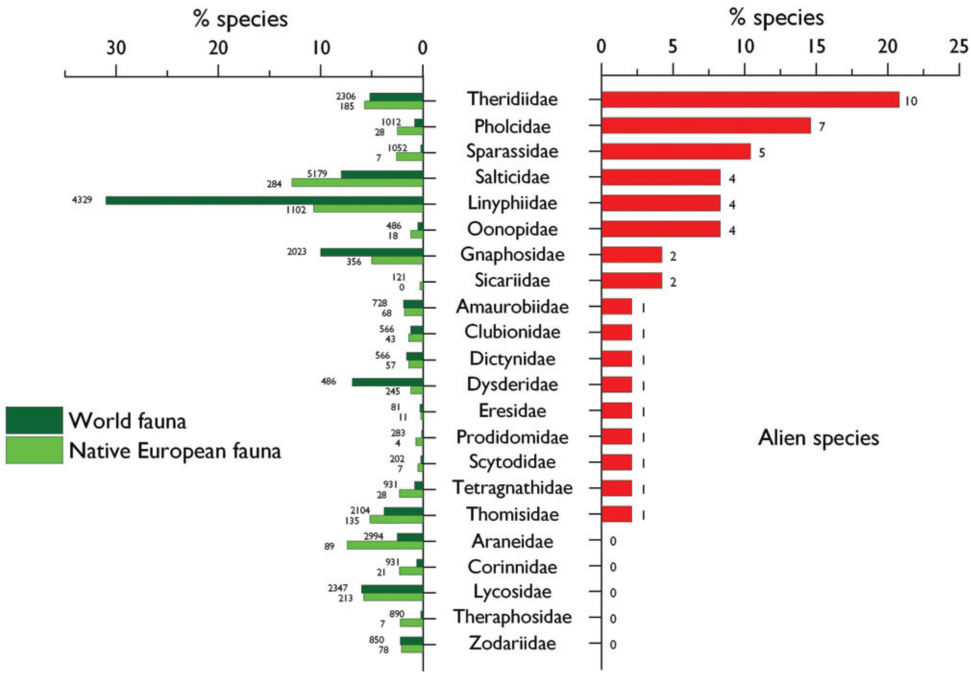

Figure 7.3.1 Taxonomic overview of the spider species alien to Europe compared to the native European fauna. Right- Relative importance of the spider families in the alien fauna expressed as the percentage of species in the family compared to the total number of alien spiders in Europe. Families are presented in a decreasing order based on the number of alien species. The number over each bar indicates the total number of alien species observed per family. Left- Relative importance of each family in the native European fauna of spiders and in the world fauna expressed as the percentage of species in the family compared to the total number of spiders in the corresponding area. The number over each bar indicates the total number of species observed per family in Europe and in the world, respectively.

Transported plants represent a very important pathway for spiders. This hardly concerns cut flowers but potted plants and plants for planting. There are numerous anecdotes that plants bought in supermarket, in a plant shop or at a plant fair contained a spider or a spider cocoon. Since a considerable amount of such potted plants is produced in China and transported through Italy to different European countries, this indicated the importance of plants as pathway from Asia to Europe.

For the further spread of alien spiders within Europe, it is assumed that transport vehicles such as trucks or trains play an important role. The spread of *Zodarion rubrum*, formerly only known from the French Pyrenees, followed in the last 100 years the main railway connections within Europe. This allowed the small spider to hitchhike over large distances (Pekár 2002). Hänggi and Bolzern (2006) discuss this phenomenon and give evidence for additional species. Spread by vehicles also may explain the fact that quite often the first record of an alien spider had been made at roadsides or in drains along roadsides (Van Keer 2007).

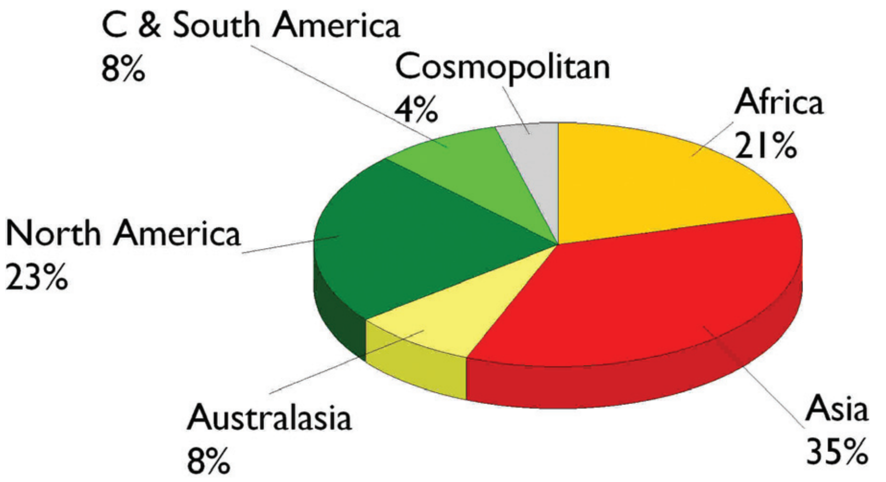

Figure 7.3.2 Geographic origin of the 47 spider species alien *to* Europe.

In a country-wise comparison within Europe, France, Belgium, The Netherlands, Germany and Switzerland possess the highest numbers of alien spider species (Fig. 7.3.4). These countries are also the ones with the highest level of imports (Fig. 7.3.5). On the other side, the Balkan countries have much lower numbers of alien spiders and Norway, the Baltic States, Belarus, and Russia have the lowest numbers of alien spiders. There is a good correlation between this type of economic activity and the number of alien species, thus, on the country level a comparable picture to the continental level of Kobelt and Nentwig (Kobelt and Nentwig 2008) is obtained.

7.3.6 Most invaded ecosystems and habitats

Nearly half of all alien spider species occur only in buildings and/or urban areas. This may be species which inhabit walls of buildings or need the specific microclimatic conditions of houses. One third of all alien species live in greenhouses, botanical gardens, in zoo buildings, or in comparably warm buildings. They rely on the specific temperature conditions but nevertheless are able to establish permanent populations (Holzapfel 1932, Van Keer 2007). In the summer season, in southern countries and under the conditions of climate change some species can colonise the vicinity of buildings and have the potential of further spread.

Only five among 47 alien spiders so far were able to establish in natural habitats. They usually are small-sized species, belonging to families which are common in Europe (Dictynidae, Linyphiidae, Tetragnathidae), and they build sheet webs or small orb webs. They originate from North America, Japan and the temperate part of Australia or New Zealand. These parameters probably indicate the conditions which an alien spider should fulfil to be able to survive in natural habitats in Europe.

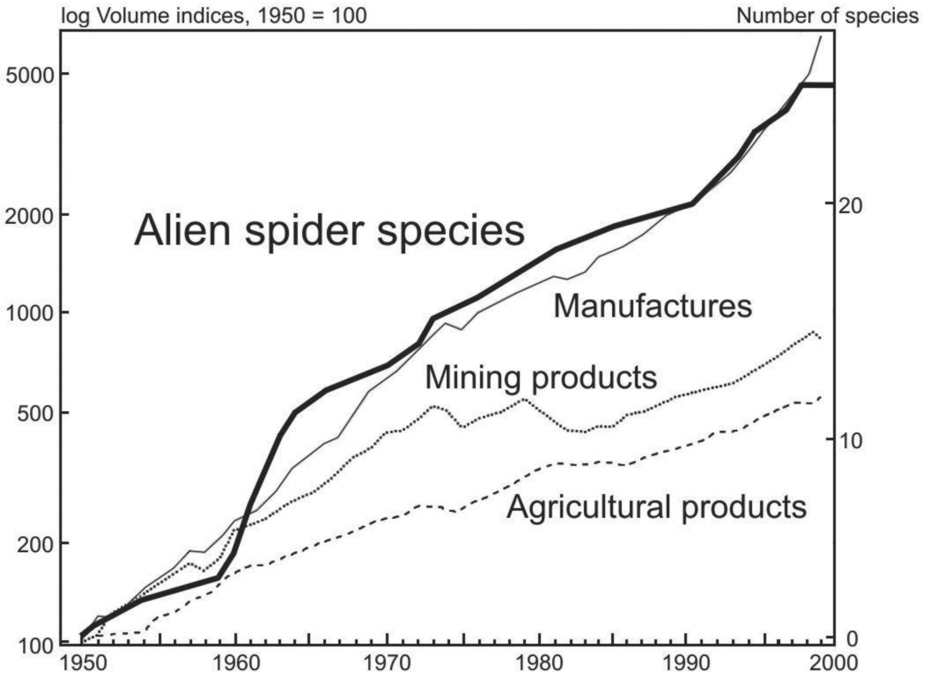

Figure 7.3.3 Increase in global trade (left scale) and the cumulative number of alien spider species introductions (right scale) during the last 50 years. Only cases with known year of introduction are included - from Kobelt and Nentwig (2008).

An interesting reason for the obvious high establishment success of alien spiders in human buildings may be found in the rarity of native species at such conditions. This could mean that alien species have much better chances to establish in habitats with no competition by native species.

7.3.7 Ecological and economic impact

A family-wise comparison of body sizes of alien and European spider species showed that alien Theridiidae imported to Europe were significantly larger than the native species, Pholcidae and Salticidae showed a trend into the same direction. Kobelt and Nentwig (2008) argue that this reflects the physical transport conditions, especially of temperature and humidity inside a standard ship container (Diepenbrock and Schieder 2006, Naber et al. 2006). These are important stress factors which primarily affect small specimen and can be more easily compensated by large spiders (Pulz 1987). So, even if spiders of all body sizes and from all continents would have more or less equal possibilities to be shipped around the globe, larger species have better chances to survive transportation than smaller ones do.

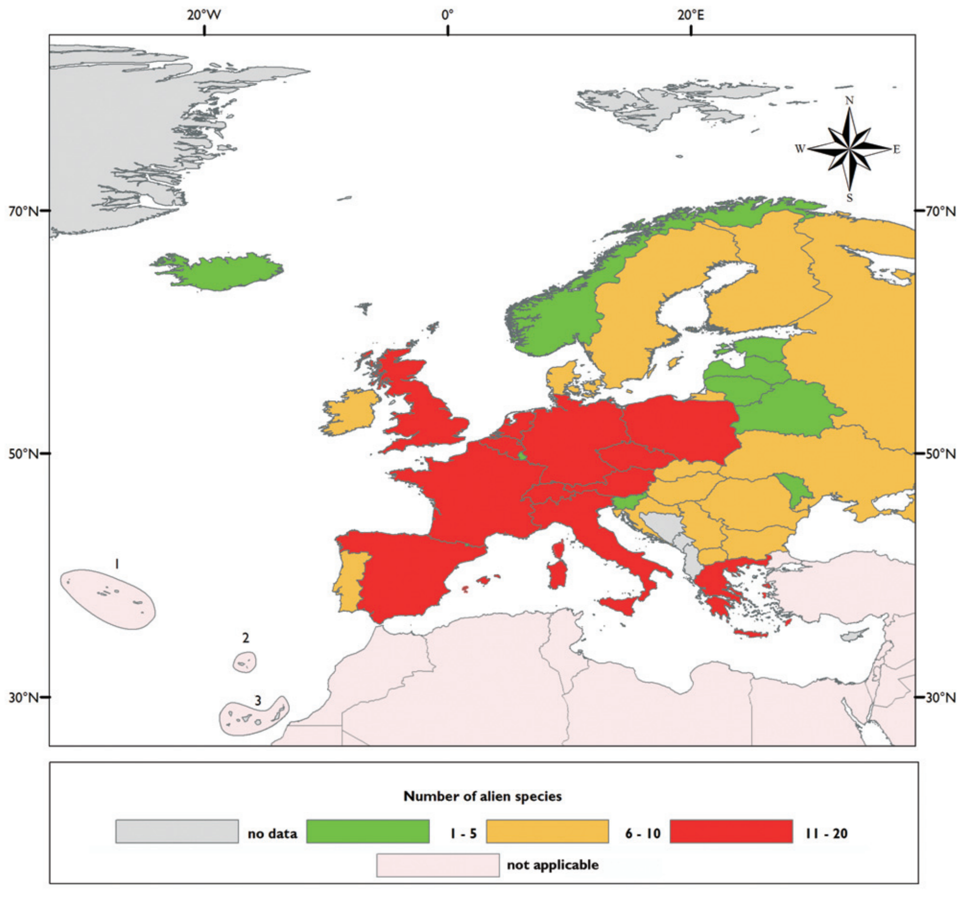

Figure 7.3.4 Number of alien spider species for each European country.

If alien species could successfully invade European spider assemblages in natural habitats, it could be argued that due to their slightly larger body size they could compete with native species and suppress or even replace them. This would change the dominance structure in natural spider communities within a few years. So far, however, most alien species do not occur in natural spider communities and / or remained rare. Therefore, in Europe no influence of alien spider species on native spiders had been observed so far. This is in agreement with a two-year-analysis of spider communities in California were the occurrence of alien spider species did not negatively affect native species. The most productive habitats contained both the highest proportion of alien and the greatest number of native spiders. No negative associations between native and alien spiders could be detected and, thus, Burger et al. (2001) concluded that the alien spiders do not impact native ground-dwelling spiders.

The most frequently occurring alien spider in Europe is probably the North American linyphiid *Mermessus trilobatus,* first detected in southern Germany in the 1980s and spreading since then. Only in the last years it had been detected that it obviously easily

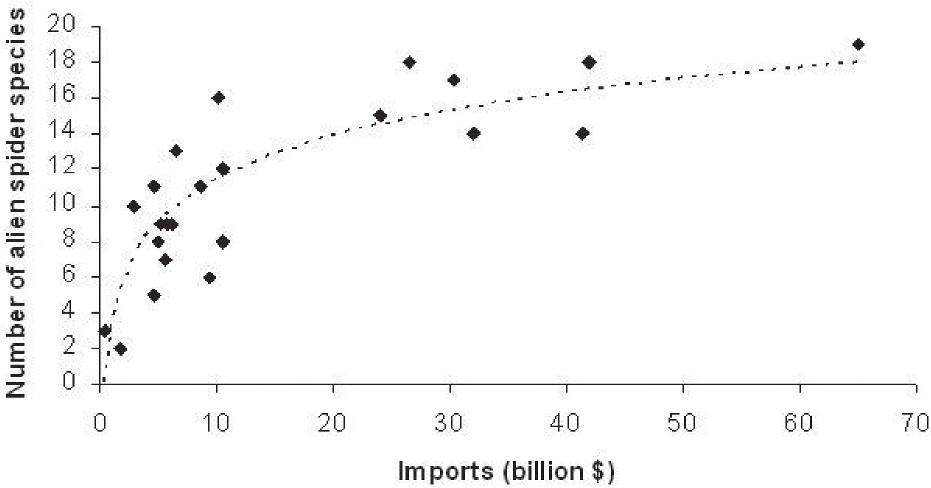

Figure 7.3.5 Relationship between the number of alien spider species and the value of imported goods in European countries (economic data for 2005).

establishes in many natural spider communities, especially in grassland and ruderal habitats (Schmidt et al. 2008). With an average body length of 1.6–2.1 mm (Nentwig et al. 2003), *M. trilobatus* belongs to the smaller linyphiids and it is unlikely that it outcompetes a native species. Competition experiments indeed proved that the invasion success of *M. trilobatus* is not facilitated by strong competitiveness. Actually it is unknown if other traits (e.g., higher reproduction effort, better dispersal abilities, or nutritional aspects) give some competitive advantage over native species (Eichenberger et al. 2009). So far, the integration success of *M. trilobatus* into native spider communities seems to confirm the assumption of Burger et al. 2001 on the resilience of native spider communities.

An economic impact of spiders may be expected from those spider species which are venomous to humans. Among the alien spiders listed here (Table 7.3.1) species which may be considered as theoretically dangerous to humans comprise the sicariids *Loxosceles laeta* and *L. rufescens* and the Australian black widow *Latrodectus hasselti* (Forster 1984). We are, however, not aware of any report from Europe referring to bites from these species. This is in line with the general assumption that the frequency of spider bites is overestimated (Vetter et al. 2003). Additionally it may be possible that these alien species did not reach relevant densities or that they even did not establish in the long term.

Spiders are also known to pollute the faces of buildings and the interior of rooms by their silk spinning activity. Spider webs often stay for long, collect dust and dirt, and are the reason for additional cleaning procedures which cause costs for hygienic reasons. There are only very few reports on this and they only refer to the Mediterranean dictynid spider *Dictyna civica* spreading since more than 50 years in Central Europe (Billaudelle 1957, Hertel 1968) which occasionally colonises the outside surface of buildings in high densities. Also many native species live inside buildings and cause

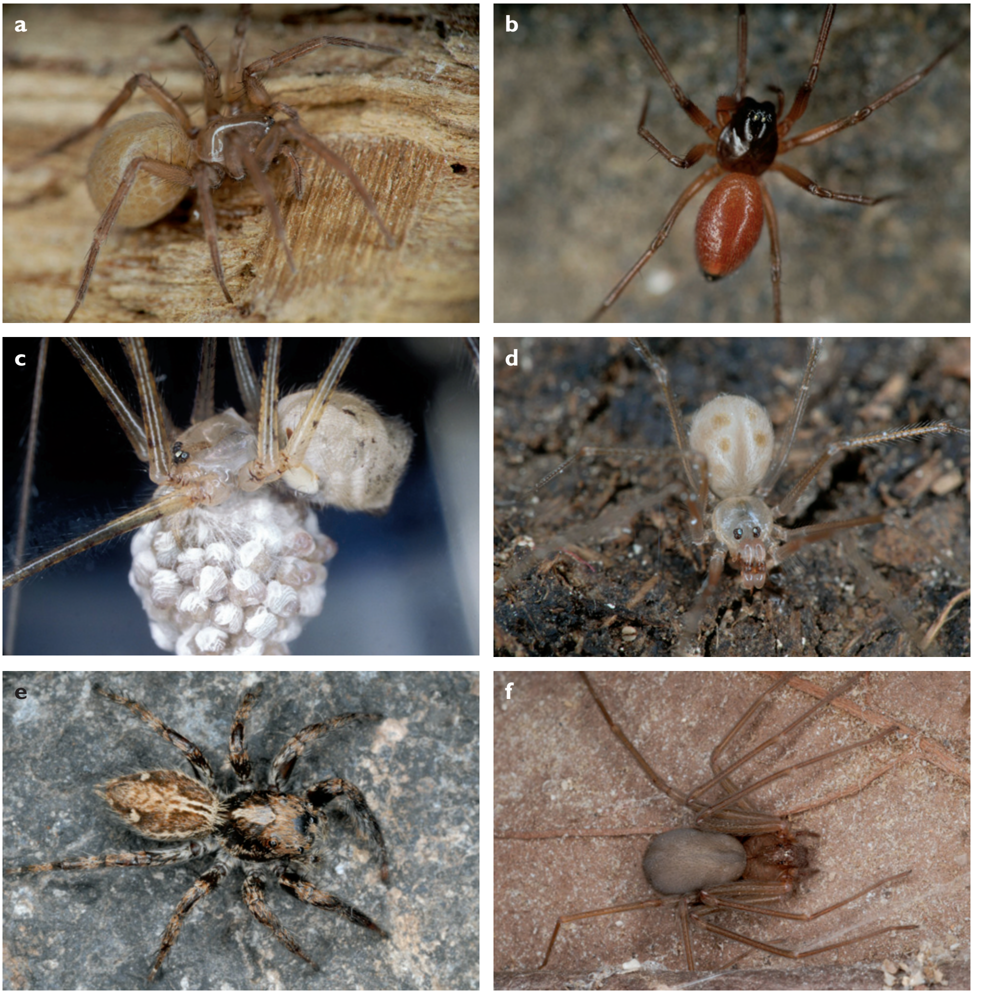

Figure 7.3.6. Alien spiders. **a** *Cicurina japonica* female (Dictynidae) **b** *Ostearius melanopygius* female (Linyphiidae) **c** *Crossopriza lyoni* female with eggsac (Pholcidae) **d** *Spermophora senoculata* male (Pholcidae) **e** *Plexipus paykulli* female (Salticidae) **f** *Loxosceles rufescens* female (Sicariidae). Reprinted with kind permission of Jǿrgen Lissner (© Jǿrgen Lissner, http://www.jorgenlissner.dk).

regular cleaning activities due to their web spinning activity but no report concerns additional cleaning costs. Since alien species are much less abundant, such additional costs are not to be expected or they will be merged with cleaning costs which anyhow have to be achieved. In addition, it should not be underestimated that many people simply fear spiders and react with insecticidal applications which involves financial costs and may cause health problems. This, however, concerns native and alien spiders likewise.

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Table 7.3.1 List and main characteristics of the spider species alien to Europe. Area of origin: since the area of origin is quite often not well known, this refers to the most probable origin. "cosmopolitan" means that the area of origin is outside Europe but not known, "cosmopolitan" in brackets gives an alternative explanation, South America refers to the tropical part of America. Country codes abbreviations refer to ISO 3166 (see appendix I). Only selected references are given. Last update 30.09.2008.

Family *Species*	**Area of origin**	**First record in Europe**	**Invaded countries**	**Habitats**	**Refs**
Amaurobiidae					
Amaurobius similis (Blackwall 1861)	North America (cosmopolitan)	1915, DK	AD, BE, CH, DK, DE, ES, FR, GB, IE, MD, NL, NO, PL, RO, SE, UA	J1	Fauna Europaea (2005), Harvey (2002), Sacher (1983), Jonsson pers. comm. (2005), Scharff pers. comm. (2005)
Clubionidae					
Clubiona facilis O. P.-Cambridge 1910	Australia	1932, GB	GB	U	Fauna Europaea (2005), Platnick (2008)
Dictynidae					
Cicurina japonica (Simon 1886)	Asia	1990, DE	DE, CH, DK	E, F, G, H, I	Blick and Hänggi (2003), Wunderlich and Hänggi (2005)
Dysderidae					
Dysdera aculeata Kroneberg 1875	Asia	1988 HR	HR	U	Deeleman-Reinhold and Deeleman (1988)
Eresidae					
Seothyra perelegans Simon 1906	Africa	1906 FR	FR	U	Fauna Europaea (2005)
Gnaphosidae					
Sosticus loricatus (L. Koch 1866)	Asia	1879, SK	AT, BG, BY, CS, CZ, DE, EE, FI, FR, GR, HU, IT, LV, LT, MK, PL, RO, RU, SK	J1	Fauna Europaea (2005), Sacher (1983), Terhivuo (1993), Pekar pers. comm. (2005)
Zelotes puritanus Chamberlin 1922	North America	1966, CZ	AT, CH, CR, CZ , DE, LI, NO, RU, SE, SK	J1	Fauna Europaea (2005), Komposch (2002), Pekar pers. comm. (2005)
Linyphiidae					
Erigone autumnalis Emerton 1882	North America	1990, CH	CH, IT	E, F, G, H, I	Blick and Hänggi (2003), Fauna Europaea (2005)
Mermessus denticulatus (Banks, 1898) (=*Eperigone eschatologica*)	North America	1995, BE	BE, CH, DE, ES, NL	J1, J2.43	Blick (2004), Blick and Hänggi (2003), Fauna Europaea (2005)
Mermessus trilobatus (Emerton 1882)	North America	1980, DE	AT, BE, CH, DE, IT, PL	E, F, G, H, I	Blick and Hänggi (2003), Fauna Europaea (2005)
Ostearius melanopygius (O. P.-Cambridge 1879)	Australia	1906, GB	AT, BE, BG, CH, CZ, DE, DK, ES, FR, FI, GB, IT, NL, PT, PL, RO, SE, SK	E, F, G, H, I	Blick and Hänggi (2003), Fauna Europaea (2005), Komposch (2002), Ruzicka (1995), Pekar pers. comm. (2005), Scharff pers. comm. (2005)

Family *Species*	**Area of origin**	**First record in Europe**	**Invaded countries**	**Habitats**	**Refs**
Oonopidae					
Diblemma donisthorpei O. P.-Cambridge 1908	Asia	1914, GB	GB	J1	Platnick (2008), Saaristo (2003)
Ischnothyreus lymphaseus Simon 1893	Asia	2005, FR	FR	U	Fauna Europaea (2005)
Ischnothyreus velox Jackson 1908	Asia	2003, DE	DE, GB, NL	J2.43	Blick (2004), Fauna Europaea (2005), Saaristo (2003)
Triaeris stenaspis Simon 1891	North America	1896, FR	BE, FI, FR, IE, SK	J1, J100	Blick (2004), Fauna Europaea (2005), Holzapfel (1932), Koponen (1997), Van Keer (2007), Pekar pers. comm. (2005)
Pholcidae					
Artema atlanta Walckenaer 1837	Africa	2001 BE	BE, GB, GR	J1	Blick (2004), Blick and Hänggi (2003), Fauna Europaea (2005), Lee (2005), Platnick (2008), Van Keer (2007)
Crossopriza lyoni (Blackwall 1867)	Africa	2004, BE	BE	E, F, G, H, I, J1	Blick (2004), Van Keer (2007)
Micropholcus fauroti (Simon 1887)	Africa	2001, BE	BE, CH	J1	Blick (2004), Blick and Hänggi (2003), Platnick (2008), Van Keer (2007)
Pholcus opilionoides (Schrank 1781)	Asia	1859, CZ	AD, AT, BG, CH, CS, CZ , DE, ES, FR, GR, HR, HU, IT, LI, LU, MD, MK, MT, PL, PT, RO, RU, SK, UA	J1	Fauna Europaea (2005), Sacher (1983), Pekar pers. comm. (2005)
Pholcus phalangioides (Fuesslin 1775)	Asia	1857, SK	AT, BE, BG, BY, CH, CS, CZ , DE, DK, ES, FI , FR, GB, GR, HU, IE, IS, IT, LI, LT, LU, MD, MK, MT, NO, NL, PL, PT, RO, RU, SE, SK, UA	J1	Fauna Europaea (2005), Holzapfel (1932), Komposch (2002), Sacher (1983), Terhivuo (1993), Valesova-Zdarkova (1966), Jonsson pers. comm. (2005), Pekar pers. comm. (2005), Scharff pers. comm. (2005)
Smeringopus pallidus (Blackwall 1858)	Africa	2004, NL	NL	J1, J2.43	Blick (2004)
Spermophora senoculata (Dugès 1836)	Africa	1976, SK	BE, BG, CH, CS, ES, FR, GR, HR, IT, MK, MT, PT, SI, SK, UA	J1, J100	Blick (2004), Fauna Europaea (2005), Platnick (2008), Pekar pers. comm. (2005)

Family *Species*	**Area of origin**	**First record in Europe**	**Invaded countries**	**Habitats**	**Refs**
Prodidomidae					
Zimiris doriai Simon 1882	Asia	2005, DE	DE	J1	Jäger (2005)
Salticidae					
Hasarius adansoni (Audouin 1826)	Africa	1901, FR	BE, CH, CZ, DE, DK, ES, FR, GR, IE, IT, MT, NL, PL	J2.43	Blick and Hänggi (2003), Bosmans and Vanuytven (2002), Fauna Europaea (2005), Hänggi (2003), Holzapfel (1932), Pekar pers. comm. (2005), Scharff pers. comm. (2005)
Menemerus bivittatus (Dufour 1831)	Africa	1831, ES	CZ, ES, FR, GB, IT, PT	J1	Fauna Europaea (2005), Montardi (2006)
Panysinus nicholsoni (O. P.-Cambridge 1899)	Asia	2005, FR	FR	J1	Fauna Europaea (2005)
Plexippus paykulli (Audouin 1826)	Asia	1819, FR	ES, FR, GB, GR, IT, MT	J1	Fauna Europaea (2005), Montardi (2006)
Scytodidae					
Scytodes venusta (Thorell 1890)	Asia	2004, NL	NL	J1	Blick (2004), Fauna Europaea (2005), Platnick (2008), Pekar pers. comm. (2005)
Sicariidae					
Loxosceles laeta (Nicolet 1849)	South America	1963, FI	FI, IT	J1	Fauna Europaea (2005), Huhta (1972)
Loxosceles rufescens (Dufour 1820)	North America (cosmopolitan)	1820, ES	ES, FR, GR, HR, IT, NL, MT, PT	J1, J2.43	Blick (2004), Fauna Europaea (2005)
Sparassidae					
Barylestis scutatus (Pocock 1903)	Africa	1961, IE	IE	J1	Forsyth (1962)
Barylestis variatus (Pocock 1899)	Africa	1961, IE	GB, IE	J1	Forsyth (1962), Slawson (2000)
Heteropoda venatoria (Linnaeus 1767)	Asia	1960, CZ	CH, CZ, DE, DK, ES, NL, NO, PL	J2.43	Blick and Hänggi (2003), Fauna Europaea (2005), Hänggi (2003), Ruzicka (1995), Valesova-Zdarkova (1966), Ruzicka pers. comm. (2005), Scharff pers. comm. (2005)
Olios sanctivincentii (Simon 1897)	Asia	1961, IE	GB, IE	J1	Forsyth (1962), Slawson (2000)
Tychicus longipes (Walckenaer 1837)	Asia	1837, NL	NL	J2.43	Platnick (2008)

Family *Species*	**Area of origin**	**First record in Europe**	**Invaded countries**	**Habi-tats**	**Refs**
Tetragnathidae					
Tetragatha shoshone (Levi 1981)	North America	1992, DE	AT, CZ, DE, HU, MK, RO, SK	E, F, G, H, I	Fauna Europaea (2005)
Theridiidae					
Achaearanea tabulata Levi 1980	South America	1991, AT	AT, CH, DE, PL, RU, BG, UA	J1	Blick and Hänggi (2003), Fauna Europaea (2005)
Achaearanea acoreensis (Berland 1932)	North America	2002, BE	BE	J1, J2.43	Van Keer (2007)
Achaearanea tepidariorum (C.L. Koch 1841)	South America (cosmopolitan)	1867, AT	AT, BE, BG, CH, CZ, DE, DK, ES, FI, FR, GB, GR, HU, HR, IE, IS, IT, LV, LI, MK, MT, NL, NO, PL, PT, RO, RU, SK, SE, UA	J1	Fauna Europaea (2005), Komposch (2002), Sacher (1983), Valesova-Zdarkova (1966), Koponen pers. comm. (2005), Pekar pers. comm. (2005), Scharff pers. comm. (2005)
Achaearanea veruculata (Urquhart 1885)	Australia	1885, BE	BE, GB	J1, J2.43	Blick (2004), Platnick (2008), Van Keer (2007)
Chrysso spiniventris (O. P.-Cambridge 1869)	Asia	1949, NL	NL	J2.43	Blick (2004)
Coleosoma floridanum Banks 1900	Asia	1981, GB	AT, CH, DE, FI, GB, NL	J1, J2.43	Blick (2004), Blick and Hänggi (2003), Fauna Europaea (2005), Hänggi (2003), Harvey (2002), Komposch (2002)
Latrodectus hasselti Thorell 1870	Australia	2001, BE	BE, DK	J2.43	Blick (2004), Platnick (2008), Scharff pers. comm. (2005)
Nesticodes rufipes (Lucas 1846)	South America	1996, AT	AT, BE, CZ, ES, MT, PT	J2.43	Blick (2004), Komposch (2002), Van Keer (2007)
Steatoda grossa (C.L. Koch 1838)	Cosmopolitan	1850, SE	AT, BE, BG, BY, CS, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LT, LV, MD, MK, MT, NL, PL, PT, RO, RU, SE, SI, SK , UA	J1	Fauna Europaea (2005), Komposch (2002), Sacher (1983), Valesova-Zdarkova (1966), Jonsson pers. comm. (2005), Pekar pers. comm. (2005), Scharff pers. comm. (2005)
Steatoda triangulosa (Walckenaer 1802)	Cosmopolitan	1852, AT	AD, AT, BE, BG, CH, CS, CZ, DE, ES, FR, GB, GR, HR, HU, LV, MK, MT, NL, PT, RO, RU, SI, SK, UA	J1	Fauna Europaea (2005), Harvey (2002), Komposch (2002), Valesova-Zdarkova (1966), Scharff pers. comm. (2005)
Thomisidae					
Bassaniana versicolor Keyserling 1880	North America	1932, FR	FR	U	Fauna Europaea (2005)