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Coleoptera families other than Cerambycidae, Curculionidae *sensu lato*, Chrysomelidae *sensu lato* and Coccinelidae Chapter 8.5

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Abstract

Here we consider 274 alien Coleoptera species belonging to 41 of the 137 beetle families in Europe (Cerambycidae, Curculionidae *sensu lato*, Chrysomelidae *sensu lato* and Coccinelidae are treated separately elsewhere). Among the families we consider as having invaded the European fauna, Acanthocnemidae and Ptilodactylidae represent new arrivals. Many species-rich families have surprisingly few aliens, whereas some relatively minor families such as Dermestidae, Nitidulidae and Anobiidae have a relatively high representation of alien species. Since the start of the 19th century, the number of coleopteran aliens introduced into Europe has continued to increase. Alien species colonizing Europe derive from a wide range of geographic regions as well as ecozones, but the most important source area is Asia. The countries with the largest number of alien species established are France, Germany and Italy. The majority have been introduced accidentally via international transport mechanisms. The most important route for importation is stored products and crops, followed by transport of wood, then horticultural and ornamental plants. Most alien species in these families are found within anthropogenic habitats in Europe. The introduction of invasive alien beetles in these families has had significant economic impacts, particularly as pests of stored foodstuffs, as well as serious ecological impacts. For example, the buprestid species *Agrilus planipennis*, recently recorded in Russia, is an important potential economic threat which may also impact the biodiversity associated with ash trees.

Keywords

Europe, beetles, Dermestidae, Nitidulidae, Anobiidae, alien species, invasive species, stored products, pests

8.5.1. Introduction

Introductions of alien species in Europe started in ancient times (Genovesi and Shine 2003), but this phenomenon has grown rapidly during the two last centuries. This is considered largely to be a consequence of the globalization of trade (Smith et al. 2007). Among these introductions, Coleoptera dominate the alien terrestrial invertebrates in Europe, where the fauna consists of over 27,000 species in 137 families (Fauna Europaea Web Service). In addition to the alien species observed in the families Cerambycidae, Curculionidae (*sensu lato*), Chrysomelidae (*sensu lato*) and Coccinelidae, which were treated in the preceding chapters, 274 other beetles of exotic or cryptogenic origin have been established to date in Europe (Table 8.5.1). These alien species belong to 41 different families. Additionally, 237 species are considered to have been introduced through human activity from one region of Europe to another (Table 8.5.2). However, the cause of such movements are often difficult to ascertain, particularly where the original range is poorly known. Thus, the analyses detailed below will mostly consider the species alien *to* Europe.

8.5.2 Diversity of alien coleopteran species

The Coleoptera families treated here with the greatest number of species in Europe are Staphylinidae (rove beetles), Carabidae (ground beetles) and Tenebrionidae (darkling beetles) but these have proportionally few alien species (figure 8.5.1). These three families constitute an important component of the European ground fauna (Dajoz 2002). Conversely, the families with the most aliens in Europe and significant economic impact tend to be families with relatively few native species such as Dermestidae (carpet beetles), Nitidulidae (sap-feeding beetles) and Anobiidae (death-watch beetles). Two of the 41 families do not have any native species in Europe and they are new arrivals for the European fauna: Acanthocnemidae (little ash beetles) and Ptilodactylidae (toe-winged beetles). The following presentation of families follows the taxonomic classification of Fauna Europaea (Fauna Europaea Web Service) and of the Tree of Life Web Project (Maddison et al. 2007) (for Ptilodactylidae, not included in Fauna Europaea).

ADEPHAGA

The **Carabidae,** are widespread and known to colonize a great diversity of ecological niches (Denux et al. 2007, Holland 2002). They are typically predators (as larvae and adults), although some groups (e.g. Harpalinae) have evolved toward granivory (feeding on seeds). These life traits do not favour passive transportation by humans, and thus, only eight alien species have been established in Europe, accounting for approximately 0.2% of the European carabid fauna. Among these, *Somotrichus unifasciatus*, *Trechicus nigriceps* and *Plochionus pallens* have benefited from the global trade in food products to become cosmopolitan, being introduced with cargos of groundnuts, rice, broad beans,

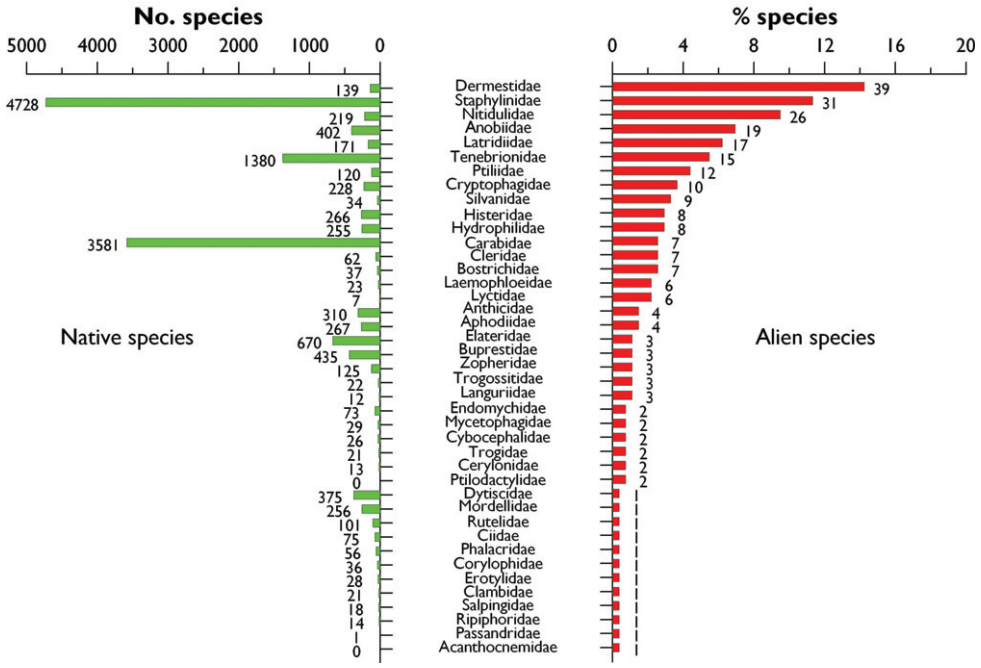

Figure 8.5.1. Relative importance of the Coleoptera families other than Cerambycidae, Curculionidae *sensu lato*, Chrysomelidae *sensu lato* and Coccinelidae families in the alien and native fauna in Europe. *Right* - Relative importance of the families in the alien entomofauna. Families are presented in a decreasing order based on the number of alien species. Species alien *to* Europe include cryptogenic species. The number over each bar indicates the number of alien species observed per family. *Left* - Species richness of the same families in the native European entomofauna. The number over each bar indicates the total number of species observed per family in Europe.

cocoa, etc. (Jeannel 1942, Weidner et al. 1984). Only one species is established throughout Europe: *Trechicus nigriceps* (recorded in 30 countries). This species seems to have been imported from the Eastern coast of Africa several centuries ago (Jeannel 1942).

The **Dytiscidae** (predaceous diving beetles) are all aquatic carnivores. Only one dytiscid beetle has been reported in our database (DAISIE). This large South American species, *Megadytes costalis*, has been recorded once in Great Britain, but there is no data on its establishment in the wild.

POLYPHAGA STAPHYLINIFORMIA

The **Hydrophilidae** (water scavenger beetles) are another family of aquatic beetles, easily distinguished from the Dytiscidae by the length of their maxillary palpi. One tribe, the Sphaeridiini, is exceptional due to its terrestrial, saprophagous and coprophagous habits. Many species share mammal dung with scarab beetles. Significantly, among eight hydrophilids reported as aliens in Europe, seven belong to the Sphaeridiini.

The **Histeridae** (clown beetles) are mainly predators, specializing on saprophagous, coprophagous or necrophagous prey. Eight species have been reported in the database, but little is known about their life traits, except for the widespread, cryptogenic *Carcinops pumilio*, which is common everywhere in natural and anthropized habitats.

The **Ptiliidae** (featherwinged beetles) are a very small family (120 species in Europe and 180 in the world) of which 12 alien species have been recorded in Europe. These are very tiny beetles, including the smallest of all, with a length of just 0.5 mm, whilst even the largest members of the family do not exceed 2 mm. Adults and larvae are usually found in rotting organic material in a wide range of habitats. Their small size and lifestyle means that they are easily dispersed via the movements of soil.

Staphylinidae is the most important group of Coleoptera in Europe and the second richest in the world (with over 46,000 species), but the number of alien species (31) in Europe is proportionally low, representing 0.7% of the whole of the Europeans staphylinid fauna. Many genera were not included in Fauna Europaea (Fauna Europaea Web Service), due to the lack of taxonomic expertise. Staphylinidae alien species found in Europe are essentially predatory (Coiffait 1972, Paulian 1988) and mainly species associated with compost, humus and decomposing matter (Cho 2008, Ødegaard and Tømmerås 2000, Tronquet 2006), such as *Bisnius parcus*, *Lithocharis nigriceps* and *Oxytelus migrator*. One predatory species, *Philonthus rectangulus*, has been reported from 36 countries/islands. Originating from temperate East Asia, it may have expanded westward naturally.

POLYPHAGA SCARABAEIFORMIA

The **Trogidae** (hide beetles) are a small family of beetles related to the scarabs. They feed on mammal skins and furs, or on bird feathers, either as late arriving necrophages on carrion, or as commensals of vertebrates in their nests. Two species from Australasia have been recorded in Spain in our database.

The **Aphodiidae** (dung beetle) are mainly small dung beetles, frequently included in the Scarabaeidae. Four species have been recorded as aliens, in one country only. Both *Saprosites* species introduced in Great Britain seem to be saproxylic beetles (Angus et al. 2003).

The **Rutelidae** (leaf chafers) are a family of brightly-coloured beetles, especially diverse in the tropics. Only one species of this family has been found in the Azores, the well-known Japanese beetle, *Popilia japonica*, which is considered as a severe pest in the United States, where it was introduced from Japan in 1912.

POLYPHAGA ELATERIFORMIA

The **Clambidae** (minute beetles) are very small beetles that have the capability to roll into a ball. One species is listed here, the Australian *Clambus simsoni*, a saprophagous species which seems to be rapidly expanding in western Europe.

The **Buprestidae** (metallic wood-boring or jewel beetles) are a well-known family of xylophagous beetles. In most cases, the larvae develop in living wood, and a few species became major pests in orchards or forests. Only three buprestid species have been reported as aliens in the database, each observed in only one country.

The **Ptilodactylidae**, the "toed-winged beetles", are a group of elateriform Coleoptera, which was formely treated as part of the Dascilloidea and included in Byrrhoidea (Maddison et al. 2007). Little is known of the biology of adults (Aberlenc and Allemand 1997). The habit of soil-leaf litter dwelling of both the adults and larvae facilitates their distribution with potted plants (Mann 2006).

The **Elateridae** (click beetles) are a large family of beetles with quite diverse life history traits. Some species have soil-living larvae, either predators or rhizophages, with reported agricultural pests in the latter category. Other species are saproxylic (predators or saprophages), some of which are very specialized, and have high conservation value. Three species are reported as aliens here, occuring in one country each. The life history traits of these species remain unknown.

POLYPHAGA BOSTRICHIFORMIA

The European **Dermestidae** comprise only 139 species (less than 1% of the European Coleoptera fauna) yet they are the largest contributor to the database, with 40 species reported as aliens. Many species are synanthropic and associated with animal remains, leathers and skins, dried meats, woollens and furs (Delobel and Tran 1993), such as *Dermestes vorax*, *D. frischi*, *D. maculatus*, *D. lardarius* and *Anthrenus flavidus*. Some species eat stored seeds such as *Trogoderma granarium.* The protraction of the number of larval stages and longevity in suboptimal nutritive media (Delobel and Tran 1993), as well as the relevance of the food product trade, explain partly how the damaging pests of this family have easily conquered new territories.

The **Lyctidae** (true powder-post beetles) are a very small family (13 species in Europe) closely related to the Bostrichidae. All species are wood-borers, specializing on hardwoods. They usually attack dry wood that is less than five years old, and may become important pests of structural wood or furniture. As inhabitants of raw or manufactured wood products, they are easily transported. Six species have been reported as aliens in Europe, but only one, *Lyctus brunneus*, has been established throughout the continent for more than 150 years.

The **Bostrichidae** (horned powder-post beetles) are a small family (37 native species in Europe). The native species are saproxylophages, whereas the aliens are either wood-borers or grain-feeders (apparently, some species show both feeding habits) (Lesne 1901). Seven species have been reported as aliens, and have been found in many countries. The wood-borers may cause important damage to manufactured objects, but the stored-product feeders (*Dinoderus* spp., *Rhyzopertha dominica*) are the most economically harmful. Among these, the lesser grain borer, *Rhyzopertha dominica*, has been observed in 34 countries/islands.

The **Anobiidae** have 19 alien species compared to 402 native species in Europe. About 11 species are associated with stored food products and include devastating pests such as *Lasioderma sericorne* which attacks a wide variety of dried products of animal or vegetable origin (Espanol 1992, Weidner et al. 1984). Several species attack soft woody matter: wood in the case of *Ernobius mollis*, but also books in the case of *Nicobium castaneum*, which can cause irrepairable damage. Many cryptogenic anobiid species are established in Europe for centuries, and may be found in many countries.

POLYPHAGA CUCUJIFORMIA

The **Nitidulidae** have 26 aliens compared with 219 native species in Europe. A third of these have occurred as far west as Macaronesia, but the other species have expanded their range in many countries of mainland Europe. As the majority of species are pollen-eaters, phytophagous, mycetophagous or predatory, they have a particular agronomic importance, damaging crops and stored food products. Among these, the 13 aliens species of the genus *Carpophilus* cause damage to dried fruits (Weidner et al. 1984).

The **Cybocephalidae** are a very small family, frequently subsumed within Nitidulidae. Cybocephaline beetles are well known predators of armoured scale insects (Coccoidea: Diaspididae) throughout tropical, sub-tropical and temperate regions of the world (Kirejtshuk et al. 1997).They are minute beetles, very convex and able to roll into a ball, as for Clambidae.

The **Silvanidae** (silvanid flat bark beetles) are a small family (34 native species in Europe) of flat beetles, formerly included in the Cucujidae. These insects were originally mycetophages, living under the bark of trees, but the feeding habits of many species have adapted to grain and fruit feeding, so that they have become synanthropic pests of stored products (Ratti 2007). Nine species are listed in the database, among which three are cryptogenic, long-established species occuring in several countries, such as the sawtoothed grain beetle, *Oryzaephilus surinamensis*.

The **Laemophloeidae** (lined flat bark beetles) are a small family of flat beetles with 23 native species in Europe, which was formerly included in the Cucujidae. They are closely related to the Silvanidae, and show the same life history traits. Six species, belonging to the genus *Cryptolestes*, are reported as aliens in Europe. They have established successfully in many countries.

The **Phalacridae** (shining flower beetles) are a small family of minute, rounded beetles. One North American species of *Phalacrus* has been recorded in the Azores, whose biological traits remain unknown (many species are micro-mycetophages).

The **Cryptophagidae** (silken fungus beetles) are an important family of mycetophagous insects with 228 native species in Europe, living in various habitats. Ten species have been reported as aliens in Europe, which are now established in many countries (the Cryptophagidae have the widest species range). The majority of these species (*Cryptophagus* spp.) are cryptogenic, feeding on fungal spores or decaying vegetal material, sometimes on stored products.

The **Languriidae** (lizard beetles) are a small family (12 native species in Europe) of phytophagous or saprophagous beetles. Three alien species are considered here, with a rather low dispersal rate. Nevertheless, *Cryptophilus integer* and *Pharaxonotha kirschii* are reported as pests of stored products.

The **Erotylidae** (pleasing fungus beetles) are a small family of mycetophagous beetles, with many species in saproxylic habitats. One Japanese species, *Dacne picta*, has possibly been introduced in Central Europe.

The **Cerylonidae** (minute bark beetles) are a small family of saproxylic beetles. They just appear here because a well-known pest of stored grain, *Murmidius ovalis*, is now included in this family (formerly Murmidiidae). This is a cosmopolitan species probably originating from tropical Asia.

The **Endomychidae** (handsome fungus beetles) are a small family of mycetophagous beetles (Shockley 2009, Shockley et al. 2009b), closely related to the Coccinellidae. Two very small species (*Holoparamecus* spp.) are cryptogenic and may be found in many countries worldwide.

The **Corylophidae** (minute hooded beetles) are another small family of micromycetophagous beetles, which occur in a variety of habitats. One species, *Orthoperus aequalis*, from Australia, has now established in 10 countries within Europe.

The **Latridiidae** (minute hooded beetles) are also a small family with 171 native species in Europe and 17 aliens which are essentially mycetophagous and associated with stored food products, such as *Dianerella filum* or *Cartodere nodifer*. These species are also plaster beetles which occupy wet places in the plastered walls of houses (Bouget and Vincent 2008). However, these latridiids do not appear to have an economic impact (Delobel and Tran 1993) and merely indicate bad food storage conditions.

The **Trogositidae** (bark-gnawing beetles) are a small family of saproxylic insects, living as saprophages or predators of other insects under the bark of trees. The three species reported here are predators of cosmopolitan pests of stored products.

The **Cleridae** (checkered beetles) are a conspicuous family of brightly coloured insects. Nearby all species are predators of other insects. Seven species are reported as aliens in the database, some of them (*Necrobia* spp.) established in Europe for a long time. These are either predators of xylophagous beetles or predators of stored product insects, and thus likely to be transported everywhere with their prey. We include here in the Cleridae the small family Thanerocleridae, which shows life traits similar to the typical Cleridae, with one introduced species, *Thaneroclerus buqueti*.

The **Acanthocnemidae**, have only one alien species: *Acanthocnemus nigricans* which is attracted by forest fires (Schmitz et al. 2002). The recent worldwide expansion of this species is due to the commercial export of Australian wood (Kreiss et al. 2005).

The **Mycetophagidae** (hairy fungus beetles) are a family of saproxylic insects, feeding on tree fungi. Two species, specialized on fungi growing on rotten vegetal material, are reported in the database. *Typhaea stercorea* is a well-known cryptogenic species, whereas *Litargus balteatus* is an American species found only recently in Europe

The **Ciidae** (minute tree-fungus beetles) are another family of saproxylic insects feeding on tree fungi. Only one species (out of 76 occurring in Europe) is reported

here as alien, *Xylographus bostrichoides*. This small insect probably originates from Asia and has to date been found in 19 European countries.

The **Mordellidae** (tumbling flower beetles) are a large family (256 native species in Europe) of flower-dwelling insects, with endophytic larvae. Only one species, *Mordellistena cattleyana*, is considered as an alien in Europe. This is a neotropical insect whose larvae develop inside tissues of ornamental orchids (Costa Lima 1955). This behaviour may have enabled its importation through the horticultural trade, since it has been found in Germany and the Netherlands.

The **Ripiphoridae**, formerly spelled Rhipiphoridae (wedge-shaped beetles), are a small family of strange parasitic insects. Their larvae develop in other insect orders, namely Hymenoptera, Orthoptera or Dictyoptera. One species, *Ripidius pectinicornis*, has sometimes been found in harbours, along with its host cockroaches (mainly *Blatta orientalis*).

The **Zopheridae** (ironclad beetles) were previously included in the Colydiidae. This is a family of saproxylic, bark-living insects with 125 native species in Europe. The three species reported as aliens in Europe are probably predators of other saproxylic insects. They are established in one country only, or a small number of countries in the case of *Pycnomerus inexpectus*, a species found in tropical greenhouses.

The **Tenebrionidae** is mainly composed of saprophagous species. Many species are xerophiles or thermophiles, which explains their predominance in areas with hot climate and their low representation in more temperate zones (Dajoz 2002). About 15 tenebrionid alien species are present in Europe (1.1% of European tenebrionid fauna). The majority of these species are associated with spoiled or wet cereals (Weidner et al. 1984). They include very damaging pests, such as species of *Tribolium*, which enter cracks in wet or already damaged seeds, and *Alphitobius* spp., which feed on mildewed food products.

The **Salpingidae** (narrow-waisted bark beetles) are a small family of saproxylic beetles with 18 native species in Europe. One species only is mentioned here, *Aglenus brunneus*, formerly included in the Colydiidae (Zopheridae). It is a very small, blind insect, often found in stables or poultry houses, where it feeds on animal waste (Dajoz 1977).

The **Anthicidae** (antlike flower beetles) are small beetles resembling ground beetles. Four species are considered as aliens, among 310 native species living in Europe. These insects typically feed on rotten vegetal material, which has been heated through fermentation. These life history traits probably enable a wide tolerance to cold temperatures, and some species are cosmopolitan, found everywhere in the world, from tropical to boreal climates, e.g. *Omonadus floralis*, recorded in 40 countries.

8.5.3 Temporal trends

Some Coleoptera species were introduced to Europe a very long time ago. Fossils of alien species have even been found in archeological sites, such as the blind flightless beetle *Aglenus brunneus* in Iceland (Buckland et al. 2009) and *Amara aulica* (alien but native in Europe), which arrived in the Faroe islands with the Viking settlers

(Brandt 2006). But the first date of introduction of a new species into a country is often difficult to establish. A species could have been present for years without its presence being noticed immediately. Particularly relevant here are small or inconspicuous species lacking agronomic or economic impact (e.g. Ptiliidae), and members of neglected or hard to identify taxonomic groups (e.g. Cryptophagidae and Staphylinidae).

The precise date of the first record is available for 201 species (i.e. 73.1% of aliens). The first statistical data derives from the beginning of the 19th century with the introduction of the nitidulid *Carpophilus hemipterus* in 1800 by the historical opening of trade routes (Audisio 1993). Then comes the trogossitid *Tenebroides mauritanicus* in 1803, and the anobiid *Nicobium castaneum* in 1807. The endomychid *Holoparamecus depressus* arrived in 1843 and the anobiid *Lasioderma sericorne* in 1848. These detritivores are all associated with stored food products or wood.

We observed an accelerating increase in the number of new records per year (figure 8.5.2), from 0.1 p.a. between 1800–1849 to 3.5 p.a. during 2000–2007, with an intermediate level of 1.3 p.a. during the period 1900–1924. During this last period, 33 new alien species were recorded, including 14 alone for the year 1900. This unexpected increase coincides with the industrial revolution of the first developing European countries (Cosseron and Faverjon 1991) (Great Britain, Belgium, France, and Germany) and with the increase in imports ensuing from it.

8.5.4 Biogeographic patterns

8.5.4.1 Origin of alien species

Alien species come from all continents except Antarctica (figure 8.5.3) (arthropods most represented on this continent are Collembola and mites rather than beetles) (Schulte et al. 2008). The considerable periods of environmental stress in Antarctic (Benoit et al. 2009) limit the diversity of insects, even though a very few beetles do occur there (Vernon et al. 1999), such as the ground-beetles *Amblysogenium pacificum* and *A. minimum*. These factors explain easily the absence of invasives coming from Antarctic.

About 82 aliens have origins currently considered cryptogenic. These are cosmopolitan species or distributed mainly in on one or more ecozones, with a tendency to become cosmopolitan. This is particularly the case with the cryptophagid *Cryptophagus cellaris*, a holarctic species which has become practically cosmopolitan following international commercial exchanges (Delobel and Tran 1993).

Asia is the most important source of aliens, with 58 species established in Europe (21%), comprising Dermestidae (13 spp.), Staphylinidae (8 spp.), Nitidulidae (6 spp.), Anthicidae (4 spp.) and Carabidae (3 spp.). These families are generally associated with stored products, crops, decomposing matter such as compost, and to a lesser extent with wood. The 16 other families number one or two species of aliens each.

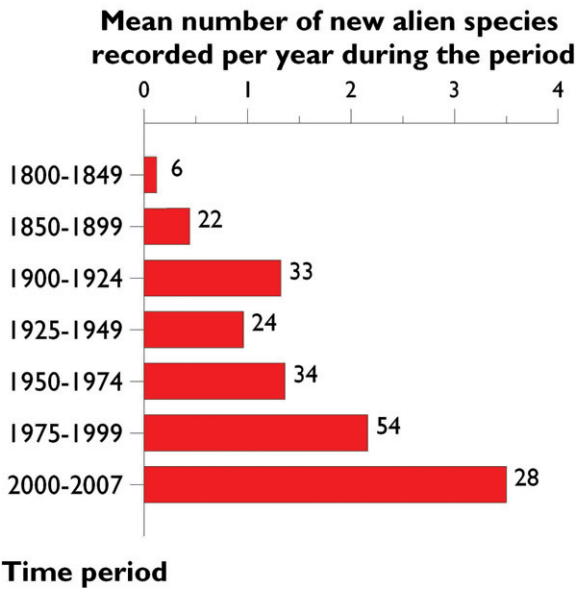

Figure 8.5.2. Temporal changes in the mean number of new records per year of alien Coleoptera species of families other than Cerambycidae, Curculionidae *sensu lato*, Chrysomelidae *sensu lato* and Coccinelidae, from 1800 to 2007. The number over each bar indicates the absolute number of species newly recorded per time period.

About 35 aliens come from Africa and these comprise Nitidulidae (5 spp.), Carabidae (3 spp.), Histeridae (3 spp.), Hydrophilidae (3 spp.) and Tenebrionidae (3 spp.). Nitidulidae and Tenebrionidae have been transported through stored food products. The mode of introduction is unknown for Carabidae and Hydrophilidae. There are also 14 other families having one or two alien species, which are partly associated with stored food products and wood.

The 55 aliens coming from the American continent (20% of the all alien species to Europe), include 24 species from North America and 31 species from Central and South America. From North America, the principal families are Dermestidae (7 spp.), Nitidulidae (6 spp.) and Tenebrionidae (4 spp.). Four species of Staphylinidae and four species of Ptiliidae derive from Central and South America. As for Asia and Africa, the neoarctic and neotropic aliens are mainly associated with foodstuffs and cultures. About 16 other families coming from America with one or two alien species have also been recorded in Europe.

Relatively few aliens originate from Australia. The 25 species of Australian origin include Latridiidae (4 spp.), Ptiliidae (4 spp.) and Staphylinidae (3 spp.). These species have no economic impact. The 12 other families include one or two alien species each, among which are species of the stored food products (*Ptinus ocellus*, *Anthrenus oceanicus*, *Brachypeplus mauli*) or living under the tree bark (*Ptinella cavelli* and *P. errabunda*).

The aliens with a specifically tropical origin (Pantropical) are the least presented in Europe with 20 species, that is to say 7% of all exotic species to Europe. The families

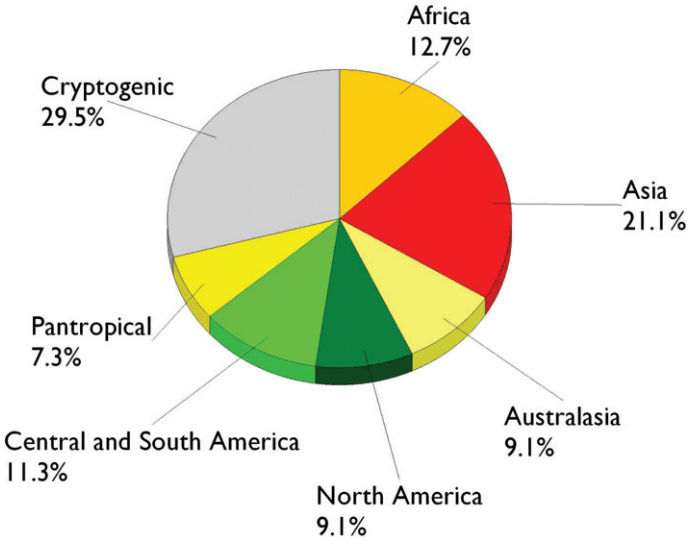

Figure 8.5.3. Origin of the Coleoptera species alien *to* Europe of families other than Cerambycidae, Curculionidae *sensu lato*, Chrysomelidae *sensu lato* and Coccinelidae

with the most species are Anobiidae (3 spp.), Bostrichidae (3 spp.) and Tenebrionidae (3 spp.). The eight other families have only one or two species each. These tropical aliens are associated with stored food products and fruits.

During different time slices, the origin of alien species has increasingly diversified (figure 8.5.4). The number of ecozones represented has increased from three (Africa, Asia, Pantropical) during 1800–1849 to six since 1950–1974 (Africa, Asia, Australasia, Central and South America, North America, Pantropical). The geographic source has also varied temporally although Asia has always been both an important and early region of origin. This situation can be explained by the opening of the trade route between Europe and India by the Cape of Good Hope at the end of the 15th century (which was also the sole sea route before the opening of the Suez Canal in 1869) and the strong Western influence which followed, the opium wars and the East India Companies, which revolutionized methods and the extent of the trade with Asia.

We highlight especially two ambiguous periods for biological invasions: 1850–1899 and 1925–1949. During the first period, no new record of an alien from Africa was recorded in Europe. The same goes for the second period with a fall of the number of new arrivals detected from South America (nine in 1900–1924 and only two in 1925–1949). These phenomena may coincide with the Great Depression, the result of the economic crisis of 1929 (Cosseron and Faverjon 1991, Gravereau and Trauman 2001), which affected both the level of protectionism on trade routes and the overall volume of international economic exchange between Europe and its colonies. The consequence for South America, Asia and Africa was "the crisis of dessert products", coinciding with the fall of the purchasing power in Europe and North America. Thus in Brazil for example, in an attempt to control the market, coffee was burned in engines (Launay 1999).

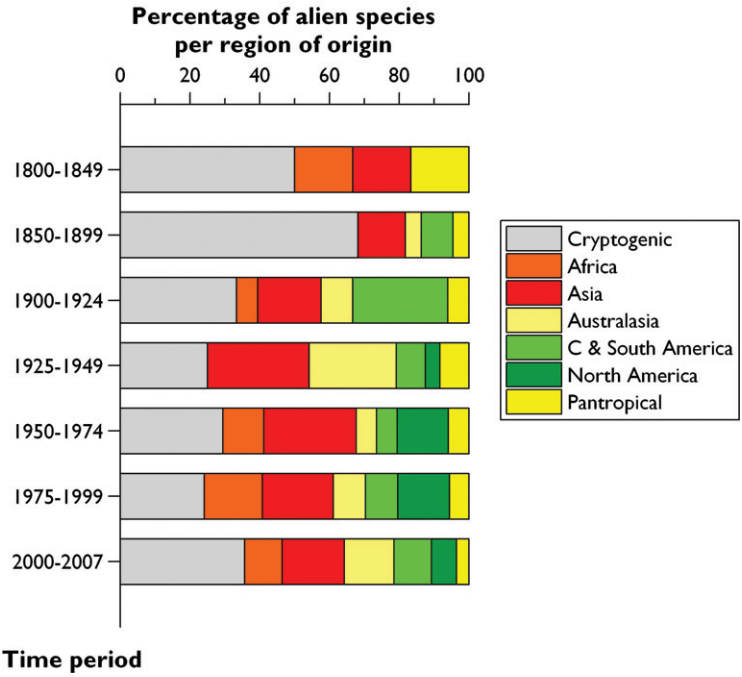

Figure 8.5.4. Temporal changes in the origin of the Coleoptera species alien *to* Europe of families other than Cerambycidae, Curculionidae *sensu lato*, Chrysomelidae *sensu lato* and Coccinelidae

The late arrival of aliens to Europe from North America is remarkable (first record in 1935) and probably corresponds to weak exports of foodstuffs towards Europe (except cereals). For forest biotopes especially, the North American component of species is small and of limited economic impact in Europe (Dajoz 2007).

8.5.4.2 Distribution of alien species within Europe and their range expansion

The majority of European countries have been directly affected by alien species (figure 8.5.5), but there is a very great mismatch in the number of species present in one country versus another.

The archipelago of Svalbard, with an insect fauna of a meagre 230 species (Coulson 2007), seems free from aliens. As in the case of Antarctica, the strong environmental contraints (harsh temperatures, shortened seasons and strong winds) have evidently limited the colonization of insects (Hulle et al. 2008) and geographical isolation has posed a barrier. For Macedonia there is a lack of readily accessible data (Tomov 2009), which has prevented us updating the situation there.

The countries/islands most affected by aliens are France (126), Germany (107), Italy (101), Austria (98), Great Britain (97), Switzerland (91), the archipelago of Azores (92), Denmark (89) and the Czech Republic (84).

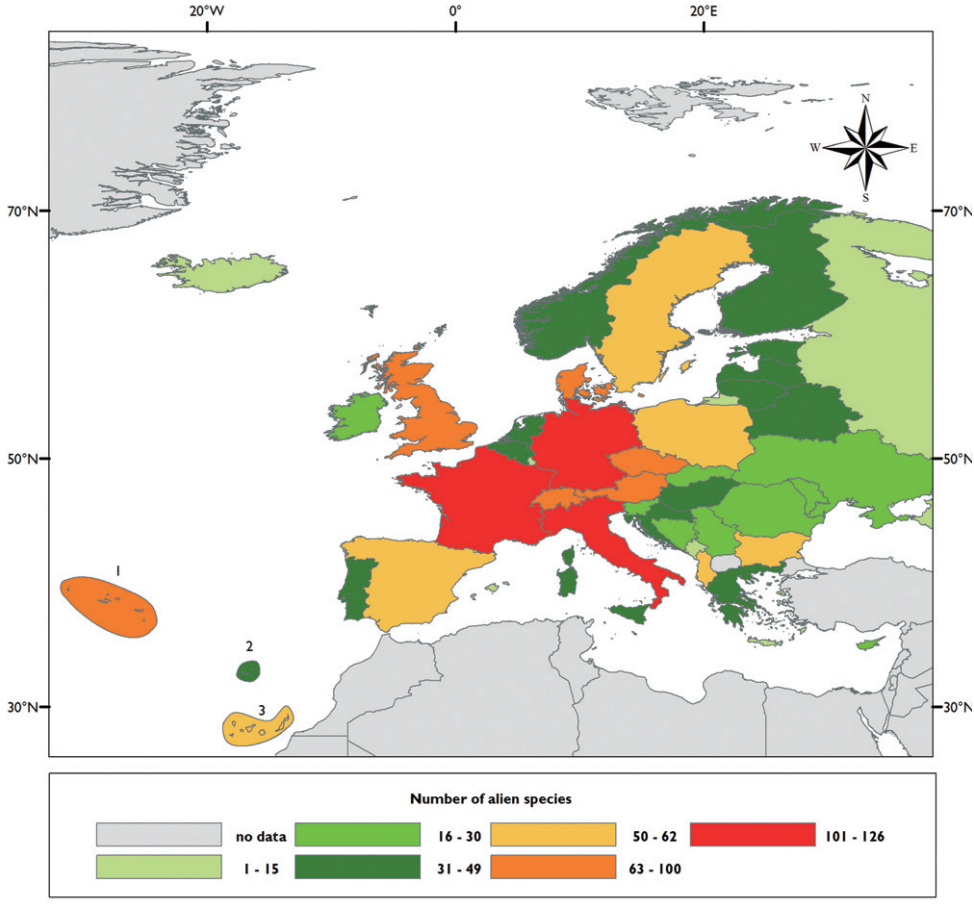

Figure 8.5.5. Comparative colonization of continental European countries and islands by by the Coleoptera species alien *to* Europe of families other than Cerambycidae, Curculionidae *sensu lato*, Chrysomelidae *sensu lato* and Coccinelidae. Archipelago: **1** Azores **2** Madeira **3** Canary islands.

The number of aliens per country is not significantly correlated with Global Domestic Product per capita (International Monetary Fund), latitude, nor longitude of the centroid of the country. In contrast, the number of aliens per country is significantly correlated with import (Spearman-Rho 0.650, P-value < 0.001) from 2003 to 2008 (The World Factbook) and also more weakly with area (Spearman-Rho 0.432, P-value < 0.01).

In spite of its geographical isolation (1500km from Europe, 1450km from Africa and 3900km from North America) and its small area, the archipelago of Azores has a large number of aliens. Since their historical discovery, the geographic position of the Azores has made the islands a strategic harbour for transatlantic ships, resulting in the introduction overall of several hundreds of taxa (Haggar 1988, Heleno 2008). Twenty-four alien species have been recorded exclusively in the Azores archipelago.

Indeed, alien native species in Europe have colonized islands more than other continental countries. The archipelago of Azores is the most affected with 126 alien species to Europe, followed by Great Britain (with 58 aliens), Faroe Islands (32 aliens) and Canary Islands (32 aliens). Perhaps surprisingly, Austria is the most important continental country affect by alien native to Europe, with 13 species.

8.5.5 Main pathways to Europe

The most important pathways for accidental invasions of exotic species to Europe are those closely bound to international transport, whereas the most important processes relating to deliberate introductions are the biological control of agricultural pests and the pollination of crops (Ruiz and Carlton 2003). Rapidly developing international trade and the reduction of travel times by air to less than two days, have meant that a living insect can be transported almost any part of the world (Mouchet et al. 1995).

Only three species have been introduced intentionally in Europe, two for biological control. The first is the cybocephalid beetle *Cybocephalus nipponicus*, originating in South Korea (Evans et al. 2005) and introduced into Italy for the control of cochineals bugs (Diaspididae) (Lupi 2002). The second species is *Ripidius pectinicornis* (Ripiphoridae), a parasitoid of the german cockroach *Blattella germanica* (Falin 2001) which was released from culture and is now present in several European countries (Bétis 1912). The third species is the tenebrionid *Zophobas morio* which has been used for bird and especially lizard food (Thomas 1995).

About 98.9% of aliens have been introduced accidently in Europe. The exact pathway of introduction is difficult to establish. The introduction vector is unknown for 123 aliens out of the total of 275. Theses aliens are essentially detritiphagous, saproxylophagous or predatory species.

The first clearly identified means of importation is via stored products and crops (approximately 120 aliens, or 40%). This can be explained by the importance of the international stored products trade (cereals, fruits and vegetables) and the primary position of Coleoptera as pests of stored products (Delobel and Tran 1993). About 20 Coleoptera have been implicated directly in the transport of woods. Some species have been found in wood derivatives such as *Dinoderus minutus*, a bostrichid introduced with furniture and bamboo-work (Lesne 1901). Few species have been identified as transported with horticultural or ornamental products, despite the increase of economic importance of ornamental pot plants (Lawson 1996), in sharp contrast for example to the situation in Lepidoptera (see Chapter 11). However, the level may be underestimated for this route, as some Coleoptera tend to occur in compost and may pass unnoticed via the pot plant trade.

The extruded starch products used as impact protection for fragile packing can even be a food source for stored grains pests (Fraga et al. 2009) as for *Cryptolestes ferrugineus*, *Lasioderma serricorne* and *Tribolium castaneum*. Thus starch-packings could become a new vector of introductions in the future.

8.5.6 Most invaded ecosystems and habitats

The anthropogenic habitats most strongly colonized by coleopteran alien species (figure 8.5.6), are buildings (50%), cultivated lands (20%) and forest habitats (10%). The large proportion of species associated with foodstuffs explains this relation. Conversely, the weak colonization of pseudo-natural habitats can be explained by the near-absence of phytophagous, and more particularly phyllophagous species among the coleopteran families treated here. This result contrasts with the situation for other groups of predominantly phytophagous insects (Cerambycidae, Chrysomelidae, Lepidoptera: Chapter 8.1, 8.3, 11).

In spite of the popularity of exotic species for the aquatic animal and plant trade (Leppäkoski et al. 2002) and the fact that migrating waterfowl can transport aquatic invertebrates or their eggs (Figuerola et al. 2003), surprisingly no water beetle has been introduced into Europe, except for the dytiscid *Megadytes costalis* (again contrasting with the situation for Lepidoptera, the aquatic Pyraloidea: Chapter 11). This low importance of the aquatic route in Coleoptera is also observed in the United States, where only 2.2% of the invasive arthropods are aquatics (Pimentel et al. 2005).

8.5.7 Ecological and economics impacts

Most alien species do not become invasive in their new locations (Genovesi and Shine 2003). It is often difficult to predict whether a new introduction will actually become established (Streito and Martinez 2008). However, the subset of alien species that are invasive may have significant environmental, economic and public health impacts and threaten the wholesale homogenisation of ecosystems (Sefrova 2005).

Invasive alien species are now considered to be the second greatest cause of global biodiversity loss after direct habitat destruction (Simberloff 2001) and have adverse environmental, economic and social impacts from the local level upwards.

The invasion of most Coleoptera treated here bears a direct relation to human presence (synanthropic species). Their impact is essentially with stored foodstuffs which they can extensively damage (Sefrova 2005). Coleoptera damaging stored food products on a global economic scale are very few (Delobel and Tran 1993), but include several species of aliens in Europe, among which are *Cryptolestes ferrugineus*, *C. pusillus*, *Lasioderma sericorne*, *Oryzaephilus surinamensis*, *Rhyzopertha dominica*, *Tribolium castaneum*, *T. confusum* and *Trogoderma granarium*. The impact of insect pests in a given situation can widely fluctuate depending on various parameters, in particular on production levels and the commercial value of those products infested both in time and in a geo-economic context. However, these synanthropic species are not known to have a direct effect on biodiversity.

The situation for agronomic and forest species can be different. The buprestid *Agrilus planipennis,* recently recorded in European Russia, is a very good example. This xylophagous East Asian species is presently causing significant damage to ash trees (*Fraxinus* spp.) in North America (Baranchikov et al. 2008). *A. planipennis* has killed

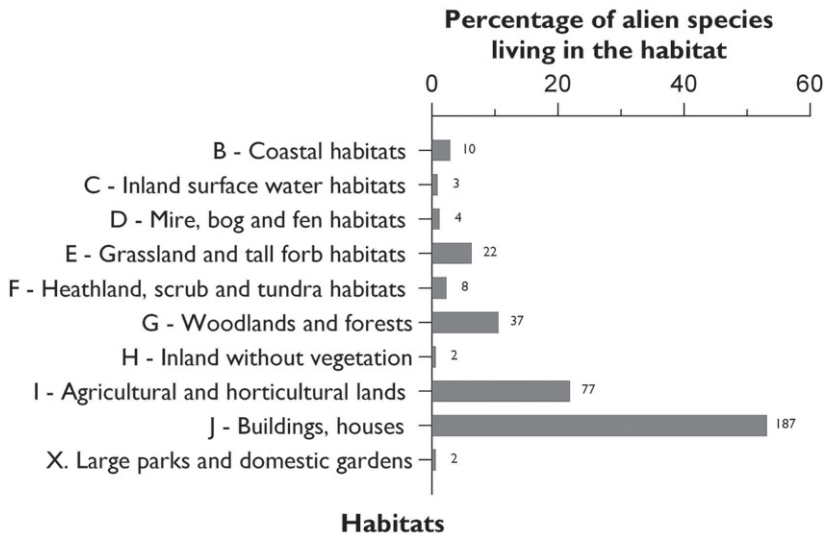

Figure 8.5.6. Main European habitats colonized by the Coleoptera species alien *to* Europe of families other than Cerambycidae, Curculionidae *sensu lato*, Chrysomelidae *sensu lato* and Coccinelidae. The number over each bar indicates the absolute number of alien coleopterans recorded per habitat. Note that a species may have colonized several habitats.

over 15 million forest and ornamental trees in several US States in less than 10 years (Poland and McCullough 2006). It is alarming that European ash trees are not more resistant than those of North America (Baranchikov et al. 2008). *Agrilus planipennis* could become a serious pest in Europe with a dramatic economy impact as well as potentially for biodiversity associated with *Fraxinus*.

Many species are associated with compost and even while their economical impact may be negligible (as mainly predators or detritivores), ecological disruption may still occur. This appears to be the case with the Staphylinid *Lithocharis ochracea*. This native beetle has declined, supplanted by the alien species *L. nigriceps* (Ødegaard and Tømmerås 2000, Tronquet 2006).

Even if the eradication of invasive species seems possible in Europe and in particular for mammals (Genovesi 2005), the possibility of eradication of invasive Coleoptera appears much more remote.

8.5.8 Conclusion

On of the most striking consequences of globalization is the increase in the problem of invasive species (Perrings et al. 2005). The volume of international trade and travel is now so great, and the modes of entry so varied, that not all consignments or routes of entry can be screened (Levine and D'Antonio 2003). Three categories are particularly important to highlight for the coleopteran alien species treated here: synantropic

Figure 8.5.7. Habitus of some Coleoptera species alien *to* Europe. **a** *Ernobius mollis* **b** *Tribolium castaneum* **c** *Oryzaephilus surinamensis* **d** *Alphitobius diaperinus* **e** *Cryptolestes duplicatus* **f** *Dermestes lardarius* **g** *Gnathocerus cornutus* **h** *Rhizopertha dominica* **i** *Necrobia ruficollis* **j** *Trechicus nigriceps* **k** *Lyctus brunneus* **l** *Gibbium psylloides* (Credit: Pierre Zagatti).

habitats with essentially stored products, compost (probably that associated with ornamental plants), and forest or wood-derived products.

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Table 9.5.1. List and characteristics of the Coleoptera species alien *to* Europe of families other than Cerambycidae, Curculionidae *sensu lato*, Chrysomelidae *sensu lato* and Coccinelidae. Status: **A** Alien *to* Europe **C** Cryptogenic. Country codes abbreviations refer to ISO 3166 (see Appendix I). Habitat abbreviations refer to EUNIS (see Appendix II).

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Acanthocnemidae								
Acanthocnemus nigricans (Hope 1845)	A	phyto-phagous	Australasia	1922, FR-COR	CY, FR, FR-COR, DE, IT, IT-SAR, IT-SIC, PT, ES	I2	timber, wood	Alonso-Zarazaga et al. (2003), (Kreiss et al. (2005)
Anobiidae								
Calymmaderus oblongus (Gorham, 1883)	A	phyto-phagous	Tropical, subtropical	Unknown	PT-AZO	J1	stored products	Bercedo et al. (2008), Borges et al. (2005), Espanol (1979), Mendonça and Borges (2009)
Epauloecus unicolor (Piller and Mitterpacher)	C	detriti-vorous	Crypto-genic	1861, DE	AT, BE, BA, BG, HR, CZ, DK, EE, FI, FR, FR-COR, DE, HU, IS, IE, IT, LV, LT, LU, MD, NL, NO, PL, PT, PT-AZO, RO, RU, RS, SK, SI, ES, SE, CH, UA, GB	J1	barns, cowsheds, animal burrows	Tomov (2009), Wittenberg et al. (2006)
Ernobius mollis (Linnaeus, 1758)	C	phyto-phagous	Crypto-genic	Unknown	PT-AZO	J, G	soft wood, sawmills, books	Borges et al. (2005), Espanol (1992), Mendonça and Borges (2009)
*Gibbium aequinoctia*le Boieldieu, 1854	A	detriti-vorous	Tropical, subtropical	Unknown	MT	J1	stored products	Bellés and Halstead (1985)
Gibbium psylloides (Czempinski, 1778)	C	detriti-vorous	Crypto-genic	1900, CZ	AL, AT, BE, BA, BG, HR, CY, CZ, DK, EE, FI, FR, FR-COR, DE, GR, HU, IE, IT, IT-SAR, IT-SIC, MT, MD, NL, PL, PT, PT-MAD, RO, RU, RS, SK, ES, ES-BAL, SE, CH, UA, GB	J1	houses, hotels, stored products	Bellés (1985), Bellés and Halstead (1985), Duff (2008), Freude et al. (1969), Šefrova and Lastuvka (2005), Wittenberg et al. (2006)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Lasioderma sericorne Fabricius, 1792	A	phyto-phagous	Tropical, subtropical	1848, PT	AL, AT, BG, CZ, DK, EE, HU, IT, IT-SAR, IT-SIC, LV, MT, PT, RS, CH	J1	tobacco, stored products	Borges et al. (2005), Espanol (1992), Freude et al. (1969), Glavendekic et al. (2005), Šefrova and Lastuvka (2005), Wittenberg et al. (2006)
Mezium affine Boieldieu 1856	C	detriti-vorous	Crypto-genic	Unknown	AT, DK, DE, PT-AZO, PT-MAD, ES, ES-CAN, SE	J	mills, stored products, bird nests	Bellés (1985), Freude et al. (1969)
Mezium americanum Laporte de Castelnau, 1840	A	detriti-vorous	North America	Unknown	IT, IT-SAR, MT, PT-AZO	J	stored products	Bellés (1985), Borges et al. (2005)
Nicobium castaneum (Olivier, 1790)	C	phyto-phagous	Crypto-genic	1807, PT	AT, BA, HR, CY, CZ, FR, FR-COR, DE, GR, IT, IT-SAR, IT-SIC, MT, PL, PT, PT-AZO, PT-MAD, RO, SI, ES, ES-BAL, ES-CAN, CH, UA	J	soft wood furniture, old books	Espanol (1992), Freude et al. (1969), Mendonça and Borges (2009), Šefrova and Lastuvka (2005)
Ozognathus cornutus (LeConte, 1859)	A	detriti-vorous	North America	2005, ES	MT, RO, ES	J	dead wood	Allemand (2008), Bercedo et al. (2005), Zahradnik and Mifsud (2005)
Pseudeurostus hilleri (Reitter 1877)	A	detriti-vorous	Asia-Temperate	1993, DE	DK, DE	J	likely scavenger and inhabitant of residues, potential minor pest of feed mills and warehouses	
Ptilineurus marmoratus (Reitter, 1877)	A	phyto-phagous	Asia	1999, FR	FR, SE	G	trees	Imperial Institute of Entomology (1930)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Ptinus bicinctus Sturm 1837	C	detriti-vorous	Crypto-genic	1856, FR	AT, BY, BE, BA, BG, HR, CZ, DK, EE, FI, FR, FR-COR, DE, HU, IT, IT-SAR, LV, NL, NO, PL, RO, RU, RS, SK, SI, ES, SE, CH, UA	J1	stored products	Freude et al. (1969)
Ptinus clavipes Panzer, 1792	C	detriti-vorous	Crypto-genic	Unknown	EE, LV, MT, ES-CAN, GB	J1	stored products, fur	Duff (2008), Freude et al. (1969), Machado and Oromi (2000)
Ptinus fur (Linnaeus 1758)	C	detriti-vorous	Crypto-genic	1940, BG	AL, AD, AT, BY, BE, BA, BG, HR, CY, CZ, DK, EE, FÖ, FI, FR, FR-COR, DE, GR, HU, IS, IE, IT, IT-SAR, IT-SIC, LV, LI, LT, LU, MT, MD, NL, NO, PL, PT, PT-AZO, PT-MAD, RO, RU, RS, SK, SI, ES, ES-BAL, ES-CAN, SE, CH, UA, GB	J1, J6	waste, dried vegetals	Bengtson (1981), Borges et al. (2005), Duff (2008), Mendonça and Borges (2009), Tomov (2009)
Ptinus latro Fabricius, 1775	C	detriti-vorous	Crypto-genic	1850, CZ	AL, AT, BY, BE, BA, BG, HR, CY, CZ, DK, EE, FI, FR, FR-COR, DE, GR, GR-CRE, HU, IE, IT, IT-SAR, IT-SIC, LV, LI, LT, LU, MT, MD, NL, NO, PL, PT, PT-AZO, PT-MAD, RO, RS, SK, SI, ES, ES-CAN, SE, CH, UA, GB	J	old wood, synanthropic	Borges et al. (2005), Freude et al. (1969), Šefrova and Lastuvka (2005), Tomov (2009)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Ptinus tectus Boieldieu 1856	A	detriti-vorous	Australasia	1916, DE	AT, BY, BE, BA, BG, HR, CY, CZ, DK, EE, FÖ, FI, FR, DE, GR, HU, IE, IT, LV, LT, LU, MD, NL, NO, PL, PT, PT-AZO, RU, RS, SK, SI, ES, SE, CH, UA, GB	J1	stored products	Allemand (2008), Bengtson (1981), Duff (2008), Wittenberg et al. (2006)
Tricorynus tabaci (Guérin-Méneville, 1850)	A	phyto-phagous	C & S America	1965, CZ	HR, CZ, DK, FR, DE, IT	J	seeds, stored products; crataegus in native fields	Freude et al. (1969), Šefrova and Lastuvka (2005)
Trigonogenius globulus Solier, 1849	A	detriti-vorous	C & S America	1939, CZ	CZ, DK, GB	J	dried animal products, insects, herbarium, stored products	Duff (2008), Ratti. Coleotteri alieni in Italia., Šefrova and Lastuvka (2005)
Anthicidae								
Anthicus crinitus La Ferte-Senectere, 1849	A	unknown	Asia	Unknown	CY, GR, GR-SEG, MT, PT-MAD	J	anthropophilous, larva scavenger	Pollock and Ivie (1996)
Anthicus czernohorskyi Pic, 1912	A	unknown	Asia	1982, IT	IT	U		Degiovanni and Pezzi (2007)
Omonadus floralis (Linnaeus 1758)	A	detriti-vorous	Asia-Tropical	1951, HR, BG	AL, AT, BA, BG, HR, CY, CZ, DK, EE, FI, FR, FR-COR, DE, GR, GR-CRE, GR-ION, GR-SEG, HU, IE, IT, IT-SAR, IT-SIC, LV, LI, LT, MT, NL, NO, PL, PT, PT-AZO, PT-MAD, RO, RU, SK, ES, ES-BAL, ES-CAN, SE, CH	J6	vegetal decay, detritiphage, mycophage, adult predator	Freude et al. (1969), Hemp and Dettner (2003), Machado and Oromi (2000), Mendonça and Borges (2009), Tomov (2009)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Stricticomus tobias (De Marseul 1879)	A	detriti-vorous	Asia	1944, IT	AT, BY, BE, CZ, DK, EE, FR, FR-COR, DE, HU, IT, IT-SAR, IT-SIC, LV, LT, MT, MD, NL, PT, PT-MAD, SK, ES, ES-CAN, SE, CH, GB	I, J1	rotten vegetal tissues	Duff (2008), Freude et al. (1969), Machado and Oromi (2000), Telnov (1996), Wittenberg et al. (2006)
Aphodiidae								
Aphodius gracilis Boheman, 1857	A	detriti-vorous	Africa	Unknown	PT-AZO	E	dung	Baraud (1985)
Saprosites mendax Blackburn, 1892	A	detriti-vorous	Australasia	1921, GB	GB	I2	rotting wood; in borings of *Dorcus* and *Sinodendron* beetles	Baraud (1992), Duff (2008), Paulian and Baraud (1982)
Saprosites natalensis (Peringuey, 1901)	A	detriti-vorous	Africa	1982, GB	GB	I2	rotting wood	Duff (2008)
Tesarius caelatus (Laconte, 1857)	A	detriti-vorous	North America	1976, GB	GB	U		Baraud (1992), Duff (2008)
Bostrichidae								
Apate monachus Fabricius, 1775	A	phyto-phagous	Tropical, subtropical	Unknown	FR, FR-COR, IT-SAR, IT-SIC, ES	G3, I2	polyphagous stem borer, fruit trees, Acacia	Freude et al. (1969), Lesne (1901)
Bostrychoplites cornutus (Olivier 1790)	A	phyto-phagous	Africa	Unknown	DK, DE, IT, ES, SE	J	timber (ethnic carved wooden bowls and ornaments)	Freude et al. (1969), Ratti. Coleotteri alieni in Italia.)
Dinoderus bifoveolatus (Wollaston, 1858)	A	phyto-phagous	Tropical, subtropical	Unknown	AT, BE, HR, DK, DE, NL, PT-MAD, SK, ES, SE, CH, GB	J	bamboo borer (N); dried cassava chips and stored products	Duff (2008), Freude et al. (1969), Lesne (1901)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Dinoderus minutus (Fabricius, 1775)	A	phyto-phagous	Tropical, subtropical	1965, CZ	AL, BE, CZ, DK, FR, DE, GR, IT, IT-SAR, IT-SIC, NL, PL, SK, SE, GB	J,I2	bamboo, manioc (Cassava), stored products (intro)	Duff (2008), Freude et al. (1969), Lesne (1901),Lesne (1904), Šefrova and Lastuvka (2005)
Rhyzopertha dominica (Fabricius, 1792)	A	phyto-phagous	Asia-Tropical	1900, CZ	AL, AT, BY, BE, BG, HR, CY, CZ, DK, EE, FI, FR, FR-COR, DE, GR, GR-SEG, IE, IT, IT-SAR, IT-SIC, LV, MT, NL, PL, PT, PT-AZO, RO, SK, ES, ES-BAL, ES-CAN, SE, CH, GB	J1	stored products, mainly cereals	Borges et al. (2005), Cobos (1986), Duff (2008), Freude et al. (1969), Lesne (1901), Lesne (1904), Machado and Oromi (2000), Mendonça and Borges (2009), Šefrova and Lastuvka (2005), Tomov (2009), Wittenberg et al. (2006)
Sinoxylon senegalense Karsch, 1831	A	phyto-phagous	Africa	Unknown	DE	J	*Acacia* wood borer (N); imported construction wood	Lesne (1901)
Heterobostrychus hamatipennis (Lesne, 1895)	A	phyto-phagous	Asia	2005, BE	BE	J	xylophagous, Salix, osier goods	Lesne (1901)
Buprestidae								
Agrilus planipennis Fairmaire, 1888	*A*	phyto-phagous	Asia	2003	RU	I2	*Fraxinus*	Baranchikov et al. (2008)
Buprestis decora Fabricius, 1775	A	phyto-phagous	North America	Unknown	ES-CAN	I2		Cobos (1986), Machado and Oromi (2000)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Chrysobothris dorsata (Fabricius, 1787)	A	phyto-phagous	Africa	1986, ES	ES	F5, I		Ratti. Coleotteri alieni in Italia.)
Carabidae								
Laemostenus complanatus (Dejean, 1828)	A	parasitic/ predator	Africa	Unknown	FR, FR-COR, IE, PT-AZO, ES-CAN, GB	B, J, H1	littoral in ports, cellars caves	Anderson et al. (2000), Arndt (2006), Borges et al. (2005), Duff (2008), Jeannel (1942), Luff (1998), Luff (2007), Machado (1976), Machado and Oromi (2000), Mendonça and Borges (2009), Perrault (1981), Perrault (1984)
Leistus nubivagus Wollaston, 1864	A	parasitic/ predator	Africa	Unknown	ES-CAN	U		Machado (1976), Machado and Oromi (2000), Perrault (1981)
Notiobia cupripennis (Germar, 1824)	A	phyto-phagous	C & S America	Unknown	ES-CAN	I2	seeds of Amaranthus	Machado and Oromi (2000), Perrault (1984)
Plochionus pallens (Fabricius, 1775)	A	parasitic/ predator	C & S America	2000, NL	DK, FR, DE, HU, IT, NL	J	in ports, transported with peanuts, raisin storages	Trautner and Geigenmuller (1987), Valemberg (1997)
Pterostichus caspius (Ménétriés, 1832)	A	parasitic/ predator	Asia-Temperate	1980, CZ	BG, CZ	U	Predator in various environments, pyrophilous	Hurka (1996), (Šefrova and Lastuvka (2005), Valemberg (1997)
Somotrichus unifasciatus (Dejean, 1831)	A	parasitic/ predator	Africa	Unknown	FR, IT	J	predator of beetles in stored products, avian droppings	Jeannel (1942), (Valemberg (1997)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Trechicus nigriceps (Dejean, 1831)	A	parasitic/ predator	Asia-Tropical	1902, DE	AT, BE, BA, BG, HR, CZ, DK, FI, FR, DE, HU, IT, LV, LI, LU, MD, NL, NO, PL, PT-AZO, PT-MAD, RS, SK, SI, ES, ES-CAN, SE, CH, UA, GB	I1, I2, J1, J6	compost, predator, gardens; also in peanuts	Borges et al. (2005), Darlington (1964), Duff (2008), Hurka (1996), Luff (2007), Machado and Oromi (2000), Mendonça and Borges (2009), Neculiseanu and Matalin (2000), Serrano et al. (2003), Tomov (2009), Trautner and Geigenmuller (1987), Valemberg (1997), Wittenberg et al. (2006)
Cerylonidae								
Murmidius ovalis (Beck 1817)	A	detriti-vorous	Asia	Unknown	AL, AT, DK, FR, DE, HU, IT, PL, CH, GB	J1	stored products (few damage-ports)	Duff (2008), Wittenberg et al. (2006), Moncoutier (2002)
Philothermus montandoni Aube, 1843	A	detriti-vorous	Tropical, subtropical	Unknown	FR, IT	X11	botanical garden	Stoch: Checklist of the species of the italian fauna)
Ciidae								
Xylographus bostrychoides (Dufour 1843)	A	detriti-vorous	Asia?	Unknown	AT, BY, BA, BG, HR, CZ, DK, FR, FR-COR, GR, HU, IT, IT-SAR, IT-SIC, PL, RO, SK, ES, UA	I	feeds on fungi	Tomov (2009)
Clambidae								
Clambus simsoni Blackburn 1902	A	detriti-vorous	Australasia	1987, SE	AT, FR, DE, NL, SE, GB	G	forest, firewood, compost; myco-phagous	Duff (2008), Tamisier (2004)

Family species	Status	Regime	Native range	1st record in Europe	Invaded countries	Habitat	Host	References
Cleridae								
Necrobia ruficollis (Fabricius 1775)	C	parasitic/ predator	Crypto-genic	1976, LT	AT, DK, EE, FI, HU, LT, NO, PT-AZO, SE, CH	J1, J6	predator on old bones, decaying animals	Borges et al. (2005), Du Chatenet (2000), Freude et al. (1979), Mendonça and Borges (2009), Wittenberg et al. (2006)
Necrobia rufipes (De Geer 1775)	A	parasitic/ predator	Tropical, subtropical	1935, LT	AT, BG, DK, EE, FI, DE, LT, NO, PT, PT-AZO, SE, CH	J1, J6	predator, necrophage, seeds with oil content (copra, soya), dried fish	Borges et al. (2005), Du Chatenet (2000), Freude et al. (1979), Haines and Rees (1989), Tomov (2009), Wittenberg et al. (2006)
Necrobia violacea (Linnaeus 1758)	C	parasitic/ predator	Crypto-genic	1976, LT	AT, DK, FI, HU, LT, NO, SE, CH	J1, J6	old bones, prey dry carrion	Freude et al. (1979), Wittenberg et al. (2006)
Opetiopalpus scutellaris (Panzer 1797)	A	parasitic/ predator	Africa	Unknown	AT, EE, FR, DE, ES	J	old timber houses	Du Chatenet (2000), Freude et al. (1979)
Paratillus carus (Newman, 1840)	A	parasitic/ predator	Australasia	1933, GB	FR, GB	G,I2	predator on Lyctiidae	Du Chatenet (2000), Duff (2008)
Tarsostenus univittatus (Rossi, 1792)	C	parasitic/ predator	Crypto-genic	1990, CZ	AT, CZ, CH	J	predator on Bostrychidae, Anobiidae	Du Chatenet (2000), Freude et al. (1979), Šefrova and Lastuvka (2005), Wittenberg et al. (2006)
Thaneroclerus buqueti (Lefebvre, 1835)	A	parasitic/ predator	Asia	1963, CZ	CZ, DE, IT, PL	J	predator on insects on tobacco, rice (*Lasioderma*, *Areaocerus*)	Du Chatenet (2000), Freude et al. (1979), Šefrova and Lastuvka (2005)
Corylophidae								
Orthoperus aequalis Sharp 1885	A	detriti-vorous	Australasia	Unknown	HR, FR, FR-COR, IT, PT-AZO, PT-MAD, ES, ES-CAN, CH, GB	G, I2		Borges et al. (2005), Bowestead (1999), Duff (2008), Machado and Oromi (2000), Ratti. Coleotteri alieni in Italia.)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Cryptophagidae								
Atomaria lewisi Reitter, 1877	A	detriti-vorous	Asia	1937, GB	AL, AT, BY, BE, HR, CZ, DK, EE, FI, DE, IT, LV, LT, MD, NO, PL, PT-AZO, SK, SE, CH, UA, GB	I2, J1, G	mycophage; compost, In decaying plant material	Duff (2008), Freude et al. (1967), Ødegaard and Tømmerås (2000), Šefrova and Lastuvka (2005), Wittenberg et al. (2006)
Caenoscelis subdeplanata C.Brisout de Barneville, 1882	A	detriti-vorous	North America	1950, GB	BY, HR, CZ, EE, FI, FR, FR-COR, DE, IT, LV, LT, LU, MT, MD, NL, NO, PL, PT-MAD, RU, SI, ES, ES-CAN, SE, CH, UA, GB	G, X11, I2, FB	mycophage; forests In decaying wood and plant material	Duff (2008), Falcoz (1929), Freude et al. (1967), Ratti. Coleotteri alieni in Italia., Tomov (2009), Wittenberg et al. (2006)
Cryptophagus acutangulus Gyllenhall, 1828	C	detriti-vorous	Crypto-genic	1956, BG	AL, AT, BY, BE, BA, BG, CZ, DK, EE, FI, FR, DE, IT, LV, LT, PL, RO, RS, SK, SI, SE, CH, UA, GB	J	attic, mills	Falcoz (1929), Freude et al. (1967), Tomov (2009)
Cryptophagus affinis Sturm 1845	C	detriti-vorous	Crypto-genic	1956, BG	AL, BG, CZ, FR, GR, IT, IT-SIC, LV, MT, PT-AZO, PT-MAD, RO, ES-CAN, GB	J	fungi, dry fruits	Borges et al. (2005), Duff (2008), Falcoz (1929), Freude et al. (1967), Machado and Oromi (2000), Mendonça and Borges (2009), Tomov (2009)
Cryptophagus cellaris (Scopoli, 1763)	C	detriti-vorous	Crypto-genic	1939, PT	AL, AT, BY, BE, BA, BG, HR, CZ, DK, FI, FR, DE, GR, HU, IT, IT-SIC, LV, MT, MD, NL, NO, PL, PT, PT-AZO, PT-MAD, RO, SK, SI, ES-CAN, SE, CH, UA, GB	J	mycophagous, stored products, herbariums, insects	Borges et al. (2005), Duff (2008), Falcoz (1929), Freude et al. (1967), Machado and Oromi (2000), Moncoutier (2002), Tomov (2009)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Cryptophagus fallax Balfour-Browne, 1953	C	detriti-vorous	Crypto-genic	1900, CZ	AL, AT, BY, BE, BA, BG, CZ, DK, EE, FI, FR, DE, IE, IT, IT-SIC, LV, LT, MT, NL, PL, RO, RS, SK, SI, SE, CH, UA, GB	J1	stored products	Duff (2008), Freude et al. (1967), Šefrova and Lastuvka (2005), Tomov (2009)
Cryptophagus pilosus Gyllenhal 1828	C	detriti-vorous	Crypto-genic	1956, BG	BY, BG, FÖ, FR, LV, PT-AZO, PT-MAD	J1	attic	Bengtson (1981), Borges et al. (2005), Enckell et al. (1987), Falcoz (1929), Freude et al. (1967), Mendonça and Borges (2009), Tomov (2009)
Cryptophagus subfumatus Kraatz, 1856	C	detriti-vorous	Crypto-genic	1956, BG	AD, AT, BY, BE, BA, BG, CZ, DK, EE, FI, FR, FR-COR, DE, IT, IT-SAR, LV, LT, MD, NL, NO, PL, PT-AZO, PT-MAD, SK, SI, ES-CAN, SE, CH, UA, GB	J1	dry fruits, nuts	Duff (2008), Falcoz (1929), Freude et al. (1967), Tomov (2009)
Curelius japonicus (Reitter, 1877)	C	detriti-vorous	Crypto-genic	1997, IT	DE, IT, MT, ES, ES-CAN	U	probably a fungus feeder	Peck (2009)
Henoticus californicus (Mannhereim 1843)	A	detriti-vorous	North America	Unknown	BY, BE, DK, FR, DE, NL, SE, GB	J1	stored products	Duff (2008), Falcoz (1929), Freude et al. (1967), Ratti. Coleotteri alieni in Italia.)
Cybocephalidae								
Aglyptinus agathidioides Blair 1930	A	parasitic/ predator	Africa	1912, GB	ES-CAN, GB	G, F,I2, J	potters bar	Duff (2008), Machado and Oromi (2000)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Cybocephalus nipponicus Endrody-Younga, 1971	A	parasitic/ predator	Asia-Temperate	2002, IT	IT	J100	predator of scales	Evans et al. (2005), Lupi (2002), Ratti. Coleotteri alieni in Italia.)
Dermestidae								
Anthrenocerus australis (Hope, 1843)	A	detriti-vorous	Australasia	1933, GB	FR, NL, GB	J1	clothes	Duff (2008), Freude et al. (1979), Hava (2003), Hava. A Catalogue of World Dermestidae., Reemer (2003)
Anthrenus caucasicus Reitter, 1881	A	detriti-vorous	Asia	1941, LV	AT, LV, PL	J1, I2, E	larva scavenger; adult on flowers	Freude et al. (1979), Hava. A Catalogue of World Dermestidae., Ruta et al. (2004)
Anthrenus flavidus Solsky, 1876	A	detriti-vorous	Asia	1935, PL	DE, PL	J1, E	wood, paper, leather and woven fabrics in collections in museums	Freude et al. (1979), Hava. A Catalogue of World Dermestidae.)
Anthrenus flavipes LeConte, 1854	C	detriti-vorous	Crypto-genic	1955, PL	BG, CZ, DK, IT-SAR, IT-SIC, PL, CH, GB	J1, G	domestic, feeds on furnitures, fabrics, etc., adult pollinophage; larva necro-phagous (faeces, cadavers, pine processionnary nests)	Duff (2008), Freude et al. (1979), Hava (2003), Hava. A Catalogue of World Dermestidae., Ratti. Coleotteri alieni in Italia., Šefrova and Lastuvka (2005), Tomov (2009), Wittenberg et al. (2006)
Anthrenus oceanicus Fauvel, 1903	A	detriti-vorous	Australasia	2004, CZ	CZ, MT	J1, E	stored products	Hava (2003), Hava. A Catalogue of World Dermestidae., Šefrova and Lastuvka (2005)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Attagenus diversepubescens Pic, 1936	A	detriti-vorous	C & S America	Unknown	DE	J	stored products	Hava (2003)
Attagenus fasciatus (Thunberg, 1795)	C	detriti-vorous	Crypto-genic	1927, DE	BG, DE, IT, MT, GB	J1, J6	necrophagous, in vegetal	Duff (2008), Freude et al. (1979), Hava (2003), Ratti. Coleotteri alieni in Italia., Tomov (2009)
Attagenus gobicola Frivaldszky, 1892	A	detriti-vorous	Asia-Temperate	Unknown	SE	J	stored products	Hava (2003)
Attagenus lynx (Mulsant & Rey, 1868)	A	detriti-vorous	Asia-Temperate	Unknown	PL	J	stored products	Hava (2003)
Attagenus smirnovi Zhantiev, 1973	C	detriti-vorous	Crypto-genic	1973, RU	BY, CZ, DK, LV, NO, PL, RU, CH, GB	J1	pest of animal-origin material (skin, furs, wool) but also buildings, entomological collections	Barsevskis et al. (2004), Duff (2008), Hava (2003), Ruta et al. (2004), Šefrova and Lastuvka (2005)
Attegenus unicolor Brahm 1791	C	detriti-vorous	Crypto-genic	1978, GB	BG, CZ, DK, LV, PL, CH, GB	J1, J6, E	domestic, feeds mainly on fabrics, adult pollinophage; larva necrophagous and cereals	Borges et al. (2005), Duff (2008), Freude et al. (1979), Hava (2003), Hermann and Baena (2004), Kadej (2005), Tomov (2009), Wittenberg et al. (2006)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Dermestes ater De Geer 1774	C	detriti-vorous	Crypto-genic	1868, GB	AT, BG, EE, FR, DE, LT, MT, PL, PT-AZO, ES-CAN, CH, GB	J1, J6	necrophagous	Duff (2008), Freude et al. (1979), Haines and Rees (1989), Hava (2003), Machado and Oromi (2000), Šefrova and Lastuvka (2005), Wittenberg et al. (2006)
Dermestes bicolor Fabricius, 1781	A	detriti-vorous	Asia-temperate	Unknown	ES-CAN	J	stored products	Freude et al. (1979), Hava (2003), Machado and Oromi (2000)
Dermestes carnivorus Fabricius, 1775	A	detriti-vorous	C & S America	1919, PL	BE, FR, IE, PL, GB	J1, J6, G	necrophagous in houses, bird nests, dead fish	Freude et al. (1979), Haines and Rees (1989), Hava. A Catalogue of World Dermestidae.)
Dermestes coronatus Steven 1808	A	detriti-vorous	Asia	Unknown	PL	E	grasslands	Hava (2003)
Dermestes frischi Kugelann, 1792	C	detriti-vorous	Crypto-genic	1862, GB	BG, DK, EE, FR, IE, LV, LT, PT-AZO, GB	J1, J6	domestic	Borges et al. (2005), Duff (2008), Freude et al. (1979), Haines and Rees (1989), Hava (2003), Hava. A Catalogue of World Dermestidae., Mendonça and Borges (2009), Tomov (2009)
Dermestes lardarius (Linnaeus, 1758)	C	detriti-vorous	Crypto-genic	1880, BG	BG, DK, EE, FR, HU, LT	J1, J6	necrophagous but in vegetal matters (peanuts, corn), eggs predation	Camerini (2009), Freude et al. (1979), Haines and Rees (1989), Hava (2003), Hava. A Catalogue of World Dermestidae., Tomov (2009)
Dermestes leechi Kalík, 1952	A	detriti-vorous	Asia	Unknown	ES, GB	J	crushed bones	Duff (2008), Hava (2003), Hava. A Catalogue of World Dermestidae.)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Dermestes maculatus De Geer, 1774	C	detriti-vorous	Crypto-genic	1871, PL	AL, AT, BG, FR, IE, LT, MT, PL, PT, PT-AZO, CH, GB	J1, J6	domestic, on animal products, fabrics, necrophagous but in vegetal matter(corn kernels)	Borges et al. (2005), Duff (2008), Freude et al. (1979), Haines and Rees (1989), 88180, Wittenberg et al. (2006)
Dermestes peruvianus Laporte de Castelnau, 1840	A	detriti-vorous	C & S America	1919, PL	AT, CZ, FR, DE, IT, PL, ES-CAN, CH, GB	J1, J6, G	domestic, on animal products, fabrics;, necrophagous but in vegetal matter (corn kernels)	Freude et al. (1979), Haines and Rees (1989), Hava (2003), Machado and Oromi (2000), Šefrova and Lastuvka (2005)
Dermestes vorax Motschulsky, 1860	A	detriti-vorous	Asia-Temperate	Unknown	IT	J	detrivorous	Freude et al. (1979), Hava (2003)
Novelsis horni (Jayne, 1882)	A	detriti-vorous	C & S America	Unknown	NL	J		Hava (2003), Hava. A Catalogue of World Dermestidae.)
Orphinus fulvipes Guerin-Meneville 1838	A	detriti-vorous	Tropical, subtropical	Unknown	FR, GB	J	stored products	Duff (2008), Freude et al. (1979), Hava (2003)
Phradonoma tricolor (Arrow, 1915b:431)	A	detriti-vorous	Asia-Tropical	Unknown	DK, NL	J		Hava (2003), Hava. A Catalogue of World Dermestidae.)
Reesa vespulae (Milliron, 1939)	A	detriti-vorous	North America	1977, GB	CZ, DK, EE, FR, DE, IT, LV, NO, SE, CH, GB	J1	domestic places and in museum collections	Duff (2008), Freude et al. (1979), Hava (2003), Martinez and Cocquempot (1985), Ratti. Coleotteri alieni in Italia., Šefrova and Lastuvka (2005), Wittenberg et al. (2006)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Sefrania bleusei Pic 1899	A	detriti-vorous	Africa	1998, PL	FR, PL	J1, J6	fish bones, window sills, entomological collections	Beal and Kadej (2008), Hava (2003), Hava. A Catalogue of World Dermestidae., Ruta et al. (2004)
Telopes heydeni Reitter 1875	A	detriti-vorous	Africa	Unknown	FR	J1		Freude et al. (1979), Hava (2003)
Thaumaglossa rufocapillata Redtenbacher, 1867	A	parasitic/ predator	Asia, Africa	Unknown	DE, NL	U	egg cases of mantids	Freude et al. (1979), Hava (2003)
Thorictodes heydeni Reitter, 1875	C	detriti-vorous	Crypto-genic	1958, IT	IT	J1	stored seeds, peanuts	Ratti. Coleotteri alieni in Italia., Freude et al. (1979), Hava (2003)
Thylodrias contractus Motschulsky, 1839	A	detriti-vorous	Asia-Temperate	1935, IT	FR, IT, GB	J1	animal materials	Duff (2008), Šefrova and Lastuvka (2005), Freude et al. (1979), Hava (2003)
Trogoderma angustum (Solier, 1849)	A	detriti-vorous	C & S America	1921, PL	AT, CZ, DK, DE, LV, LT, PL, SE, CH	J1	domestic situations and in museum collections	Barsevskis et al. (2004), Freude et al. (1979), Hava (2003), Ruta et al. (2006), Šefrova and Lastuvka (2005), Wittenberg et al. (2006)
Trogoderma glabrum (Herbst, 1783)	C	detriti-vorous	Crypto-genic	1904, BG	AT, BG, DK, FR, LV, LT, CH, GB	J1	domestic situations and in nests of solitary wasps	Duff (2008), Freude et al. (1979), Hava (2003), Tomov (2009), Wittenberg et al. (2006)
Trogoderma granarium Everts, 1898	A	detriti-vorous	Asia	1895, GB	AL, AT, BG, CZ, DK, DE, HU, IE, IT, IT-SAR, IT-SIC, PL, CH, GB	J1	stored products, especially cereals	Duff (2008), Freude et al. (1979), Hava (2003), Šefrova and Lastuvka (2005), Tomov (2009), Wittenberg et al. (2006)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Trogoderma inclusum LeConte, 1854	A	detritivorous	North America	1956, GB	AL, IT, PL, GB	J1	psychophage, stored products	Duff (2008), Hava (2003), Hermann and Baena (2004), Ratti. Coleotteri alieni in Italia.)
Trogoderma insulare Chevrolat, 1863	A	detritivorous	C & S America	Unknown	FR	J	stored products	Hava (2003)
Trogoderma longisetosum Chao & Lee, 1966	A	detritivorous	Asia	2005, CZ	AL, CZ	J1	stored products	Hava (2003), Hava. A Catalogue of World Dermestidae., Šefrova and Lastuvka (2005)
Trogoderma megatomoides Reitter, 1881	A	detritivorous	C & S America	1900, CZ	AL, AT, CZ, FR, IT, NL, SE	J1	insects in collection	Freude et al. (1979), Hava (2003), Ratti. Coleotteri alieni in Italia., Šefrova and Lastuvka (2005)
Trogoderma variabile Ballion, 1878	A	detritivorous	Asia	1978, GB	CZ, FI, IT, LV, SE, GB	J1	wheat, any dry vegetal and animal stored products in warehouse; major pest	Duff (2008), Hava (2003), Hava. A Catalogue of World Dermestidae., Šefrova and Lastuvka (2005), Ratti. Coleotteri alieni in Italia.)
Trogoderma versicolor (Creutzer, 1799)	C	detritivorous	Cryptogenic	Unknown	AT	J	eggs predation	Camerini (2009), Freude et al. (1979)
Dytiscidae								
Megadytes costalis Fabricius, 1775	A	parasitic/ predator	C & S America	Unknown	GB	U	predator	Duff (2008)
Elateridae								
Cardiophorus taylori Cobos, 1970	A	phytophagous	Africa	1952, DE	DE	U	unknown	
Conoderus posticus (Eschscholtz)	A	phytophagous	C & S America	Unknown	PT-AZO	U	*Chrysanthemoides monilifera*	Borges (1990), Borges et al. (2005), Mendonça and Borges (2009)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Panspaeus guttatus Sharp, 1877	A	phyto-phagous	Australasia	1981, GB	GB	U	unknown	Duff (2008), Freude et al. (1979)
Endomychidae								
Holoparamecus caularum Aube, 1843	C	detriti-vorous	Crypto-genic	1937, FR, FR-COR	AT, BG, FR, FR-COR, DE, CH	I, J, J6	on fungus, on decaying plant material, attic	Borges et al. (2005), Moncoutier (2002), Shockley et al. (2009a), Tomov (2009)
Holoparamecus depressus Curtis, 1833	C	detriti-vorous	Crypto-genic	1843, FR	DK, FR	J, J6	flour, dry fruits, medicinal plants, decayed wood	Curtis (1836), Shockley et al. (2009a)
Erotylidae								
Dacne picta Crotch, 1873	A	detriti-vorous	Asia	1954, FR-COR	AL, CZ, FR, FR-COR, IT, PL, ES	J	shitake mushrooms	Iablokoff-Khnzorian (1975), Šefrova and Lastuvka (2005)
Histeridae								
Carcinops pumilio (Erichson, 1834)	C	parasitic/ predator	Crypto-genic	1995, LT	AT, BG, DE, LV, LT, PT-AZO, CH	E	cadavers, faeces, *Dracunculus*	Borges (1990), Borges et al. (2005), Freude et al. (1971), Mendonça and Borges (2009), Tomov (2009), Wittenberg et al. (2006)
Carcinops troglodytes (Paykull, 1811)	A	parasitic/ predator	C & S America	Unknown	PT-AZO	J	predator on *Tribolium*, *Sitophilus* in manioc, poultry fly predator	Borges et al. (2005)
Chalcionellus decemstriatus Reichardt, 1932	A	parasitic/ predator	Africa	Unknown	FR	E	feces, cadavers	Freude et al. (1971), Gomy (2006), Gomy (2008), Gomy (2009)
Diplostix mayeti (Marseul, 1870)	A	parasitic/ predator	Africa	Unknown	FR	I2	predator under bark and pods, peanuts, manioc	Delobel and Tran (1993), Yélamos (1992)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Hister bipunctatus Paykull, 1811	A	parasitic/ predator	Africa	1974, FR	CY, FR, ES	E	dung	
Hypocaccus brasiliensis (Paykull, 1811)	C	parasitic/ predator	Crypto-genic	Unknown	IT, PT-AZO	B1	cadavers, faeces, sandy soil	Mendonça and Borges (2009)
Paromalus luderti Marseul, 1862	A	detriti-vorous	C & S America	Unknown	FR, ES, ES-CAN	I	decaying *Opuntia* in native range; straw and manure in invaded area	Gomy (2008), Machado and Oromi (2000)
Saprinus lugens Erichson, 1834	A	detriti-vorous	North America, C & S America	1984, IT	HR, FR, IT, IT-SAR, IT-SIC, PT, ES	H	cadavers, faeces	Ratti. Coleotteri alieni in Italia.)
Hydrophilidae								
Cercyon inquinatus Wollaston, 1854	A	unknown	Africa	Unknown	AT, HR, CZ, IT, PT-AZO, ES-CAN	U	decomposing seaweed, rotting fruits, cave guano	Borges et al. (2005), Boukal et al. (2007), Machado and Oromi (2000), Ryndevich (2004)
Cercyon laminatus Sharp, 1873	A	parasitic/ predator	Asia-Temperate	1950, CZ, IT	AL, AT, BE, CZ, DK, EE, FI, FR, DE, IT, LT, NL, ES, SE, CH, GB	E3, F9, I	compost, predator, In various humid environments; wet grasslands	Duff (2008), Freude et al. (1971), Ødegaard and Tømmerås (2000), Ratti. Coleotteri alieni in Italia., Wittenberg et al. (2006)
Cercyon nigriceps (Marsham, 1802)	A	parasitic/ predator	Asia?	Unknown	CZ, PT-AZO	U		Borges et al. (2005), Boukal et al. (2007), Freude et al. (1971), Mendonça and Borges (2009), Ryndevich (2004)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Cryptopleurum subtile Sharp, 1884	A	parasitic/ predator	Asia-Temperate	1950, IT	AL, AT, BE, CZ, DK, FI, FR, DE, HU, IT, NL, NO, SE, CH, GB	E3, F9, I	compost, predator, In various humid environments	Duff (2008), Freude et al. (1971), Ødegaard and Tømmerås (2000), Šefrova and Lastuvka (2005), Wittenberg et al. (2006)
Dactylosternum abdominale (Fabricius, 1792)	A	parasitic/ predator	Africa	Unknown	HR, CY, FR, DE, GR, IT, PT-AZO, PT-MAD, ES, ES-CAN	C1+C2	thermophilic, standing water with plants; egg predator on banana weevil in Kenya	Borges et al. (2005), Machado and Oromi (2000), Mendonça and Borges (2009)
Oosternum sharpi Hansen, 1999	A	unknown	North America	Unknown	PT-AZO	C1, D	in standing water	Borges et al. (2005), Mendonça and Borges (2009), Peck (2009)
Pachysternum capense (Mulsant, 1894)	A	unknown	Africa	Unknown	GR, IT, ES-CAN	C1, D	in standing water	Boukal et al. (2007), Fikacek and Boukal (2004), Machado and Oromi (2000), Ratti. Coleotteri alieni in Italia.)
Pelosoma lafertei Mulsant, 1844	A	unknown	C & S America	1929, IT	FR, IT	D1-D4 ? J?	plant held waters, or phytotelmata	Fikacek and Boukal (2004), Sharp (1882–1887)
Laemophloeidae								
Cryptolestes duplicatus (Waltl 1834)	C	detriti-vorous	Crypto-genic	1990, FR	AT, BY, CZ, DK, FR, DE, HU, PL	J1, G1	under oak bark, stored products	Santamaria et al. (1996)
Cryptolestes ferrugineus (Stephens, 1831)	C	detriti-vorous, parasitic/ predator	Crypto-genic	1875, CZ	AT, BY, BE, BG, HR, CZ, DK, FI, FR, DE, GR, HU, IT-SIC, LV, LT, MT, PL, PT, PT-AZO, PT-MAD, RS, ES, SE, CH, UA, GB	J1, G	stored products, under bark	Borges et al. (2005), Duff (2008), Mendonça and Borges (2009), Santamaria et al. (1996), Šefrova and Lastuvka (2005), Tomov (2009), Wittenberg et al. (2006)

Family species	Status	Regime	Native range	1st record in Europe	Invaded countries	Habitat	Host	References
Cryptolestes pusilloides (Steel & Howe, 1952)	C	detritivorous	Cryptogenic	1978, IT	AT, BE, HR, CZ, DK, FI, FR, DE, GR, HU, IT, IT-SIC, MT, PL, PT, PT-MAD, RS, ES, SE, UA, GB	J	stored products, psychophage/ mills	Duff (2008), Ratti. Coleotteri alieni in Italia., Santamaria et al. (1996)
Cryptolestes pusillus (Schönherr, 1817)	A	detritivorous	Tropical, subtropical	1875, CZ	AL, AT, BY, BG, CZ, DK, FR, DE, IT, IT-SAR, MT, PT-AZO	J	synanthropic, grain, damage	Borges et al. (2005), Moncoutier (2002), Santamaria et al. (1996), Šefrova and Lastuvka (2005), Tomov (2009)
Cryptolestes spartii (Curtis, 1834)	C	detritivorous	Cryptogenic	1991, FR	AL, EE, FR, FR-COR, DE, PT-AZO, ES, ES-CAN, CH	J1, F	corn flour; dry wood (Sarothamnus)	Santamaria et al. (1996), Wittenberg et al. (2006)
Cryptolestes turcicus (Grouvelle, 1876)	C	detritivorous	Cryptogenic	1904, FR	AL, AT, BE, HR, CZ, DK, FI, FR, DE, GR, HU, IT, IT-SAR, IT-SIC, PL, PT, PT-AZO, PT-MAD, RS, ES, SE, CH, UA, GB	J1	dry fruits, grain, wheat, synanthropic	Borges et al. (2005), Duff (2008), Santamaria et al. (1996), Šefrova and Lastuvka (2005), Wittenberg et al. (2006)
Languriidae								
Cryptophilus integer (Heer, 1841)	C	detritivorous	Cryptogenic	Unknown	AT, MT, PT-AZO, CH	J1	stored products; mycophagous, Vigna	Borges et al. (2005), Mendonça and Borges (2009), Wittenberg et al. (2006)
Cryptophilus obliteratus Reitter,1874	A	detritivorous	Asia	1982, DE	AT, DK, FR, DE	I	hay	Callot (2003)
Pharaxonotha kirschii Reitter, 1875	C	detritivorous	Cryptogenic	1900, CZ	CZ	J1	psychophage, grain, floour	Šefrova and Lastuvka (2005)
Latridiidae								
Adistemia watsoni (Wollaston, 1871)	C	detritivorous	Cryptogenic	1959, CZ	CZ, FR, DE, CH, GB	J1, I	*Tamarindus* seeds, dry fruits, Feeds on fungus, found in herbariium	Bouget and Vincent (2008), Duff (2008), Freude et al. (1967), Šefrova and Lastuvka (2005), Wittenberg et al. (2006)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Cartodere bifasciata (Reitter, 1877)	A	detriti-vorous	Australasia	2000, DE	AT, BE, CZ, DK, FR, DE, NL, PT-MAD, SE, CH, GB	G, I2	mycophagous, under bark	Bouget and Vincent (2008), Duff (2008), Reemer (2003)
Cartodere delamarei (Dajoz, 1960)	A	detriti-vorous	C & S America	1976, FR	FR	I, J6	mycophagous, vegetal decay	Bouget and Vincent (2008), Vincent (1999)
Cartodere nodifer (Westwood, 1839)	A	detriti-vorous	Australasia	1850, DE	AL, AT, BY, BE, BA, BG, HR, CY, CZ, DK, EE, FI, FR, FR-COR, DE, GR, GR-CRE, HU, IS, IE, IT, IT-SAR, IT-SIC, LV, LI, LT, LU, MT, MD, NL, NO, PL, PT, PT-AZO, PT-MAD, RO, RU, RS, SK, SI, ES, ES-BAL, ES-CAN, SE, CH, UA, GB	I, J6	mycophagous, compost, attic, hay	Borges et al. (2005), Bouget and Vincent (2008), Duff (2008), Machado and Oromi (2000), Mendonça and Borges (2009), Tomov (2009)
Cartodere constricta (Gyllenhal, 1827)	C	detriti-vorous	Crypto-genic	1889, GB	BY, FR, LV, NO, SE, GB	J1, J6	mycophagous, compost, dry fruits, remains, dust	Bouget and Vincent (2008), Duff (2008), Telnov (1996)
Corticaria elongata(Gyllenhal 1827)	C	detriti-vorous	Crypto-genic	1889, GB	AT, BY, BE, BA, BG, HR, CZ, DK, EE, FI, FR, FR-COR, DE, GR, HU, IT, IT-SAR, IT-SIC, LV, LT, LU, MD, ME, NL, NO, PL, PT, PT-AZO, RO, RS, SK, ES, SE, CH, UA, GB	G, I, J	forest humus, rotten fruits, hay, firewood	Borges et al. (2005), Bouget and Vincent (2008), Duff (2008), Freude et al. (1967), Mendonça and Borges (2009), Moncoutier (2002), Telnov (1996), Tomov (2009)
Corticaria fenestralis Linneaus, 1758)	C	detriti-vorous	Crypto-genic	1908, FR	AT, BY, BG, FR, DE, CH	G, I, J	vegetal refuses, hotels, houses, pine bark	Bouget and Vincent (2008), Duff (2008)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Corticaria fulva (Comolli, 1837)	C	detritivorous	Cryptogenic	1874, FR	AT, BY, BG, FR, DE, PT-AZO, CH	I, J6	Fungi on cacao, spices, cereals, decaying plant material	Borges et al. (2005), Bouget and Vincent (2008), Duff (2008), Freude et al. (1967), Mendonça and Borges (2009), Tomov (2009), Wittenberg et al. (2006)
Corticaria pubescens (Gyllenhal, 1827)	C	detritivorous	Cryptogenic	1897, GB	AT, BY, FR, DE, HU, LT, CH	I, J6	tobacco, medicinal plants, on fungus, on decaying plant material	Bouget and Vincent (2008), Freude et al. (1967), Wittenberg et al. (2006)
Corticaria serrata (Paykull 1798)	C	detritivorous	Cryptogenic	1997, LT	AT, BY, BG, DE, LT, PT-AZO, CH	I, J1, J6	on fungus, on decaying plant material, corn, barley	Borges et al. (2005), Bouget and Vincent (2008), Freude et al. (1967), Mendonça and Borges (2009), Tomov (2009), Wittenberg et al. (2006)
Dienerella argus (Reitter, 1884)	C	detritivorous	Cryptogenic	1907, GB	FR, LV, GB	G	mycophagous, mosses, old trees	Bouget and Vincent (2008), Duff (2008), Moncoutier (2002), Telnov (1996)
Dienerella costulata (Reitter, 1877)	C	detritivorous	Cryptogenic	1900, CZ	CZ, DK, FR	J	foodstuffs, roots, cellars, appartments	Bouget and Vincent (2008), Šefrova and Lastuvka (2005)
Dienerella filum (Aubé, 1850)	C	detritivorous	Cryptogenic	1850, FR	AT, BE, BG, CZ, FR, DE, IE, LV, MT, SE, CH, GB	I, J	cereals, herbaria, yeast, on fungus, on decaying plant material	Bouget and Vincent (2008), Duff (2008), Freude et al. (1967), Moncoutier (2002), Šefrova and Lastuvka (2005), Tomov (2009)
Lathridius australicus Belon, 1887	A	detritivorous	Australasia	Unknown	PT-AZO	U	unknown	Duff (2008), Freude et al. (1967), Mendonça and Borges (2009)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Latridius minutus (Linnaeus, 1767)	C	detriti-vorous	Crypto-genic	1852, FR	AT, BY, BG, FÖ, FR, FR-COR, DE, LV, LT, PT-AZO, CH, GB	I, J	cereals/ mills, cellars, attic, on fungus, on decaying plant material	Bengtson (1981), Borges et al. (2005), Bouget and Vincent (2008), Duff (2008), Enckell et al. (1987), Freude et al. (1967), Moncoutier (2002), Tomov (2009), Wittenberg et al. (2006)
Metophthalmus serripennis Broun 1914	A	detriti-vorous	Australasia	1928, DE	DE, GB	J	fungi on straw, warehouses; dead leaves	Duff (2008)
Migneauxia orientalis Reitter, 1877	C	detriti-vorous	Crypto-genic	1993, DE	AT, DK, FR, DE, PL, CH	I, J	rice, on fungus, on decaying plant material	Bouget and Vincent (2008), Wittenberg et al. (2006)
Lyctidae								
Lyctus africanus Lesne, 1907	A	phyto-phagous	Africa	Unknown	AT, FR, CH	J1	ginger roots; sapwood in field	Freude et al. (1969), Ratti. Coleotteri alieni in Italia., Wittenberg et al. (2006)
Lyctus brunneus (Stephens, 1830)	A	phyto-phagous	Asia	1850, FR	AL, AT, BY, BG, CZ, DK, FR, DE, GR, IT, IT-SAR, LV, MT, PT, RS, CH	J1	manioc; sapwood	Borges et al. (2005), Freude et al. (1969), Glavendekic et al. (2005), Mendonça and Borges (2009), Šefrova and Lastuvka (2005), Wittenberg et al. (2006)
Lyctus cavicollis J. L. LeConte, 1805	A	phyto-phagous	North America	1996, DE	AT, FR, DE, CH	J1	wood in houses	Ratti. Coleotteri alieni in Italia., Wittenberg et al. (2006)
Lyctus planicollis J. L. LeConte, 1858	A	phyto-phagous	North America	1935, FI	AT, FI, FR	J1	*Quercus*, *Fraxinus* (N), wood post in houses	Freude et al. (1969), Ratti. Coleotteri alieni in Italia.)
Lyctus sinensis Lesne, 1911	A	phyto-phagous	Asia	Unknown	GB	J1	timber yards, rarely in the wild	Duff (2008)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Minthea rugicollis (Walker, 1858)	A	phyto-phagous	Tropical, subtropical	Unknown	IT	J1	timber-feeding beetle; attack wide-pored hardwood, broadleaf or coniferous trees and timber with starch levels of greater than 3% (*Afzelia*, *Artocarpus, Avicennia, Bombax, Helicia, Koompassia, Shorea*)	Abood and Murphy (2006), Halperin and Geis (1999)
Mordellidae								
Mordellistena cattleyana Champion, 1913	A	phyto-phagous	C & S America	1921, NL	DE, LV, NL	J100	*Cattleya, Vandia*, warm greenhouses. On flowers of *Angelica silvestris* in pine forest.	Batten (1976), Lima (1955), Telnov (1996)
Mycetophagidae								
Litargus balteatus Leconte, 1856	A	detriti-vorous	North America	1983, CZ	AT, CZ, FR, IT, PT-AZO, CH	I, J6	on fungus, on decaying plant material, Maize, dried grapes, stored products	Borges et al. (2005), Ratti. Coleotteri alieni in Italia., Šefrova and Lastuvka (2005), Wittenberg et al. (2006)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Typhaea stercorea (Linnaeus, 1758)	C	detriti-vorous	Crypto-genic	1955, BG	AT, BG, FR, DE, IT, IT-SAR, IT-SIC, LT, MT, PT-AZO, CH	I, J, J6	on fungus, on decaying plant material, waste, decay; mills, attic	Borges et al. (2005), Freude et al. (1967), Mendonça and Borges (2009), Tomov (2009), Wittenberg et al. (2006)
Nitidulidae								
Brachypeplus deyrollei Murray, 1864	A	detriti-vorous	Africa	1999, FR	FR	I	decaying fruits	Ratti. Coleotteri alieni in Italia., Mifsud and Audisio (2008), Moncoutier (2001)
Brachypeplus mauli Gardner & Classey, 1962	A	detriti-vorous	Australasia	2005, PT-AZO	PT-AZO, PT-MAD	J1	stored products; under bark	Audisio (1993), Borges (1990), Borges et al. (2005), Mendonça and Borges (2009)
Carpophilus bifenestratus Murray, 1864	A	phyto-phagous, detriti-vorous	Africa	1993, FR, FR-COR	AL, BA, BG, HR, CY, FR, FR-COR, GR, IT, IT-SAR, IT-SIC, MT, ME, PT-MAD, RS, SI, ES, ES-BAL, ES-CAN	I, J6	rotten fruits	Mifsud and Audisio (2008)
Carpophilus dimidiatus (Fabricius, 1792)	A	phyto-phagous, detriti-vorous	C & S America	1900, CZ	AL, AT, BG, CZ, DK, EE, FR, FR-COR, IT, IT-SAR, IT-SIC, MT, PL, PT-AZO, ES, CH	I, J1	stored products, corn in fields	Audisio (1993), Borges et al. (2005), Mendonça and Borges (2009), Mifsud and Audisio (2008), Moncoutier (2001), Šefrova and Lastuvka (2005), Tomov (2009)
Carpophilus freemani Dobson, 1956	A	phyto-phagous, detriti-vorous	Tropical, subtropical	1976, IT	AL, DK, FR-COR, GR, IT, IT-SAR, IT-SIC, PT-AZO, ES	I, J1	dry fruits, maize in field	Audisio (1993), Borges (1990)
Carpophilus fumatus Boheman, 1851	A	phyto-phagous, detriti-vorous	Africa	1977, IT	AL, IT, IT-SIC, PT, PT-AZO	J1	*Tamarindus* seeds, dry fruits, granaries	Audisio (1993), Mendonça and Borges (2009), Ratti. Coleotteri alieni in Italia., Vieira et al. (2003)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Carpophilus hemipterus (Linnaeus, 1758)	A	phyto-phagous, detriti-vorous	Asia-Tropical	1800, IT	AL, AT, BY, BG, CZ, FR, FR-COR, DE, IT, IT-SAR, IT-SIC, LT, MT, PL, PT-AZO, ES, CH	I, J1	decaying grapes, dry fruits, cereals in granaries, fruits on ground, mushrooms	Audisio (1993), Borges et al. (2005), Mendonça and Borges (2009), Mifsud and Audisio (2008), Šefrova and Lastuvka (2005), Tomov (2009), Wittenberg et al. (2006)
Carpophilus ligneus Murray, 1864	A	phyto-phagous, detriti-vorous	C & S America	1981, ES-CAN	HR, FR, DE, GR, ES-CAN	J1	maize, dry fruits, granaries	Audisio (1993), Machado and Oromi (2000)
Carpophilus marginellus Motschulsky, 1858	A	phyto-phagous, detriti-vorous	Asia-Tropical	1938, GB	AT, BY, BE, BG, CZ, DK, FI, FR, FR-COR, DE, GR, IT, IT-SAR, IT-SIC, MT, NL, NO, PL, PT-AZO, PT-MAD, ES, ES-CAN, SE, CH, GB	J1	mainly domestic; cereals, compost, saprophagous	Audisio (1993), Borges et al. (2005), Duff (2008), Machado and Oromi (2000), Mendonça and Borges (2009), Ødegaard and Tømmerås (2000), Reemer (2003), Šefrova and Lastuvka (2005), Tomov (2009), Wittenberg et al. (2006)
Carpophilus mutilatus Erichson, 1843	A	phyto-phagous, detriti-vorous	C & S America	1900, CZ	AT, BG, CZ, DK, FR, FR-COR, IT, IT-SAR, IT-SIC, LT, MT, PT-AZO	J1, I	dry fruits	Audisio (1993), Borges et al. (2005), Mendonça and Borges (2009), Mifsud and Audisio (2008), Šefrova and Lastuvka (2005), Tomov (2009)
Carpophilus nepos Murray, 1864	A	phyto-phagous, detriti-vorous	Tropical, subtropical	Unknown	AL, BA, BG, HR, CY, FR, FR-COR, GR, GR-CRE, GR-ION, GR-NEG, GR-SEG, IT-SAR, IT-SIC, MT, PT, PT-AZO, RO, RU, SI, ES, ES-BAL, ES-CAN, UA	J1, I	dry fruits, outdoors in mediterranean; houses in central europe	Borges et al. (2005), Machado and Oromi (2000), Mendonça and Borges (2009), Mifsud and Audisio (2008), Tomov (2009)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Carpophilus obsoletus Erichson, 1843	A	phyto-phagous, detriti-vorous	Asia-Tropical	1895, GR-CRE	CY, CZ, DK, FR, FR-COR, GR, GR-CRE, IT, IT-SAR, IT-SIC, MT, PT, ES,	J1, I	rotten fruits outdoors, granaries (maize, corn)	Audisio (1993), Mifsud and Audisio (2008), Šefrova and Lastuvka (2005)
Carpophilus pilosellus Motschulsky, 1858	A	phyto-phagous, detriti-vorous	Asia-Tropical	1983, CZ	AT, HR, CZ, FR, IT, IT-SAR, IT-SIC, PT-AZO, RS, SI	J1, I	dry fruits, fruits on ground, poultry dung	Audisio (1993)
Carpophilus succisus Erichson, 1843	A	phyto-phagous, detriti-vorous	C & S America	2005, PT-AZO	PT-AZO	J1	maize	Borges et al. (2005)
Carpophilus zeaphilus Dobson, 1969	A	phyto-phagous, detriti-vorous	Africa	1985, PT, ES	AL, FR, IT, IT-SIC, PT, ES	J1, I	maize	Audisio (1993), Ratti. Coleotteri alieni in Italia.)
Epuraea luteola Erichson, 1843	A	detriti-vorous	C & S America	1970, ES-CAN, PT-MAD	AL, FR, IT, IT-SAR, IT-SIC, MT, MD, PT-MAD, ES-CAN	G, I	fruits (*Prunus*), mushrooms	Audisio (1993), Machado and Oromi (2000), Mifsud and Audisio (2008), Ratti. Coleotteri alieni in Italia., Tomov (2009)
Epuraea oculariis Fairmaire, 1849	A	detriti-vorous	Asia-Tropical	1900, IT	AL, AT, FR, DE, IT, IT-SIC, MD, ES, ES-CAN, CH	J	mycophagous; manioc, dry fruits	Machado and Oromi (2000), Mifsud and Audisio (2008), Ratti. Coleotteri alieni in Italia.)
Glischrochilus fasciatus (Olivier, 1790)	A	phyto-phagous, parasitic/ predator	North America	1977, DE	DE, CH	I	bark beetle predator, vegetables, fruits	Audisio (1993)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Glischrochilus quadrisignatus (Say, 1835)	A	phyto-phagous, parasitic/ predator	North America	1950, DE	AL, AT, BY, BA, BG, HR, CZ, FR, DE, GR, HU, IT, LI, LT, MD, ME, PL, RO, RU, RS, SK, SI, SE, CH, UA, GB	I	bark beetle predator, vegetables, fruits	Audisio (1993), Glavendekic et al. (2005), Mendonça and Borges (2009), Ratti. Coleotteri alieni in Italia., Reemer (2003), Šefrova and Lastuvka (2005), Tomov (2009), Wittenberg et al. (2006)
Meligethes ruficornis (Marsham, 1802)	C	phyto-phagous	Crypto-genic	Unknown	MT, GB	G,I2	*Ballota nigra* pollen	Audisio (1993), Duff (2008), Mifsud and Audisio (2008)
Nitidula carnaria (Schaller, 1783)	C	detriti-vorous	Crypto-genic	2005, PT-AZO	MT, PT-AZO	J1		Audisio (1993), Borges et al. (2005), Mendonça and Borges (2009), Mifsud and Audisio (2008)
Omosita colon (Linnaeus, 1758)	C	detriti-vorous	Crypto-genic	2005, PT-AZO	PT-AZO	E, G, I, J	old bones left on the soil surface	Audisio (1993), Borges et al. (2005), Mendonça and Borges (2009)
Omosita discoidea (Fabricius, 1775)	C	detriti-vorous	Crypto-genic	2005, PT-AZO	PT-AZO	E, G, I, J	cadavers, carrion	Audisio (1993), Borges et al. (2005), Mendonça and Borges (2009)
Phenolia tibialis (Boheman, 1851)	A	detriti-vorous	Africa	2005, PT-AZO	PT-AZO	I2	decaying and rotting fruits	Borges et al. (2005), Mendonça and Borges (2009)
Stelidota geminata (Say, 1825)	A	phyto-phagous, parasitic/ predator	C & S America	1900, IT	FR, IT, PT-AZO, SI, ES-CAN, CH	I	in insect galleries under oak bark, strawberries and other fruits	Audisio (1993), Borges et al. (2005), Mendonça and Borges (2009), Ratti. Coleotteri alieni in Italia.)
Urophorus humeralis (Fabricius, 1798)	A	detriti-vorous	Asia-Tropical	1976, IT	AL, AT, BA, BG, HR, CY, FR, FR-COR, GR, GR-CRE, GR-ION, GR-NEG, GR-SEG, IT, IT-SAR, IT-SIC, MT, ME, PT, PT-MAD, RU, RS, SI, ES, ES-BAL, ES-CAN, UA	J1	dry fruits and vegetables	Audisio (1993), Machado and Oromi (2000), Tomov (2009)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Passandridae								
Catogenus rufus (Fabricius, 1798)	A	parasitic/ predator	North America	2007, AT	AT	F9	predator of wood-boring Coleoptera in riverine forest	Mitter and Schuh (2008)
Phalacridae								
Phalacrus politus Melsheimer, 1844	A	phyto-phagous	North America	Unknown	PT-AZO	I	sweetcorn	Borges et al. (2005), Mendonça and Borges (2009)
Ptiliidae								
Acrotrichis henrici (Matthews, 1872)	A	detriti-vorous	North America	1966, GB	DK, DE, NL, NO, SE, GB	G, J6	compost	Duff (2008), Freude et al. (1971), Reemer (2003), Sörensson and Johnson (2004)
Acrotrichis insularis (Maklin, 1852)	A	detriti-vorous	North America	1965, NO, BG	AT, CZ, DK, FI, FR, DE, IE, NL, NO, PT-AZO, PT-MAD, SE, CH, GB	G, J6	compost, saprophagous, fungivore	Borges et al. (2005), Duff (2008), Freude et al. (1971), Freude et al. (1989), Mendonça and Borges (2009), Ødegaard and Tømmerås (2000), Sörensson and Johnson (2004), Wittenberg et al. (2006)
Acrotrichis josephi (Matthews, 1872)	A	detriti-vorous	North America	1987, GB	GB	I	grass moving; litter, roting organic material	Duff (2008), Sörensson and Johnson (2004)
Acrotrichis sanctaehelenae Johnson, 1972	A	detriti-vorous	Africa	1964, ES-CAN	FR, IT, PT, ES-CAN, CH, GB	I, J6	anthropogenic habitats, dung, compost, rotting organic substances	Duff (2008), Machado and Oromi (2000), Ratti. Coleotteri alieni in Italia., Sörensson and Johnson (2004), Wittenberg et al. (2006)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Baeocrara japonica (Matthews, 1884)	A	detriti-vorous	Asia	1974, FI	AT, BY, CZ, DK, FI, DE, HU, LV, NO, SK, SE	I, J	compost, saprophagous, fungivore	Freude et al. (1989), Ødegaard and Tømmerås (2000), Ratti. Coleotteri alieni in Italia., Sörensson and Johnson (2004)
Ptinella cavelli (Broun, 1893)	A	detriti-vorous	Australasia	1936, GB	IE, GB	G3, G4	under tight bark of dead broad-leaves and conifers	Sörensson and Johnson (2004)
Ptinella errabunda Johnson, 1975	A	detriti-vorous	Australasia	1925, GB	DE, IE, NL, GB	G3	under tight bark of most species of dead trees	Freude et al. (1989), Reemer (2003), Sörensson and Johnson (2004)
Ptinella simsoni (Matthews, 1878)	A	detriti-vorous	Australasia	1929, GB	GB	G,I2 ?	heap in crass cuttings in wooded areas around large coastal cities (e.g. London, Liverpool)	Sörensson and Johnson (2004)
Ptinella taylorae Johnson, 1977	A	detriti-vorous	Australasia	1967, GB	IE, GB	G3, G4	under tight bark of dead trees	Duff (2008), Sörensson and Johnson (2004)
Bambara contorta (Dybas, 1066)	A	detriti-vorous	Tropical, subtropical	1997, DE	DE	E5	forest litter	Ryndevich (2004)
Bambara fusca (Dybas, 1966)	A	detriti-vorous	North America	1997, DE	DE	E5	forest litter	Sörensson and Johnson (2004)
Ptinella johnsoni Rutanen, 1985	A	detriti-vorous	Asia	1978, FI, SE	FI, NO, SE	E5	taiga, litter	Sörensson and Johnson (2004)
Ptilodactylidae								
Ptilodactyla exotica Chapin, 1927	A	detriti-vorous	Africa	1971, IT	FR, IT, SI, CH	J1, J100	*Dracaena* in greenhouse; plants in appartments	Aberlenc and Allemand (1997), Mann (2006), Wittenberg et al. (2006)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Ptilodactyla luteipes Pic, 1924	C	detritivorous	Cryptogenic	1952, DE	DE	J100	greenhouse	
Ripiphoridae								
Ripidius pectinicornis Thunberg, 1806	A	parasitic/predator	Asia	Unknown	DK, FI, IT, NL	J	*blatta* parasitoid, synanthropic	Bétis (1912), Falin (2001), Freude et al. (1969)
Rutelidae								
Popilia japonica Newman, 1841	A	phytophagous	Asia	2005, PT-AZO	PT-AZO	I2	polyphagous deciduous	Borges et al. (2005), Mendonça and Borges (2009), Paulian and Baraud (1982)
Salpingidae								
Aglenus brunneus (Gyllenhall)	C	detritivorous	Cryptogenic	2005, PT-AZO	PT-AZO	J1	anthropophilic: attic, stables, poultry, damage cultivated mushrooms; rodent nests in forests	Borges et al. (2005)
Silvanidae								
Ahasverus advena (Waltl, 1832)	A	detritivorous	C & S America	1875, CZ	AT, BY, BG, CZ, DK, EE, FI, DE, LT, MT, PL, PT-AZO, SE, CH	I, J1	saprophagous-stored products; compost, clethrophage in field	Borges et al. (2005), Mendonça and Borges (2009), Ødegaard and Tømmerås (2000), Šefrova and Lastuvka (2005), Tomov (2009), Wittenberg et al. (2006)
Cryptamorpha desjardinsi (Guérin-Méneville, 1844)	A	detritivorous, parasitic/predator	Tropical, subtropical	1911, DE	BE, DK, DE, NL, PT-AZO, ES-CAN	G, I, J	banana, ananas; dead plants, bark, cadavers; larva predator	Borges et al. (2005), Machado and Oromi (2000), Mendonça and Borges (2009), Ratti (2007)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Nausibius clavicornis (Kugelann, 1794)	C	detritivorous	Cryptogenic	1906, FR	DK, FR, PT-AZO	J1	stored products	Borges et al. (2005), Mendonça and Borges (2009), Ratti (2007), Moncoutier (2002)
Oryzaephilus acuminatus Halstead, 1980	A	detritivorous	Asia	1980, GB	GB	J1	coconut, *azadirachta* seeds	Duff (2008)
Oryzaephilus mercator (Fauvel, 1889)	A	detritivorous	Tropical, subtropical	1962, CZ	AT, BY, BG, CZ, DK, EE, HU, LV, MT, NO, PT, PT-AZO, ES-CAN, CH	J1	psychophage, stored products	Borges et al. (2005), Machado and Oromi (2000), Mendonça and Borges (2009), Šefrova and Lastuvka (2005), Tomov (2009), Wittenberg et al. (2006)
Oryzaephilus surinamensis (Linnaeus, 1758)	C	detritivorous	Cryptogenic	1894, PT	AT, BY, BG, CZ, DK, EE, FR, DE, HU, LV, LT, MT, NO, PT, PT-AZO, RS, ES-CAN, CH	J1	psychophage, stored products	Borges et al. (2005), Glavendekic et al. (2005), Machado and Oromi (2000), Mendonça and Borges (2009), Šefrova and Lastuvka (2005), Tomov (2009), Wittenberg et al. (2006)
Silvanus lateritius (Broun, 1880)	A	detritivorous	Australasia	Unknown	PT-AZO	J1		Borges et al. (2005), Mendonça and Borges (2009), Ratti. Coleotteri alieni in Italia.)
Silvanus lewisi Reitter, 1876	A	detritivorous	Asia	Unknown	MT	J1, G	rice, manioc, stored products; under bark of dead trees in field	Ratti (2007), Ratti. Coleotteri alieni in Italia.)
Silvanus recticollis Reitter, 1876	A	detritivorous	Africa	Unknown	IT-SAR, IT-SIC	J1		Ratti. Coleotteri alieni in Italia.)
Staphylinidae								
Acrotona pseudotenera (Cameron, 1933)	A	parasitic/ predator	Asia	1988, FI	AT, DK, FI, DE, NO, SE, CH	I	compost, predator, fungivorous	Luka et al. (2009), Ødegaard and Tømmerås (2000), Wittenberg et al. (2006)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Adota maritima Mannerheim, 1843	A	parasitic/ predator	North America	Unknown	GB	B	decomposing seaweed, predator flies	Duff (2008)
Aleochara puberula Klug, 1833	C	parasitic/ predator	Crypto-genic	Unknown	AT, PT-AZO	I1, J	predator of cyclorrhaphous Diptera (*Musca*) in stables	Borges et al. (2005), Freude et al. (1974), Mendonça and Borges (2009)
Anotylus nitidifrons (Wollaston, 1871)	C	parasitic/ predator	Crypto-genic	Unknown	PT-AZO, ES-CAN	I	predator on *Delia* (carrots)	Borges et al. (2005), Machado and Oromi (2000), Mendonça and Borges (2009)
Atheta dilutipennis (Motschulsky, 1858)	A	parasitic/ predator	Africa, Asia	1995, IT	AL, IT, PT-AZO, ES-CAN	U		Borges (1990), Borges et al. (2005), Machado and Oromi (2000), Mendonça and Borges (2009)
Atheta mucronata (Kraatz, 1859)	A	parasitic/ predator	Tropical, subtropical	2002, ES	IT, ES	I2	decaying vegetals, citrus groves	Gamarra and Outerelo (2005), Monzo et al. (2005)
Bisnius palmi (Smetana, 1955)	A	parasitic/ predator	North America	Unknown	AL, CZ, IT, IT-SIC	I, J6		Newton. Staphylinini Species Catalog Draft)
Bisnius parcus (Sharp, 1874)	A	parasitic/ predator	Asia-Temperate	1950, FI, DE	AL, AT, DK, FI, FR, DE, IT, NO, ES-CAN, SE, CH, GB	I, J6	compost, predator	Cho (2008), Duff (2008), Korge (2005), Luka et al. (2009), Ødegaard and Tømmerås (2000), Ratti. Coleotteri alieni in Italia., Tronquet (2006)
Bohemiellina flavipennis (Cameron, 1921)	C	parasitic/ predator	Crypto-genic	1941, FI, DE	AT, BE, DK, FI, FR, DE, NO, SE, GB	B1, E3	compost	Ødegaard and Tømmerås (2000), Tronquet (2006)
Carpelimus bilineatus Stephens, 1834	C	phyto-phagous	Crypto-genic	2005, PT-AZO	PT-AZO	B1, E3	grassy coastal patches, sand dunes	Borges et al. (2005), Mendonça and Borges (2009), Tronquet (2006)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Carpelimus corticinus (Gravenhorst, 1806)	C	phyto-phagous	Crypto-genic	2005, PT-AZO	PT-AZO	B1, E3	floodplains, river banks, sand beaches	Borges (1990), Borges et al. (2005), Tronquet (2006)
Carpelimus gracilis (Mannerheim, 1830)	C	parasitic/ predator	Crypto-genic	2005, PT-AZO	PT-AZO	B1, E3	floodplains, river banks, sand beaches	Borges et al. (2005), Tronquet (2006)
Carpelimus pusillus (Gravenhorst, 1802)	C	parasitic/ predator	Crypto-genic	2005, PT-AZO	PT-AZO	B1, E3	floodplains, river banks, sand beaches	Borges et al. (2005), Mendonça and Borges (2009)
Carpelimus subtilis (Erichson, 1839)	C	unknown	Crypto-genic	2005, PT-AZO	PT-AZO	B	floodplains, river banks, sand beaches	Borges et al. (2005), Duff (2008), Vorst et al. (2007)
Carpelimus zealandicus (Sharp, 1900)	A	unknown	Australasia	2000, DE	AT, BE, DE, SE, CH, GB	E	Sandy banks	Cuppen (2003), Korge (2005), Luka et al. (2009)
Cilea silphoides (Linnaeus, 1767)	C	parasitic/ predator	Crypto-genic	2005	PT-AZO, ES-CAN	U	cattle dung	Borges et al. (2005), Machado and Oromi (2000), Mendonça and Borges (2009), Tronquet (2006)
Coproporus pulchellus (Erichson, 1839)	A	unknown	North America	Unknown	PT-AZO, PT-MAD, ES-CAN	U		Borges et al. (2005), Machado and Oromi (2000), Mendonça and Borges (2009)
Diestota guadalupensis Pace, 1987	A	unknown	C & S America	1982, IT	IT	U		Ratti. Coleotteri alieni in Italia.)
Leptoplectus remyi (Jeannel, 1961)	A	parasitic/ predator	Asia	Unknown	CH	U		Wittenberg et al. (2006)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Lithocharis nigriceps (Kraatz, 1859)	A	parasitic/ predator	Asia-Tropical	1912, CZ	AL, AT, BE, CZ, DK, EE, FI, FR, DE, HU, IT, LV, NL, NO, PL, PT-AZO, SK, ES, SE, CH, UA, GB	I, J6	compost, predator.	Borges et al. (2005), Duff (2008), Freude et al. (1964), Korge (2005), Luka et al. (2009), Ødegaard and Tømmerås (2000), Šefrova and Lastuvka (2005), Tronquet (2006)
Myrmecocephalus concinna (Erichson,1840)	C	detriti-vorous	Crypto-genic	1970, DE	DE, PT-AZO, PT-MAD, RU, ES-CAN, SE, GB	G	deadwood	Duff (2008), Korge (2005), Machado and Oromi (2000), Tronquet (2006)
Myrmecopora brevipes Butler, 1909	C	parasitic/ predator	Crypto-genic	Unknown	FR, IE, GB	U	in wet sand under plants	Anderson (1997), Scheerpeltz (1972)
Nacaeus impressicollis (Motschulsky, 1857)	A	unknown	Africa (or Asia?)	2005, PT-AZO	CZ, PT-AZO	I2,G?		Borges et al. (2005), Mendonça and Borges (2009), Rogé (2003), Tronquet (2006)
Oligota parva Kraatz, 1862	A	detriti-vorous	C & S America	1858, FR	AT, BE, BA, HR, DK, EE, FI, FR, FR-COR, DE, GR, GR-CRE, IT, IT-SIC, NL, NO, PL, PT-AZO, PT-MAD, ES-CAN, SE, CH, GB	I, J6	compost, predator, fungivorous. Synanthropic	Borges et al. (2005), Freude et al. (1974), Korge (2005), Luka et al. (2009), Machado and Oromi (2000), Mendonça and Borges (2009), Ødegaard and Tømmerås (2000), Reemer (2003), Wittenberg et al. (2006)
Oxytelus migrator Fauvel, 1904	A	detriti-vorous	Asia	1975, DK	AT, BE, CZ, DK, FR, DE, IT, LT, LU, NO, SE, CH	I, J6	compost, saprophagous	Korge (2005), Luka et al. (2009), Ratti. Coleotteri alieni in Italia., Šefrova and Lastuvka (2005), Wittenberg et al. (2006)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Paraphloeostiba gayndahensis (Mac Leay, 1871)	A	detriti-vorous	Australasia	1988, IT	FR, DE, IT, IT-SIC, PT, ES, ES-CAN, CH	I, J6	rotting fallen fruits of various trees, decaying vegetals	Duff (2008), Korge (2005), Luka et al. (2009), Machado and Oromi (2000), Ratti. Coleotteri alieni in Italia., Tronquet (2006), Wittenberg et al. (2006)
Philonthus rectangulus Sharp, 1874	A	parasitic/ predator	Asia-temperate	1920, IT	AL, AT, BE, BA, BG, HR, CZ, DK, EE, FI, FR, DE, GR, HU, IT, IT-SAR, LV, LT, LU, MD, ME, NL, NO, PT, PT-AZO, PT-MAD, RO, RS, SK, SI, ES, ES-CAN, SE, CH, UA, GB	I, J6	compost, predator	Borges et al. (2005), Coiffait (1972), Korge (2005), Luka et al. (2009), Machado and Oromi (2000), Ødegaard and Tømmerås (2000), Šefrova and Lastuvka (2005), Tomov (2009), Tronquet (2006), Wittenberg et al. (2006)
Philonthus spinipes Sharp, 1874	A	parasitic/ predator, detrivorous	Asia	1980, IT	AL, AT, BG, CZ, DK, FR, IT, LT, RU, CH	J1, J6	in stable litter, cadavers	Callot (1993), Luka et al. (2009), Ratti. Coleotteri alieni in Italia., Šefrova and Lastuvka (2005), Tomov (2009), Tronquet (2006)
Tachinus sibiricus Sharp, 1888	A	unknown	Asia	Unknown	AT	U		
Trichiusa immigrata Lohse, 1984	A	unknown	North America	1975, DE	AL, AT, BE, CZ, DK, FR, DE, IT, NO, ES-CAN, SE, CH	I, I2	compost, predator, fungivorous	Korge (2005), Luka et al. (2009), Ødegaard and Tømmerås (2000), Ratti. Coleotteri alieni in Italia., Tronquet (2006), Wittenberg et al. (2006)
Teropalpus unicolor (Sharp, 1900)	A	parasitic/ predator, detrivorous	Australasia	Unknown	GB	I2	halophilous	Duff (2008), Kuschel (1990)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Tenebrionidae								
Alphitobius diaperinus (Panzer, 1797)	A	parasitic/ predator, detrivorous	Tropical, subtropical	1921, ME	AT, BG, DK, EE, FR, FR-COR, DE, HU, IT, LV, LT, MT, ME, NO, ES-CAN, CH, GB	J1, J6, G	minor pest of residues, common inhabitant of chicken houses; feeds on faeces and wastes; outdoors in rotten trunks and bird/ bat nests	Borges et al. (2005), Duff (2008), Freude et al. (1969), Tomov (2009), Wittenberg et al. (2006)
Alphitobius laevigatus (Fabricius, 1781)	A	detriti-vorous	Tropical, subtropical	Unknown	DK, EE, FR, MT, ES-CAN, GB	J1, J6, G	minor pest of residues; stored products; outdoors on fungi in trunks	Borges et al. (2005), Duff (2008), Freude et al. (1969), Machado and Oromi (2000)
Alphitophagus bifasciatus (Say, 1823)	C	detriti-vorous	Crypto-genic	1940, BG	AL, AT, BG, HR, DK, FI, FR, DE, GR, HU, LT, NO, RO, SE, CH	J1, J6, G	minor pest of residues; compost, Mainly domestic in rotten fruits; under bark old stumps	Freude et al. (1969), Ødegaard and Tømmerås (2000), Tomov (2009), Wittenberg et al. (2006)
Cynaeus angustus (Leconte, 1851)	A	detriti-vorous	C & S America	1988, SE	FI, FR, DE, SE	J6	saprophagous, waste heaps	Ferrer (2004), Ferrer and Andersson (2002), Reibnitz and Schawaller (2006), Soldati (2007)
Cynaeus depressus Horn, 1870	A	detriti-vorous	C & S America	1988, SE	SE	U	waste heaps	Ferrer (2004), Mannerkoski and Ferrer (1992)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Gnathocerus cornutus (Fabricius, 1798)	A	detritivorous	C & S America	1900, CZ	AT, CZ, EE, FR, DE, IT, IT-SAR, IT-SIC, LV, MT, PT-AZO, ES-CAN, CH, GB	J1	cereal grains in warehouses	Borges et al. (2005), Duff (2008), Freude et al. (1969), Machado and Oromi (2000), Mendonça and Borges (2009), Šefrova and Lastuvka (2005), Wittenberg et al. (2006)
Gnathocerus maxillosus (Fabricius, 1801)	C	detritivorous	Cryptogenic	1977, IT	AL, FR, FR-COR, IT, ES-CAN	J1	cereal grains in warehouses	Machado and Oromi (2000), Tomov (2009)
Latheticus oryzae Waterhouse, 1880	A	detritivorous	Asia	1973, BG, CZ	AL, AT, BG, CZ, DK, EE, FR, IT, IT-SIC, RS, ES-CAN, CH, GB	J1	stored products, cereals in warehouses	Duff (2008), Freude et al. (1969), Glavendekic et al. (2005), Machado and Oromi (2000), Šefrova and Lastuvka (2005), Tomov (2009), Wittenberg et al. (2006)
Lyphia tetraphylla (Fairmaire, 1856)	A	detritivorous	Asia	1934, CZ	HR, CZ, FR, GR, ME	U		Šefrova and Lastuvka (2005)
Palorus ratzeburgi (Wissmann, 1848)	A	detritivorous	Africa	1976, LT	HR, DK, FR, GR, LT, ES-CAN, GB	J1	stored products, mainly cereals; mycophagous	Borges et al. (2005), Duff (2008), Freude et al. (1969), Machado and Oromi (2000)
Palorus subdepressus (Wollaston, 1864)	A	detritivorous	Africa	1975, BG	BG, HR, CZ, DK, FR, GR, MT, PT-AZO, ES-CAN, GB	J1	stored products, mainly cereals; mycophagous	Borges et al. (2005), Duff (2008), Freude et al. (1969), Machado and Oromi (2000), Šefrova and Lastuvka (2005), Tomov (2009)
Tribolium castaneum (Herbst, 1797)	C	detritivorous	Cryptogenic	1900, CZ	AL, AT, BG, CZ, DK, EE, FR, FR-COR, DE, GR, HU, LV, LT, MT, ME, NO, PT, PT-AZO, RO, ES-CAN, CH, GB	J1, J2	stored products	Borges et al. (2005), Duff (2008), Freude et al. (1969), Machado and Oromi (2000), Mendonça and Borges (2009), Šefrova and Lastuvka (2005), Tomov (2009), Wittenberg et al. (2006)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Tribolium confusum Jacquelin du Val, 1868	A	detriti-vorous	Africa	1900, CZ	AL, AT, BG, HR, CZ, DK, EE, FR, DE, GR, HU, IT, LV, LT, NO, PT-AZO, ES-CAN, CH, GB	J1, J2	stored products	Borges et al. (2005), Duff (2008), Freude et al. (1969), Machado and Oromi (2000), Šefrova and Lastuvka (2005), Tomov (2009), Wittenberg et al. (2006)
Tribolium destructor Uyttenboogaart, 1933	A	detriti-vorous	tropical	1927, DE	AL, AT, BG, CZ, DK, EE, DE, HU, IT, LV, LT, NO, ES-CAN, CH, GB	J1, J2	stored products	Duff (2008), Freude et al. (1969), Machado and Oromi (2000), Ratti. Coleotteri alieni in Italia., Šefrova and Lastuvka (2005), Tomov (2009), Wittenberg et al. (2006)
Zophobas morio (Fabricius, 1776)	A	detriti-vorous	C & S America	Unknown	LV	J	used as food for reptile pets	Thomas (1995)
Trogidae								
Omorgus subcarinatus (MacLeay, 1864)	A	detriti-vorous	Australasia	1997, ES	ES	J1, J6		Bercedo (1997)
Omorgus suberosus (Fabricius, 1775)	A	detriti-vorous	Australasia	1997, ES	ES	J1, J6		Bercedo (1997)
Trogossitidae								
Lophocateres pusillus (Klug, 1832)	A	detriti-vorous	Asia	1962, CZ	AL, CZ, DK, IT	J1	psychophage, necrophagous; rice, stored products	Šefrova and Lastuvka (2005)
Tenebroides maroccanus Reitter 1884	A	parasitic/ predator	Africa	2005, PT-AZO	PT-AZO	G	predator egg *Lymantria dispar*	Borges et al. (2005)

Family species	**Status**	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Tenebroides mauritanicus (Linnaeus, 1758)	A	detriti-vorous	Africa	1803, PT	AT, BG, CZ, DK, EE, DE, IT, LV, LT, PT, PT-AZO, RS, CH	J1, G	psychophage, carnivorous; stored products, bark in field	Borges et al. (2005), Glavendekic et al. (2005), Mendonça and Borges (2009), Šefrova and Lastuvka (2005), Tomov (2009)
Zopheridae								
Microprius rufulus (Motschulsky, 1863)	A	unknown	Africa	Unknown	MT	U	timber	Schuh and Mifsud (2000)
Pycnomerus fuliginosus Erichson, 1842	A	unknown	Australasia	1962, GB	GB	B2, I2		Duff (2008)
Pycnomerus inexpectus (Jaquelin Du Val, 1859)	C	unknown	Crypto-genic	1901, IT	AL, AT, BE, CZ, FR, IT, ES, GB	J100	orchid greenhouses	Ratti. Coleotteri alieni in Italia.)

Table 9.5.2. List and characteristics of the Coleoptera species alien *in* Europe of families other than Cerambycidae, Curculionidae *sensu lato*, Chrysomelidae *sensu lato* and Coccinelidae. Country codes abbreviations refer to ISO 3166 (see Appendix I). Habitat abbreviations refer to EUNIS (see Appendix II).

Family *Species*	Regime	Native range	1st record in Europe	Invaded countries	Habitat	Host	References
Anobiidae							
Anobium punctatum De Geer, 1774	phyto-phagous	Europe	Unknown	PT-AZO, ES-CAN	J	wooden furnitures; twigs	Borges et al. (2005), Espanol (1992), Machado and Oromi (2000), Mendonça and Borges (2009)
Oligomerus ptilinoides (Wollaston, 1854)	phyto-phagous	Medi-terranean region	Unknown	AT, DE, HU, PL, PT-MAD, SK, ES-CAN, CH	G, J1	wood broadleaved trees and furnitures	De Laclos and Büche (2009), Espanol (1992), Machado and Oromi (2000), Wittenberg et al. (2006)
Ptinus dubius Sturm, 1837	detriti-vorous	Europe	Unknown	ES-CAN	J1	stored products	Machado and Oromi (2000)
Sphaericus gibboides (Boieldieu, 1854)	detriti-vorous	Medi-teranean	Unknown	DK, GB	J	psychophage; dry roots	Duff (2008)
Anthicidae							
Cordicomus instabilis (Schmidt, 1842)	unknown	Palaearctic	Unknown	PT-AZO	B1	sandy grounds	Borges et al. (2005)
Cyclodinus humilis (Germar, 1824)	unknown	Europe	Unknown	PT-AZO	U	clayey ground	Borges et al. (2005), Mendonça and Borges (2009)
Omonadus formicarius (Goeze, 1777)	detriti-vorous	Europe, cosmopolitan almost	Unknown	PT-AZO	J6	vegetal decay	Borges et al. (2005), Mendonça and Borges (2009)
Aphodiidae							
Calamosternus granarius (Linnaeus, 1767)	detriti-vorous	North Africa, Europe	Unknown	PT-AZO	E	dung	Borges et al. (2005), Mendonça and Borges (2009)
Pleurophorus caesus (Creutzer, 1796)	detriti-vorous	Eurasia, north America	Unknown	PT-AZO	E	dung	Borges et al. (2005), Mendonça and Borges (2009)
Buprestidae							
Agrilus angustulus (Illiger, 1803)	phyto-phagous	Europe	2005, PT-AZO	PT-AZO	G	*Quercus*	Borges et al. (2005), Cobos (1986), Freude et al. (1979), Schaefer (1949), Théry (1942)

Family *Species*	Regime	Native range	1st record in Europe	Invaded countries	Habitat	Host	References
Buprestis novemmaculata Linnaeus, 1758	phyto-phagous	All over Europe	2005, PT-AZO	PT-AZO	I2	conifers	Borges et al. (2005), Cobos (1986), Freude et al. (1979), Mendonça and Borges (2009), Schaefer (1949), Théry (1942)
Melanophila acuminata (De Geer, 1774)	phyto-phagous	holarctic	Unknown	GB	F4	conifers	Cobos (1986), Duff (2008), Freude et al. (1979), Schaefer (1949), Théry (1942)
Byrrhidae							
Simplocaria semistriata (Fabricius, 1794)	phyto-phagous	Central & southeast Europe	Unknown	FÖ	E	synathropic steppe; feeds on moss (*Mnium*)	Bengtson (1981), Enckell et al. (1987), Freude et al. (1979)
Carabidae							
Abax parallelus Duftschmid, 1812	parasitic/ predator	Central Europe	1800, GB	GB	G		Duff (2008), Jeannel (1942), Luff (2007), Valemberg (1997)
Amara aenea (De Geer, 1774)	phyto-phagous	Palaearctic	Unknown	PT-AZO, ES-CAN	E, I	Poaceae seeds	Borges et al. (2005), Machado and Oromi (2000), Mendonça and Borges (2009), Valemberg (1997)
Amara anthobia A. Villa & G.B. Villa, 1833	phyto-phagous	Medi-terranean region, Central Europe	Unknown	GB	F4, B1	Poaceae seeds; sandy soils	Duff (2008), Luff (1998), Luff (2007)
Amara aulicus (Panzer, 1797)	phyto-phagous	Palaearctic	Unknown	FÖ	E, I	compositea & carduaceae seeds, waste lands	Bengtson (1981), Enckell et al. (1987)
Amara montivaga Sturm, 1825	phyto-phagous	Central Europe, mountains	1972, IE	IE	F4, B1, I	Poaceae seeds	Anderson et al. (2000)
Anisodactylus binotatus (Fabricius, 1787)	parasitic/ predator	Medi-terranean region, Central Europe	Unknown	IS, IE, LI, PT-AZO, PT-MAD, GB	E3, I	Apiaceae seeds	Anderson et al. (2000), Duff (2008), Borges et al. (2005), Luff (2007), Mendonça and Borges (2009), Valemberg (1997)

Family *Species*	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Callistus lunatus (Fabricius, 1775)	parasitic/ predator	Europe, Asia minor	Unknown	GB	B1, F9, G	sandy soil, under felled trunks, bark, tree bases	Duff (2008), Luff (1998), Luff (2007)
Carabus auratus Linnaeus, 1758	parasitic/ predator	Western Europe	Unknown	GB	I1,E, G5	plains, waste lands, predator molluscs	Duff (2008), Luff (2007), Turin et al. (2003)
Carabus cancellatus Linnaeus, 1758	parasitic/ predator	Western and Central Europe	Unknown	GB	E5	dry soil, field, forest edge	Duff (2008), Luff (2007), Turin et al. (2003)
Carabus convexus Fabricius, 1775	parasitic/ predator	Eurosiberian	1836, GB	GB	G	forests	Duff (2008), Luff (2007), Turin et al. (2003)
Carabus nemoralis O.F. Müller, 1764	parasitic/ predator	West Palaearctic	Unknown	IS	I2, I1, G	woodlands, fields, gardens	Libungan et al. (2008), Turin et al. (2003)
Demetrias atricapillus (Linnaeus, 1758)	parasitic/ predator	Eurosiberian	Unknown	ES-CAN	F9, D	in vegetal decays along rivers and bogs, *Carex*, *Oenanthe*	Machado and Oromi (2000)
Epaphius secalis (Paykull, 1790)	parasitic/ predator	Eurosiberian	Unknown	IS	F9	along rivers, mountains (orophilous)	
Graniger femoralis (Coquerel, 1858)	phyto-phagous	Spain, Italy, Crimea	Unknown	ES-CAN	H	seeds, under stones	Machado and Oromi (2000)
Harpalus distinguendus (Duftschmid, 1812)	phyto-phagous	Medi-terranean	Unknown	ES-CAN	I	seeds; dry soils, paths, fields, dunes	Machado and Oromi (2000), Mendonça and Borges (2009)
Leistus rufomarginatus (Duftschmid, 1812)	parasitic/ predator	Eastern, central, western Europe	1942, GB	GB	G, I	mountains, forests, waste lands	Duff (2008), Luff (1998), Luff (2007)
Leistus terminatus (Panzer, 1793)	parasitic/ predator	Eurosiberian	Unknown	IS	F9, G	osieries	
Licinus punctatulus (Fabricius, 1792)	parasitic/ predator	Spain, North Africa	Unknown	PT-AZO, ES-CAN	H5	under stones, arid, sandy environments	Borges et al. (2005), Machado and Oromi (2000), Mendonça and Borges (2009), Valemberg (1997)

Family *Species*	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Lymnastis galilaeus Piochard de la Brûlerie, 1876	parasitic/ predator	Southern Europe	Unknown	AT, HU, UA	B, D	waste, near littoral, bogs	Valemberg (1997)
Microlestes minutulus (Goeze, 1777)	parasitic/ predator	Palaearctic	1976, GB	GB	G1	dry soil, under deciduous	Duff (2008), Luff (1998), Luff (2007)
Notaphus varius (Olivier, 1795)	parasitic/ predator	Europe, Minor Asia	Unknown	ES-CAN	D6, F9	salty marshes, along rivers, lakes	Machado and Oromi (2000), Ortuno and Toribio (2005)
Ocydromus tetracolus (Say, 1823)	parasitic/ predator	Palaearctic	Unknown	IS	F9	humid environments, herbs, along rivers	
Paranchus albipes (Fabricius, 1796)	parasitic/ predator	Europe, North Africa	Unknown	PT-AZO	F9, B	along rivers, coast	Borges et al. (2005), Mendonça and Borges (2009)
Philochthus guttula (Fabricius, 1792)	parasitic/ predator	Europe, Asia minor	1900, IE	IE	G, D	near bogs in forests	Anderson et al. (2000)
Pterostichus angustatus (Duftschmid, 1812)	parasitic/ predator	Northern and Central Europe	1900, GB	GB	H, G	associated with burnt sites	Duff (2008), Luff (1998), Luff (2007)
Pterostichus cristatus (Dufour, 1820)	parasitic/ predator	Europe	1800, GB	GB	G, F9	under stones in fresh, humid woods	Duff (2008), Luff (1998), Luff (2007)
Pterostichus vernalis (Panzer, 1796)	parasitic/ predator	Europe	Unknown	PT-AZO	E3	waste in wet grasslands, near bogs	Borges et al. (2005), Duff (2008), Mendonça and Borges (2009)
Scybalicus oblongiusculus (Dejean, 1829)	parasitic/ predator	Europe	1879, GB	GB	E2, I	in colonies in non-cultivated fields	Duff (2008), Luff (1998), Luff (2007)
Sphodrus leucophthalmus (Linnaeus, 1758)	parasitic/ predator	West Palaearctic	Unknown	IE, ES-CAN, GB	J2	cellars, stables	Anderson et al. (2000), Duff (2008), Machado and Oromi (2000), Luff (1998), Luff (2007), Valemberg (1997)
Tachyta nana (Gyllenhal, 1810)	parasitic/ predator	Holarctic	Unknown	ES-CAN	G3	under humid bark, in bark beetle galleries in *Abies* and *Cedrus*	Machado and Oromi (2000)

Family *Species*	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Trechus subnotatus Dejean, 1831	parasitic/ predator		1940, IE	IE, GB	J6, J2, I2	near littoral; in compost in Ireland	Duff (2008), Anderson et al. (2000), Luff (1998), Luff (2007)
Tschitscherinellus cordatus (Dejean, 1825)	phyto-phagous	Spain, North Africa, Crimea	Unknown	ES-CAN	H5	mountains under stones, arid, sandy environments; granivore	Machado and Oromi (2000)
Clambidae							
Clambus pallidulus Reitter, 1911	detriti-vorous	southern Europe, Minor Asia	Unknown	AL, DK, DE, HU, IE, NL, SE, CH, GB	G	in hollow *Malus*, debris in rotten stump, in moss among rotten logs	Duff (2008)
Cleridae							
Enoplium serraticorne (Olivier, 1790)	parasitic/ predator	Medi-terranean Region	1990, CZ	CZ	J6	predatory	Freude et al. (1979), Šefrova and Lastuvka (2005)
Opilo domesticus (Sturm, 1837)	parasitic/ predator	Europe, North Africa	Unknown	PT-AZO	J	buildings, prey anobiids	Borges et al. (2005), Freude et al. (1979)
Opilo mollis (Linnaeus, 1758)	parasitic/ predator	Europe, North Africa	Unknown	PT-AZO	J	timber, prey larvae anobiids, buildings	Borges et al. (2005), Freude et al. (1979)
Corylophidae							
Sericoderus lateralis (Gyllenhal, 1827)	detriti-vorous	palaearctic	Unknown	PT-AZO	I, J1	moldy plant remains in warm places, especially garden compost and grass cuttings	Borges et al. (2005), Bowestead (1999), Mendonça and Borges (2009)
Cryptophagidae							
Atomaria apicalis Erichson, 1846	detriti-vorous	Europe	Unknown	FÖ, PT-AZO	J6	mycophage	Bengtson (1981), Borges et al. (2005), Enckell et al. (1987), Falcoz (1929), Freude et al. (1967)
Atomaria bella Reitter, 1875	detriti-vorous	Europe, north Africa	1967, GB	GB	G3	mycophage	Duff (2008)

Family *Species*	Regime	Native range	1st record in Europe	Invaded countries	Habitat	Host	References
Atomaria fuscata (Schönherr, 1808)	detritivorous	Europe	Unknown	GB	U	mycophage; also adults damaging beet	Duff (2008), Falcoz (1929)
Atomaria fuscipes (Gyllenhal, 1808)	detritivorous	Europe	Unknown	GB	U	mycophage; also adults damaging beet	Duff (2008), Falcoz (1929), Freude et al. (1967)
Atomaria hislopi Wollaston, 1857	detritivorous	Northern Europe	Unknown	GB	U	mycophage	Duff (2008), Falcoz (1929)
Atomaria lohsei Johnson & Strand, 1968	detritivorous	Central Europe, Spain	1976, GB	GB	G3	rotten wood debris abroad; mainly conifer forest	Duff (2008)
Atomaria munda Erichson, 1846	detritivorous	Eurasia	Unknown	PT-AZO, GB	J1	attic	Borges et al. (2005), Falcoz (1929), Freude et al. (1967)
Atomaria nitidula Marsham, 1802	detritivorous	Europe, north Africa	Unknown	GB	J1	mycophage	Duff (2008), Falcoz (1929)
Atomaria punctithorax Reitter, 1887	detritivorous	Central, Northern Europe	Unknown	GB	J1	mycophage	Duff (2008)
Atomaria pusilla (Paykull, 1798)	detritivorous	Europe, north Africa	Unknown	IE, GB	J2, I2	mycophage	Duff (2008), Falcoz (1929), Freude et al. (1967)
Atomaria strandi Johnson, 1967	detritivorous	Central, southern Europe	Unknown	IE, GB	J1	mycophage	Duff (2008)
Atomaria testacea Stephens, 1830	detritivorous	Europe	Unknown	GB	J1	mycophage	Duff (2008), Falcoz (1929)
Atomaria turgida Erichson, 1846	detritivorous	Northern, Central Europe	1996, IE, GB	IE, GB	G3	mycophage	Duff (2008), Falcoz (1929), Freude et al. (1967)
Cryptophagus dentatus (Herbst, 1793)	detritivorous	Palaearctic	1937, PT-MAD	PT-AZO, PT-MAD	J1	flour, dry fruits	Borges et al. (2005), Duff (2008), Falcoz (1929), Freude et al. (1967), Mendonça and Borges (2009)
Cryptophagus distinguendus Sturm 1845	detritivorous	Europe, Asia, Africa	Unknown	FÖ	J1	mills, stored products	Bengtson (1981), Enckell et al. (1987), Falcoz (1929), Freude et al. (1967)

Family *Species*	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Cryptophagus saginatus Sturm, 1845	detriti-vorous	Europe, North Africa	Unknown	PT-AZO	J1	attic	Borges (1990), Borges et al. (2005), Falcoz (1929), Freude et al. (1967), Mendonça and Borges (2009)
Cryptophagus scanicus (Linnaeus, 1758)	detriti-vorous	Europe	Unknown	FÖ	J1	grain, dry fruits	Bengtson (1981), Enckell et al. (1987), Falcoz (1929), Freude et al. (1967)
Cryptophagus schmidti Sturm, 1845	detriti-vorous	Eurasia	Unknown	PT-AZO	J1	mammals and *Vespa* nests	Borges et al. (2005), Falcoz (1929), Freude et al. (1967)
Ephistemus globulus Paykull, 1798	detriti-vorous	Europe	Unknown	IE, PT-AZO, GB	G1	ground, salix basis	Borges et al. (2005), Duff (2008), Falcoz (1929), Mendonça and Borges (2009)
Dermestidae							
Attagenus bifasciatus (Olivier, 1790)	detriti-vorous	southern Europe, Minor Asia	Unknown	DK	J1, E	stored products	
Attegenus brunneus Faldermann, 1835	detriti-vorous	Medi-terranean region	Unknown	CH, GB	J1	domestic	Duff (2008), Freude et al. (1979)
Attegenus pellio Linnaeus, 1758	detriti-vorous	Europe	Unknown	IE, GB	J1, E5, I2	animal materials	Freude et al. (1979)
Attagenus quadrimaculatus Kraatz, 1858	detriti-vorous	southern Europe, Minor Asia	Unknown	CH	J1	domestic	Freude et al. (1979), Wittenberg et al. (2006)
Attagenus rossi Ganglbauer, 1904	detriti-vorous	Cosmo-politan (native? Europe, Africa, USSR)	Unknown	CH	J1	domestic	Wittenberg et al. (2006)

Family *Species*	Regime	Native range	1st record in Europe	Invaded countries	Habitat	Host	References
Attagenus simplex Reitter, 1881	detritivorous	North Africa, Italy	Unknown	SE	J	stored products	
Attagenus trifasciatus (Fabricius, 1787)	detritivorous	Mediterranean region	Unknown	DE, GB	J	stored products	Freude et al. (1979), Hermann and Baena (2004)
Anthrenus coloratus Reitter, 1881	detritivorous	East Mediterranean region	1983, GB	AT, GB	J1, E	skins, stuffed animals	Duff (2008), Freude et al. (1979)
Anthrenus festivus Erichson, 1846	detritivorous	Mediterranean region	Unknown	AT, CH	J1, E	insects in collection; adults on flowers	Freude et al. (1979), Wittenberg et al. (2006)
Anthrenus museorum (Linnaeus, 1761)	detritivorous	Holarctic	Unknown	PT-AZO	J1, E	insects in collection	Borges et al. (2005), Freude et al. (1979)
Anthrenus olgae Kalik, 1946	detritivorous	Central Europe	Unknown	AT, GB	J1, E	stored products	Duff (2008), Freude et al. (1979)
Dermestes murinus Linnaeus, 1758	detritivorous	Europe	Unknown	PT-AZO, ES-CAN	J	domestic on animal products	Borges et al. (2005), Freude et al. (1979), Machado and Oromi (2000)
Dermestes undulatus Brahm, 1790	detritivorous	Holarctic	Unknown	LV, PT-AZO, ES-CAN	J	domestic on animal products	Borges et al. (2005), Freude et al. (1979), Machado and Oromi (2000), Mendonça and Borges (2009)
Derodontidae							
Laricobius erichsonii Rosenhauer, 1846	parasitic/ predator	europe (imported to USA)	1971, GB	GB	G3	aphid predator	Franz (1958), Freude et al. (1979)
Elateridae							
Athous haemorrhoidalis (Fabricius, 1801)	phytophagous	Western, central, Northern Europe	Unknown	PT-AZO	E5	roots cereals, potato	Borges et al. (2005), Laibner (2000), Leseigneur (1972)
Melanotus dichrous (Erichson, 1841)	phytophagous	southern Europe	Unknown	PT-AZO	F5	shrubs	Borges et al. (2005), Leseigneur (1972), Mendonça and Borges (2009)

Family *Species*	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Histeridae							
Acritus nigricornis (Hoffmann, 1803)	parasitic/ predator	Palaearctic	Unknown	PT-AZO, ES-CAN	E	cow, horse dung	Borges et al. (2005), Machado and Oromi (2000), Mendonça and Borges (2009)
Halacritus punctum (Aube, 1843)	parasitic/ predator	europe south	Unknown	PT-AZO	U		Borges et al. (2005), Mendonça and Borges (2009)
Hypocaccus dimidiatus (Illiger, 1807)	parasitic/ predator	Medi-terranean Region	Unknown	PT-AZO	B1	cadavers, feces, vegetal decays, sandy soil	Borges et al. (2005), Mendonça and Borges (2009)
Macrolister major (Linnaeus, 1767)	parasitic/ predator	Medi-terranean Region	Unknown	DK	B1	cow dung, nr litoral	Mazur (1989)
Saprinus acuminatus (Fabricius, 1798)	parasitic/ predator	euro-centrosasiatic	Unknown	PT-AZO	U	fish decaying, cadavers, feces, *Arum*	Borges et al. (2005), Mendonça and Borges (2009)
Saprinus caerulescens (Hoffmann, 1803)	parasitic/ predator	Europe	Unknown	PT-AZO	U	fish decaying, cadavers, feces, *Arum*	Borges et al. (2005)
Saprinus planiusculus Motschulsky, 1849	parasitic/ predator	palaearctic	Unknown	PT-AZO	B	fish decaying, cadavers, feces, *Arum*	Borges et al. (2005), Mendonça and Borges (2009)
Saprinus semistriatus (Scriba, 1790)	parasitic/ predator	palaearctic	Unknown	PT-AZO	B	fish decaying, cadavers, feces, *Arum*	Borges et al. (2005), Mendonça and Borges (2009)
Saprinus subnitescens Bickhardt, 1909	detriti-vorous	Europe	Unknown	PT-AZO	B	fish decaying, cadavers, feces, *Arum*	Borges et al. (2005), Mendonça and Borges (2009)
Hydrophilidae							
Cercyon depressus Stephens, 1829	parasitic/ predator	Northern, Central Europe	Unknown	PT-AZO	B	rotting seaweed on seashores	Borges et al. (2005), Mendonça and Borges (2009)
Cercyon haemorhoidalis (Fabricius, 1775)	parasitic/ predator	Europe	Unknown	PT-AZO	J6	decaying organic matter, flood debris	Borges et al. (2005), Mendonça and Borges (2009)

Family *Species*	Regime	Native range	1st record in Europe	Invaded countries	Habitat	Host	References
Cercyon obsoletus (Gyllenhal, 1808)	parasitic/ predator	Northern, Central Europe	Unknown	PT-AZO	U	mainly in dung of larger herbivores, but also recorded from arrion and manure	Vorst (2009)
Cercyon quisquilius (Linnaeus ,1761)	unknown	Europe	Unknown	PT-AZO	U		Borges et al. (2005), Mendonça and Borges (2009)
Enochrus bicolor (Fabricius, 1792)	unknown	All over Europe	Unknown	PT-AZO	B	halophil	Borges et al. (2005), Mendonça and Borges (2009)
Helochares lividus (Forster, 1771)	parasitic/ predator, phyto-phagous	central, western, southern Europe	Unknown	PT-AZO	C1, D	in standing waters	Borges et al. (2005)
Sphaeridium bipustulatum Fabricius, 1781	parasitic/ predator	Western, Central Europe	Unknown	PT-AZO	E	mammal dung, decaying organic matter, fungi, and on plant sap	Borges et al. (2005), Mendonça and Borges (2009)
Sphaeridium scarabaeoides (Linnaeus, 1758)	parasitic/ predator	Eurasia	Unknown	PT-AZO	E	dung	Borges et al. (2005)
Kateretidae							
Brachypterolus antirrhini (Murray, 1864)	phyto-phagous	Medi-terranean Region	1926, GB	BE, LI, LU, NL, GB	E, I2	*Antirrhinum*, *Linaria*	Audisio (1993), Borges et al. (2005), Duff (2008)
Brachypterolus vestitus (Kiesenwetter, 1850)	phyto-phagous	West Medi-terranean Region	1929, GB	AT, BE, CZ, DE, LI, CH, GB	E, I2	*Antirrhinum*, *Linaria*	Audisio (1993), Duff (2008), Šefrova and Lastuvka (2005)
Laemophloeidae							
Cryptolestes capensis (Waltl, 1834)	detriti-vorous	Medi-terranean Region	1962, CZ	AL, AT, BE, CZ, DK, FI, DE, HU, PL, SE, UA, GB	J1	grain and grain products, nuts, oilseeds, dried root crops	Borges et al. (2005), Duff (2008), Šefrova and Lastuvka (2005)

Family *Species*	Regime	Native range	1st record in Europe	Invaded countries	Habitat	Host	References
Latridiidae							
Cartodere norvegica (Strand, 1940)	detritivorous	Europe	Unknown	PT-AZO, PT-MAD	FB	under populus bark	Borges et al. (2005), Rücker (1995)
Corticaria abietorum Motschulsky, 1867	detritivorous	Central northern Europe	Unknown	PL, GB	G3	conifer specialist (douglas-fir, abies)	Freude et al. (1967)
Dienerella ruficollis (Marsham, 1802)	detritivorous	Mediterranean region	1889, GB	DE, IT-SIC, PT-AZO, GB	J1	dry plants, flour	Borges et al. (2005), Bouget and Vincent (2008), Duff (2008)
Thes bergrothi (Reitter, 1880)	detritivorous	northeastern Europe	Unknown	GB	I, J	on fungus, on decaying plant material, attic; flour, dattes	Duff (2008)
Leiodidae							
Catops fuliginosus Erichson 1837	detritivorous	Western, Central, Southern Europe	Unknown	FÖ	F	fungi	Bengtson (1981), Duff (2008)
Meloidae							
Mylabris variabilis (Pallas, 1781)	parasitic/ predator, phytophagous	Eurasia	Unknown	IT-SAR	E	adult floricolous, parasite Acrididae	
Malachiidae							
Axinotarsus marginalis (Laporte de Castelnau, 1840)	detritivorous	Europe	Unknown	GB	G	saproxilic/ woodland	Duff (2008)
Monotomidae							
Monotoma bicolor A. Villa & G. B. Villa, 1835	detritivorous	Europe	2005, PT-AZO	PT-AZO	E, J	mole nest, vegetal waste	Borges et al. (2005)

Family *Species*	Regime	Native range	1st record in Europe	Invaded countries	Habitat	Host	References
Monotoma longicollis (Gyllenhal, 1827)	detritivorous	Europe	2005, PT-AZO	PT-AZO	J, J6	vegetal waste	Borges et al. (2005), Mendonça and Borges (2009)
Monotoma picipes Herbst, 1793	detritivorous	Europe	2005, PT-AZO	PT-AZO	J, J6	saprophage/ mycophage; vegetal waste	Borges et al. (2005), Mendonça and Borges (2009)
Monotoma quadrifoveolata Aube, 1837	detritivorous	Eurasia	2005, PT-AZO	PT-AZO	J, J6	decaying grains	Borges et al. (2005)
Monotoma spinicollis Aubé, 1837	detritivorous	Europe	2005, PT-AZO	PT-AZO	J	paddy residues, paddy storage	Borges et al. (2005), Mendonça and Borges (2009)
Rhizophagus grandis Gyllenhal, 1827	parasitic/ predator	Europe	1983, GB	GB	G3	predator *Dendroctonus- Picea* stands	Bouget and Moncoutier (2003), Duff (2008)
Mycetophagidae							
Berginus tamarisci Wollaston, 1854	detritivorous	southern Europe, Canary Isls	Unknown	AT, CH	G3	*Tamarix*, on pine	Borges et al. (2005), Freude et al. (1967)
Eulagius filicornis (Reitter, 1887)	detritivorous	southern France, North Africa	1993, GB	GB	G3	with the fungus *Stereum hirsutum* growing on dead branches of broad-leaved trees.	Duff (2008)
Nitidulidae							
Carpophilus quadrisignatus Erichson, 1843	phytophagous, detrivorous	Mediterranean region	2000, DE	AT, DE, PT-AZO	J1	dry fruits	Audisio (1993), Borges et al. (2005), Freude et al. (1967), Mendonça and Borges (2009)
Epuraea aestiva (Linnaeus, 1758)	detritivorous	Europe, Asia	2005, PT-AZO	PT-AZO	G, I		Audisio (1993), Borges et al. (2005)
Epuraea biguttata (Thunberg, 1784)	detritivorous	Northern Europe	2005, PT-AZO	PT-AZO	J1, I	mushrooms	Audisio (1993), Borges et al. (2005), Freude et al. (1967), Mendonça and Borges (2009)

Family *Species*	Regime	Native range	1st record in Europe	Invaded countries	Habitat	Host	References
Epuraea longula Erichson, 1845	detriti-vorous	Eurasia	2005, PT-AZO	PT-AZO	J		Audisio (1993), Borges (1990), Borges et al. (2005), Mendonça and Borges (2009)
Meligethes aeneus (Fabricius, 1775)	phyto-phagous	Europe	2005, PT-AZO	PT-AZO, ES-CAN	I1	rape, rosaceae, pollen-feeding	Audisio (1993), Borges et al. (2005), Duff (2008), Freude et al. (1967), Machado and Oromi (2000), Mendonça and Borges (2009)
Meligethes incanus Sturm, 1845	phyto-phagous	Southeastern Europe	1867, PT-AZO	PT-AZO, GB	FA, E5	*Nepeta cataria*	Audisio (1993), Borges et al. (2005)
Nitidula flavomaculata Rossi, 1790	detriti-vorous	southern Europe	1900, CZ	CZ	J1, J6	bones vertebrates	Audisio (1993), Freude et al. (1967), Šefrova and Lastuvka (2005)
Pocadius adustus Reitter, 1888	detriti-vorous	Eurasia	2004, GB	GB	E2	epigeous gastermyctes specialist	Audisio (1993), Duff (2008)
Oedemeridae							
Nacerdes melanura (Linnaeus, 1758)	detriti-vorous	Europe	2005, PT-AZO	PT-AZO	B	driftwood on beaches, moist wood	Borges et al. (2005), Mendonça and Borges (2009)
Phalacridae							
Phalacrus corruscus (Panzer, 1797)	phyto-phagous	Europe	Unknown	PT-AZO	I	seeds of yellow sowthistle *Sonchus arvensis*	Borges et al. (2005)
Ptiliidae							
Acrotrichis cognata (Matthews, 1877)	detriti-vorous	Europe	1932, SE	AT, DK, FI, DE, IE, NL, NO, SE, GB	E5, J6	dung, rotting fungi, carcasses, compost near forests	Duff (2008), Freude et al. (1971)
Actinopteryx fucicola (Allibert, 1844)	detriti-vorous	Europe	Unknown	PT-AZO	U	unknown	Borges et al. (2005), Mendonça and Borges (2009)
Ptenidium pusillum (Gyllenhal, 1808)	detriti-vorous	Europe	Unknown	PT-AZO	U		Borges et al. (2005), Mendonça and Borges (2009)
Scarabaeidae							
Onthophagus illyricus (Scopoli, 1763)	detriti-vorous	Europe	2005, PT-AZO	PT-AZO	E	dung	Baraud (1992), Borges et al. (2005), Bunalski (1999), Mendonça and Borges (2009)

Family *Species*	Regime	Native range	1st record in Europe	Invaded countries	Habitat	Host	References
Onthophagus taurus (Schreber, 1759)	detritivorous	Europe	2005, PT-AZO	PT-AZO	E	dung	Baraud (1992), Borges et al. (2005), Bunalski (1999), Mendonça and Borges (2009)
Onthophagus vacca (Linnaeus, 1767)	detritivorous	Europe	2005, PT-AZO	PT-AZO	E	dung	Baraud (1992), Borges et al. (2005), Bunalski (1999), Mendonça and Borges (2009)
Oryctes nasicornis (Linnaeus, 1758)	detritivorous	southern Europe	1880, DK	DK, FI, HU, LT, NO, SE	J	saprophagous, compost	Baraud (1992), Bunalski (1999)
Scydmaenidae							
Stenichnus collaris (Muller & Kunze, 1822)	detritivorous	Europe	Unknown	FÖ	I2	mosses, leaves	Bengtson (1981)
Silphidae							
Ablattaria laevigata (Fabricius, 1775)	parasitic/ predator	Western & southcentral Europe	Unknown	EE	E, I1	snail predator, fields	
Aclypea opaca (Linnaeus, 1758)	phytophagous	Central, Northern, Eastern Europe	2005, PT-AZO	PT-AZO	E, I1	chenopodiacées	Borges et al. (2005)
Silvanidae							
Silvanus unidentatus (Olivier, 1790)	detritivorous	Europe	Unknown	PT-AZO	J1		Borges et al. (2005), Mendonça and Borges (2009)
Sphindidae							
Sphindus dubius (Gyllenhal, 1808)	detritivorous	europe	2005, PT-AZO	PT-AZO	U	mycophage	Borges et al. (2005), Freude et al. (1967), Mendonça and Borges (2009)
Staphylinidae							
Aleochara bipustulata (Linnaeus, 1761)	parasitic/ predator	Palaearctic	Unknown	PT-AZO	I	solitary ectoparasitoids of cyclorrhaphous Diptera (*Delia*)	Borges et al. (2005), Freude et al. (1974), Mendonça and Borges (2009)

Family *Species*	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Aleochara clavicornis Redtenbacher, L., 1849	parasitic/ predator	Palaearctic	2005, PT-AZO	PT-AZO	I1, J6	feed on decaying meat, fly maggots and also on fly puparia	Borges et al. (2005), Freude et al. (1974), Mendonça and Borges (2009)
Aleochara sparsa Heer, 1839	parasitic/ predator	Europe	Unknown	FÖ	I1, J	predator of cyclorrhaphous Diptera (*Musca*) in stables	Bengtson (1981), Enckell et al. (1987), Freude et al. (1974)
Amischa analis (Gravenhorst, 1802)	parasitic/ predator	Italy	Unknown	PT-AZO	U		Borges (1990), Borges et al. (2005), Freude et al. (1974), Mendonça and Borges (2009)
Anotylus nitidulus (Gravenhorst 1802)	parasitic/ predator	Europe, cosmopolitan	2005, PT-AZO	PT-AZO	U		Borges et al. (2005), Mendonça and Borges (2009)
Anotylus speculifrons (Kraatz 1857)	parasitic/ predator	Europe, Asia Minor, North Africa	2005, PT-AZO	PT-AZO	U		Borges et al. (2005), Mendonça and Borges (2009)
Atheta acuticollis Fauvel, 1907	parasitic/ predator	palaearctic	2005, PT-AZO	PT-AZO	U		
Atheta amicula (Stephens,1832)	parasitic/ predator	Europe	2005, PT-AZO	PT-AZO, PT-MAD, ES-CAN	U		Borges (1990), Borges et al. (2005), Freude et al. (1974), Machado and Oromi (2000)
Atheta atramentaria (Gyllenhal,1810)	parasitic/ predator	Europe	Unknown	PT-AZO, PT-MAD, ES-CAN	U		Borges (1990), Borges et al. (2005), Freude et al. (1974), Mendonça and Borges (2009)
Atheta castanoptera (Mannerheim, 1830)	parasitic/ predator	Europe	2005, PT-AZO	PT-AZO	U		Borges et al. (2005), Freude et al. (1974), Mendonça and Borges (2009)
Atheta coriaria (Kraatz, 1858)	parasitic/ predator	Europe	2005, PT-AZO	PT-AZO, ES-CAN	U	predator, biological control soil-dwelling larvae of small Diptera	Borges et al. (2005), Freude et al. (1974), Machado and Oromi (2000), Mendonça and Borges (2009)

Family *Species*	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Atheta divisa (Maerkel, 1844)	parasitic/ predator	Europe	2005, PT-AZO	PT-AZO	U	bird and animal nest	Borges (1990), Borges et al. (2005), Freude et al. (1974), Mendonça and Borges (2009)
Atheta fungi (Gravenhorst,1806)	parasitic/ predator	Europe	Unknown	FÖ, PT-AZO, PT-MAD, ES-CAN	I1	predator, carrot fields	Bengtson (1981), Borges et al. (2005), Enckell et al. (1987), Freude et al. (1974), Machado and Oromi (2000), Mendonça and Borges (2009)
Atheta gregaria (Casey, 1910)	parasitic/ predator	europe	Unknown	FÖ	U		Bengtson (1981), Enckell et al. (1987), Freude et al. (1974)
Atheta harwoodi Williams, 1930	parasitic/ predator	europe	Unknown	FÖ, GB	J6	bird nest, compost	Bengtson (1981), Duff (2008), Enckell et al. (1987), Freude et al. (1974)
Atheta luridipennis (Mannerheim, 1830)	parasitic/ predator	Central, Northern Europe	2003, ES	FÖ, PT-AZO, ES	C3	streambanks	Bengtson (1981), Borges et al. (2005), Enckell et al. (1987), Freude et al. (1974), Mendonça and Borges (2009)
Atheta nigra (Kraatz,1856)	parasitic/ predator	Europe	2005, PT-AZO	PT-AZO, ES-CAN	U		Borges et al. (2005), Freude et al. (1974), Machado and Oromi (2000), Mendonça and Borges (2009)
Atheta nigricornis (Thomson,1852)	parasitic/ predator	Northern Europe	Unknown	FÖ	U	fungi *Meripilus giganteus*	Bengtson (1981), Enckell et al. (1987), Freude et al. (1974)
Atheta oblita (Erichson,1839)	parasitic/ predator	Northern Europe	2005, PT-AZO	PT-AZO	U		Borges et al. (2005), Freude et al. (1974), Mendonça and Borges (2009)
Atheta palustris (Kiesenwetter,1844)	parasitic/ predator	Morocco, France Italy	2005, PT-AZO	PT-AZO, PT-MAD	U		Borges et al. (2005), Freude et al. (1974), Mendonça and Borges (2009)
Atheta sordida Marsham,1802	parasitic/ predator	southern Europe, Minor Asia	2005, PT-AZO	PT-AZO, PT-MAD, ES-CAN	U		Borges (1990), Freude et al. (1974), Mendonça and Borges (2009)
Atheta triangulum (Kraatz,1856)	parasitic/ predator	Europe	2005, PT-AZO	PT-AZO	U		Borges et al. (2005), Freude et al. (1974)

Family *Species*	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Atheta trinotata (Kraatz,1856)	parasitic/ predator	europe	Unknown	FÖ, PT-MAD, ES-CAN	U		Bengtson (1981), Enckell et al. (1987), Freude et al. (1974), Machado and Oromi (2000)
Bisnius sordidus (Gravenhorst, 1802)	parasitic/ predator	Europe, Asia, North Africa	2005, PT-AZO	PT-AZO	I, J6	compost, predator	Borges et al. (2005), Mendonça and Borges (2009)
Brachygluta paludosa (Peyron, 1858)	unknown	Minor Asia, Bulgaria	Unknown	DK	U		
Cafius xantholoma (Gravenhorst, 1806)	unknown	Europe, Asia, Africa	2005, PT-AZO	PT-AZO	U		Borges et al. (2005), Mendonça and Borges (2009)
Cordalia obscura (Gravenhorst,1802)	unknown	Northern Europe	Unknown	PT-AZO, PT-MAD, ES-CAN	U		Borges et al. (2005), Freude et al. (1974), Machado and Oromi (2000), Mendonça and Borges (2009)
Creophilus maxillosus (Linnaeus, 1758)	unknown	Europe (intro NAm)	2005, PT-AZO	PT-AZO	U		Borges et al. (2005), Mendonça and Borges (2009)
Cypha pulicaria (Erichson,1839)	unknown	Europe	2005, PT-AZO	PT-AZO	U		Borges et al. (2005), Freude et al. (1974), Mendonça and Borges (2009)
Edaphus beszedesi Reitter, 1914	detriti-vorous	southern Europe	Unknown	AT, EE, CH	J6	compost, rotting plant material	Luka et al. (2009), Wittenberg et al. (2006)
Euplectus infirmus Raffray, 1910	unknown	Southern Europe	2005, PT-AZO	PT-AZO	U		Borges et al. (2005), Freude et al. (1974), Mendonça and Borges (2009)
Gabrius nigritulus (Gravenhorst, 1802)	unknown	Eurasia	2005, PT-AZO	PT-AZO	U		Borges et al. (2005), Freude et al. (1974), Mendonça and Borges (2009)
Gabronthus thermarum (Aubé, 1850)	parasitic/ predator	Europe	2005, PT-AZO	PT-AZO	I, J6	compost, predator	Borges et al. (2005), Mendonça and Borges (2009)
Gyrophaena bihamata Thomson,1867	unknown	Central, Northern Europe	2005, PT-AZO	PT-AZO	U		Borges et al. (2005), Freude et al. (1974), Mendonça and Borges (2009)
Gyrophinus fracticornis (O. Müller, 1776)	unknown	euroMedi-terranean	2005, PT-AZO	PT-AZO	J6	waste, decay	Borges et al. (2005), Mendonça and Borges (2009)

Family *Species*	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Hadrognathus longipalpis (Mulsant & Rey, 1851)	unknown	Western Europe	1989, GB	GB	G, J6	humus	Duff (2008)
Halobrecta flavipes Thomson,1861	unknown	Northern, Central Europe	2005, PT-AZO	PT-AZO	U		Borges et al. (2005), Freude et al. (1974), Mendonça and Borges (2009)
Heterota plumbea (Waterhouse,1858)	unknown	Europe	2005, PT-AZO	PT-AZO, PT-MAD, ES-CAN	U		Borges et al. (2005), Freude et al. (1974), Machado and Oromi (2000), Mendonça and Borges (2009)
Lathrobium fulvipenne (Gravenhorst, 1806)	unknown	Northern and Central Europe, siberia	Unknown	FÖ	D	bogs, mires, wet fields	Bengtson (1981), Enckell et al. (1987), Freude et al. (1974)
Leptacinus pusillus (Stephens, 1833)	unknown	Europe (introAF, AUS)	2005, PT-AZO	PT-AZO	U		Borges et al. (2005), Freude et al. (1974), Mendonça and Borges (2009)
Lithocharis ochracea (Gravenhorst, 1802)	unknown	Eurasia	Unknown	PT-AZO	U		Borges et al. (2005), Mendonça and Borges (2009)
Micropeplus marietti Jacquelin du Val, 1857	unknown	Southern Europe, Caucasus	Unknown	AT, CH	J6	rotten vegetals	Luka et al. (2009), Wittenberg et al. (2006)
Mycetoporus nigricollis (Stephens, 1832)	unknown	Europe	Unknown	ES-CAN	J6	rotten vegetals	Machado and Oromi (2000)
Myllaena brevicornis (Matthews,1838)	unknown	Europe	Unknown	FÖ	U		Bengtson (1981), Enckell et al. (1987), Freude et al. (1974)
Myrmecopora sulcata (Kiesenwetter,1850)	unknown	Europe	2005, PT-AZO	PT-AZO, ES-CAN	U		Borges et al. (2005), Freude et al. (1974), Machado and Oromi (2000), Mendonça and Borges (2009)
Myrmecopora uvida (Erichson, 1840)	unknown	Europe	2005, PT-AZO	PT-AZO	U		Borges et al. (2005), Freude et al. (1974), Mendonça and Borges (2009)

Family *Species*	Regime	Native range	1st record in Europe	Invaded countries	Habitat	Host	References
Neobisnius lathrobioides (Baudi, 1848)	unknown	Europe (intro NAm)	2005, PT-AZO	PT-AZO	U		Borges et al. (2005), Mendonça and Borges (2009)
Neobisnius procerulus (Gravenhorst, 1806)	unknown	Europe	2005, PT-AZO	PT-AZO	U		Borges et al. (2005)
Ocalea picata (Stephens,1832)	unknown	Northern, Central Europe	Unknown	FÖ	U		Bengtson (1981), Enckell et al. (1987), Freude et al. (1974)
Oligota pusillima (Gravenhorst,1806)	parasitic/ predator	Northern Europe	2005, PT-AZO	PT-AZO	U	mite predator	Borges et al. (2005), Freude et al. (1974), Mendonça and Borges (2009)
Olophrum fuscum (Gravenhorst, 1806)	unknown	Northern & Central Europe	Unknown	FÖ	D	bogs	Bengtson (1981), Enckell et al. (1987)
Omalium excavatum Stephens, 1834	unknown	Europe, caucasus	Unknown	FÖ	E, J	nests micromammals	Bengtson (1981), Enckell et al. (1987)
Omalium rivulare (Paykull, 1789)	unknown	Europe	Unknown	FÖ	J6	vegetal decay	Bengtson (1981), Enckell et al. (1987)
Oxypoda haemorrhoa (Mannerheim, 1830)	unknown	Northern, Central Europe	Unknown	FÖ	U		Bengtson (1981), Enckell et al. (1987), Freude et al. (1974)
Oxytelus sculptus Gravenhorst, 1806	unknown	Europe	2005, PT-AZO	PT-AZO	U		Borges et al. (2005), Mendonça and Borges (2009)
Phacophallus parumpunctatus (Gyllenhal, 1827)	unknown	Europe	1854, IE	IE, PT-AZO, GB	U		Anderson (1997), Borges et al. (2005), Duff (2008), Mendonça and Borges (2009)
Philonthus cephalotes (Gravenhorst, 1802)	parasitic/ predator	Holarctic	Unknown	FÖ	U		Bengtson (1981), Enckell et al. (1987)
Philonthus concinnus (Gravenhorst, 1802)	parasitic/ predator	Eurasia (intro Nam)	2005, PT-AZO	PT-AZO	U		Borges et al. (2005)

Family *Species*	Regime	Native range	1st record in Europe	Invaded countries	Habitat	Host	References
Philonthus discoideus (Gravenhorst, 1802)	parasitic/ predator	Eurasia, North Africa	2005, PT-AZO	PT-AZO, ES-CAN	U		Borges et al. (2005), Freude et al. (1974), Machado and Oromi (2000), Mendonça and Borges (2009)
Philonthus fenestratus Fauvel, 1872	parasitic/ predator	Europe, caucasus	2005, PT-AZO	PT-AZO	U		Borges et al. (2005)
Philonthus fimetarius (Gravenhorst, 1802)	parasitic/ predator	Palaearctic	Unknown	FÖ	G		Bengtson (1981), Enckell et al. (1987)
Philonthus longicornis Stephens, 1832	parasitic/ predator	Eurasia	2005, PT-AZO	PT-AZO	U		Borges et al. (2005), Mendonça and Borges (2009)
Philonthus marginatus (O. Muller, 1764)	parasitic/ predator	Europe, Siberia	Unknown	FÖ	U		Bengtson (1981), Enckell et al. (1987)
Philonthus politus (Linnaeus, 1758)	parasitic/ predator	Europe	2005, PT-AZO	PT-AZO	E		Borges et al. (2005), Mendonça and Borges (2009)
Philonthus quisquiliarius (Gyllenhal, 1810)	parasitic/ predator	Eurasia, North Africa	2005, PT-AZO	PT-AZO	U		Borges et al. (2005), Mendonça and Borges (2009)
Philonthus umbratilis (Gravenhorst, 1802)	parasitic/ predator	Europe (intro NAm)	2005, PT-AZO	PT-AZO, ES-CAN	U		Borges et al. (2005), Machado and Oromi (2000), Mendonça and Borges (2009)
Phloeopora angustiformis Baudi, 1870	unknown	Europe	2005, PT-AZO	PT-AZO	U		Borges et al. (2005), Freude et al. (1974), Mendonça and Borges (2009)
Phloeopora teres (Gravenhorst, 1802)	unknown	Europe	2005, PT-AZO	PT-AZO	U		Borges et al. (2005), Freude et al. (1974), Mendonça and Borges (2009)
Phloeopora testacea (Mannerheim, 1830)	unknown	Northern Europe	2005, PT-AZO	PT-AZO	U		Borges (1990), Borges et al. (2005), Freude et al. (1974), Mendonça and Borges (2009)

Family *Species*	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Proteinus brachypterus (Fabricius, 1792).	detriti-vorous	Palaearctic	Unknown	FÖ	J6	rotten vegetals	Bengtson (1981), Enckell et al. (1987), Gamarra and Outerelo (2009)
Quedius mesomelinus (Marsham, 1802)	parasitic/ predator	Alps, Central Europe	Unknown	FÖ	U		Bengtson (1981), Enckell et al. (1987)
Remus pruinosus (Erichson, 1840)	parasitic/ predator	southern Europe	2005, PT-AZO	PT-AZO	U		Borges et al. (2005), Mendonça and Borges (2009)
Geostiba circellaris (Gravenhorst, 1806)	unknown	Europe	Unknown	FÖ	E,G1		Freude et al. (1974)
Sunius propinquus (Brisout de Barneville, 1867)	unknown	Europe	Unknown	PT-AZO	U		Borges et al. (2005), Freude et al. (1974)
Tachinus laticollis Gravenhorst, 1802	detriti-vorous	Europe	Unknown	FÖ	U		Bengtson (1981), Enckell et al. (1987)
Tachinus signatus Gravenhorst, 1802	unknown	Europe (intro NAm)	Unknown	FÖ	U		Bengtson (1981), Enckell et al. (1987)
Tachyporus chrysomelinus (Linnaeus, 1758)	unknown	Eurasia	2005, PT-AZO	PT-AZO	U		Borges et al. (2005), Mendonça and Borges (2009)
Tachyporus nitidulus (Fabricius, 1781)	unknown	Europe (Int AUS)	2005, PT-AZO	PT-AZO	U		Mendonça and Borges (2009)
Thecturota marchii (Dodero,1922)	detriti-vorous	Southern Europe	Unknown	AT, DK, EE, CH, GB	I,J6	waste land, compost	Luka et al. (2009), Wittenberg et al. (2006)
Xantholinus linearis (Olivier, 1795)	parasitic/ predator	All over Europe	Unknown	FÖ, PT-AZO	E, G, I2	stones, mosses, fungi	Bengtson (1981), Borges et al. (2005), Enckell et al. (1987), Freude et al. (1974), Mendonça and Borges (2009)
Xantholinus longiventris Heer, 1839	parasitic/ predator	Europe	Unknown	PT-AZO	U		Borges et al. (2005)

Family *Species*	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Xylodromus concinnus (Marsham, 1802)	parasitic/ predator	Europe	Unknown	FÖ	G, F, I2, J1	forests, gardens, cellars	Bengtson (1981), Enckell et al. (1987)
Xylodromus depressus (Gravenhorst, 1802)	parasitic/ predator	Europe	Unknown	FÖ	G, I2	bark, wet wood	Bengtson (1981), Enckell et al. (1987)
Tenebrionidae							
Blaps gigas (Linnaeus, 1758)	detritivorous	Mediterranean region	1888, CZ	CZ, DK, PT-AZO	J6		Borges et al. (2005), Šefrova and Lastuvka (2005)
Blaps lethifera Marsham, 1802	detritivorous	Europe	Unknown	PT-AZO, GB	J1, J2		Borges et al. (2005), Duff (2008)
Blaps mortisaga (Linnaeus, 1758)	detritivorous	Eastern and Central Europe	Unknown	GB	J1, J2	detrivorous	Duff (2008), Ferrer and Martinez Fernandez (2008)
Blaps mucronata Latreille, 1804	detritivorous	Europe, Mediterranean	Unknown	IE, GB	J1, J2		Duff (2008)
Corticeus linearis (Fabricus, 1790)	detritivorous	Europe	Unknown	GB	G3	old broadleaved forests	Duff (2008)
Corticeus pini (Panzer, 1799)	detritivorous	Europe	Unknown	GB	G3		
Scaurus punctatus Fabricius, 1798	detritivorous	Mediterranean region	Unknown	ES-CAN	U		Machado and Oromi (2000)
Tenebrio obscurus Fabricius, 1792	detritivorous	Europe	Unknown	IE, PT-AZO, ES-CAN, GB	J1, J2	stored products	Borges et al. (2005), Duff (2008), Machado and Oromi (2000)
Trachyscelis aphodioides Latreille, 1809	detritivorous	Mediterranean region	Unknown	ES-CAN	J	stored products	Borges et al. (2005), Machado and Oromi (2000)

Family *Species*	**Regime**	**Native range**	**1st record in Europe**	**Invaded countries**	**Habitat**	**Host**	**References**
Throscidae							
Throscus dermestoides (Linnaeus, 1766)	detriti-vorous	Europe	2005, PT-AZO	PT-AZO	G	bark, in forest	Borges et al. (2005), Mendonça and Borges (2009), Freude et al. (1979)
Trogidae							
Trox scaber (Linnaeus, 1767)	detriti-vorous	Eurasia	2005, PT-AZO	PT-AZO	U	nests	Borges (1990), Borges et al. (2005), Mendonça and Borges (2009)
Zopheridae							
Aulonium ruficorne (Olivier, 1790)	unknown	Medi-teranean	Unknown	GB	U		Duff (2008)