

whirligigs in action

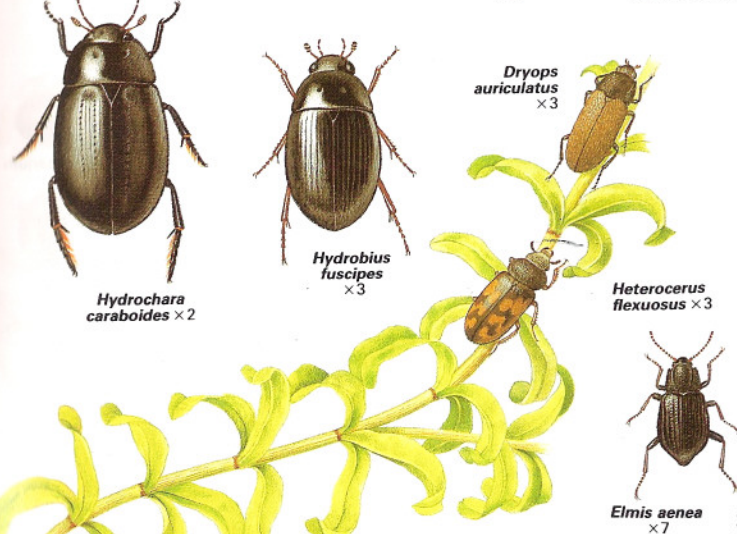
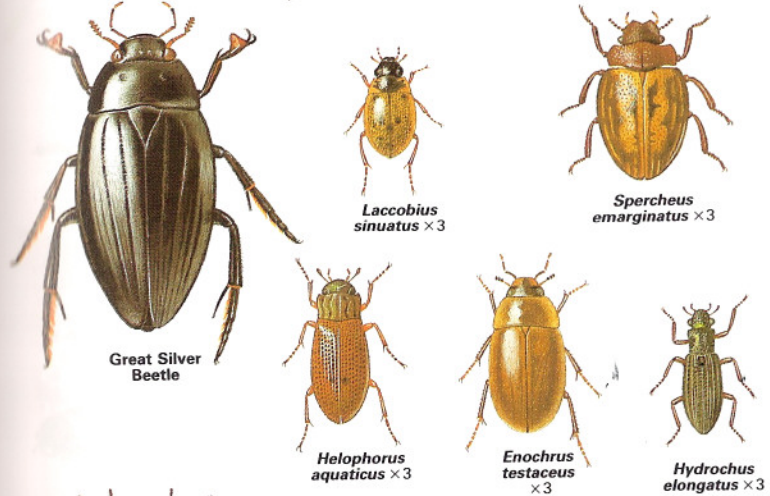
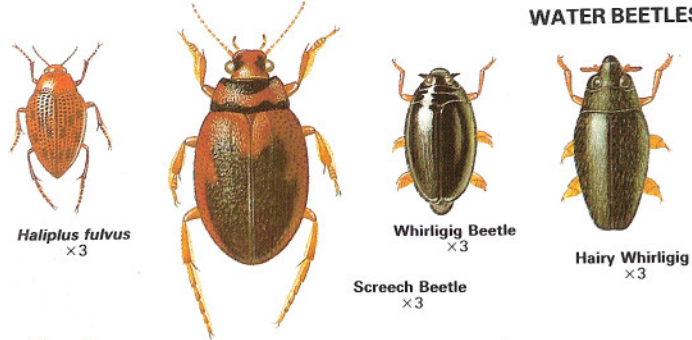
- ▲ **Halipus fulvus** Halipidae. Very convex, with rows of elongate punctures on elytra. Hind coxae very large. A poor swimmer, with hind tarsi not broad. Crawls on plants and stones in weedy pools and streams, browsing on algae. Larva (p. 297) has long 'tail'.
- ▲ **Screech Beetle** *Hygrobia herrmanni* Hygrobiidae. Very convex, with large eyes. Legs hairy, but not broad. Squeaks when alarmed by rubbing tip of abdomen against elytra. Adult and larva (p. 297) feed on invertebrates in muddy ponds. S & C.
- ▲ **Whirligig Beetle** *Gyrinus natator* Gyrinidae. One of several very similar species whirling round and round on surface of still and slow-moving water, often in large groups: dive when disturbed. Middle and hind legs very short and paddle-like. Each eye in 2 parts, one looking down into water and one looking across surface. Larva (p. 297) and adult both predatory, feeding largely on mosquito larvae. Adults hibernate.
- ▲ **Hairy Whirligig** *Orectochilus villosus*. Antennae, legs, and underside of body orange. Upper surface hairy. Nocturnal, but otherwise like *Gyrinus*.

Great Silver Beetle renewing air supply

Family Hydrophilidae. This family contains both aquatic and terrestrial species (see p. 260). Palps are long and act as antennae: true antennae are short and clubbed. Aquatic species are usually omnivorous scavengers in still and slow-moving water. They are poor swimmers, with legs little modified, and they crawl over submerged vegetation. There is an air reservoir under the elytra and another enclosed by hairs on underside of abdomen: underside of body thus looks silvery in water. Air supply is replenished by coming up head-first and breaking the surface with one of the antennae. Larvae nearly all carnivorous. Most species are adult all year, although they may hibernate.

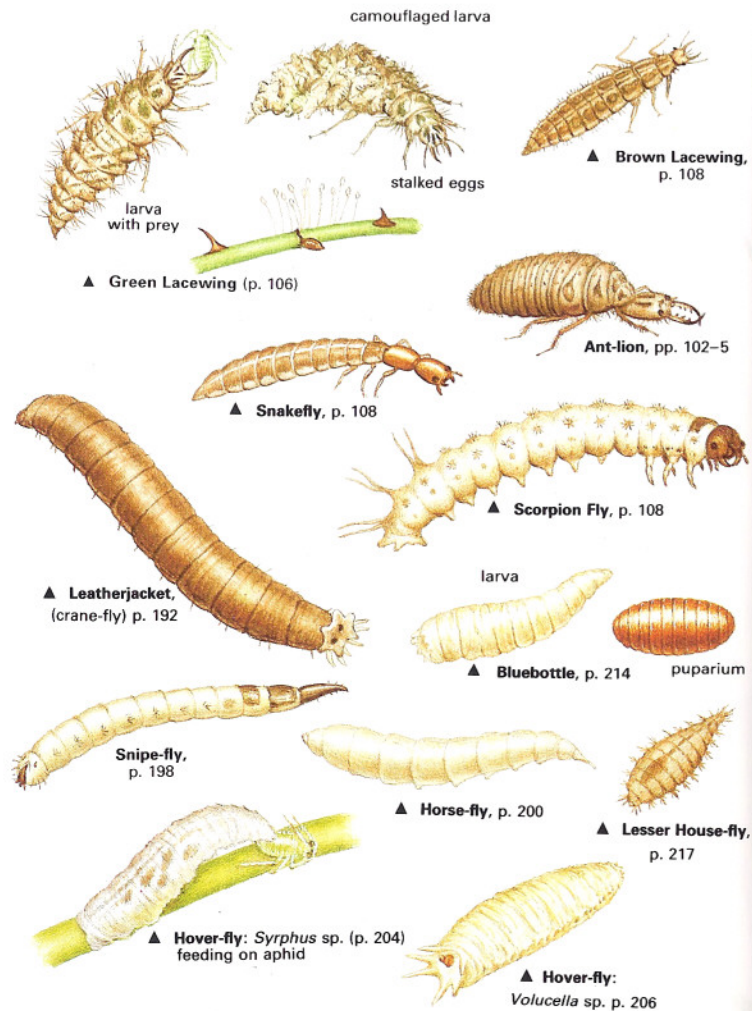
- ▲ **Great Silver Beetle** *Hydrophilus piceus*. One of Europe's largest beetles. Shiny above, with greenish sheen in life: very silvery below when seen in water. A sharp spine under thorax. A better swimmer than most hydrophilids. Scavenges on plant debris and also eats water snails. Still water with much weed and mud. Widespread, but becoming rare through loss of habitat. Larva on p. 297.
- ▲ **Laccobius sinuatus**. Readily identified by convex shape and thoracic pattern, although elytra often very pale. Long hairs on middle and hind tarsi. Mainly small, slow-flowing streams: sometimes ponds and brackish pools: several similar species.
- △ **Spercheus emarginatus**. Brick-coloured or yellowish brown: strongly domed. Carnivorous, hunting among roots and debris in muddy water.
- ▲ **Helophorus aquaticus**. Easily recognised by 5 ridges on thorax. Very hairy beneath. Mainly in still water, including ditches and brackish pools: often in debris at water's edge. Several related species are similar, but all are smaller.
- ▲ **Enochrus testaceus**. Pronotum and elytra yellow to brick-red: head black, although it may be yellow in front of eyes. 2nd segment of palp dark. Still and slow-moving water: often in debris at water's edge. Larvae are caterpillar-like.
- ▲ **Hydrochus elongatus**. Protruding eyes and large pronotal pits distinguish this genus, of which *elongatus* is the largest species. Head and pronotum black or green: elytra usually very dark, occasionally green. Weedy still water, mainly in spring.
- ▲ **Hydrochara caraboides**. Like Great Silver Beetle in shape and habits, but no more than half its size and less pointed at the rear. Still water.
- ▲ **Hydrobius fuscipes**. Shiny black elytra, often with blue or green iridescence in life. Legs long and rust-coloured. Hind femur hairy. Abundant in still water and debris. Larva on p. 297.
- ▲ **Dryops auriculatus** Dryopidae. Densely hairy. Antennae very short and stout. In and around ponds and streams, gripping plants and debris with strong claws.
- ▲ **Heteroceris flexuosus** Heteroceridae. Very hairy. Heavily spined front legs used to tunnel in mud or sand in and around ponds and streams. Flies readily at night. There are several similar species, all scavengers.
- ▲ **Elmis aenea** Elmidae. Cannot swim, and lives among stones, moss, and algae - usually in fast-flowing water. Grips with strong claws. Vegetarian. The beetle uses plastron respiration (p. 255) and does not have to surface for air.

WATER BEETLES



TERRESTRIAL LARVAE

Insects with a complete metamorphosis (p. 8) are markedly different in the young and adult stages. The young are always wingless and often feed on totally different foods from the adults. They are called larvae and a selection is illustrated here to show the wide variation in form. Page numbers refer to the descriptions of the adult insects. Fly larvae are always legless, but nevertheless display an immense range of form (see also p. 191). Most Hymenoptera larvae are legless, because they are generally completely surrounded by food and do not need to move. Larvae (caterpillars) of butterflies and moths are illustrated on pages 112-181. Sawfly larvae often resemble them but have more than five pairs of prolegs on the hind part of the body. Some aquatic larvae are illustrated on the next two pages.

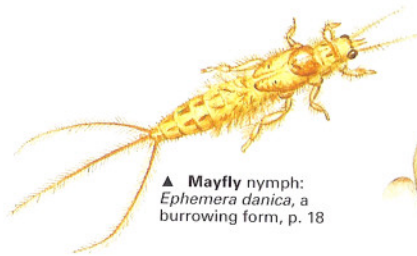


TERRESTRIAL LARVAE



AQUATIC NYMPHS and LARVAE

Many insects spend their early lives in fresh water and their adult lives in the air. Mayflies, dragonflies, and stoneflies are familiar examples. These all exhibit partial metamorphosis and their young stages, known as nymphs, show some similarity with the adult form despite living in water. A range of their forms is shown below. Mosquitoes and many other flies also grow up in water, but these insects have a complete metamorphosis and their young, known as larvae, are totally unlike the adults. Some of their larval forms are shown on these pages. Caddis flies have a similar life history and their larvae are illustrated on pages 184-189. Water beetles live in the water throughout their lives but, having a complete metamorphosis, their larvae are still very different from the adults. A selection of water beetle larvae is shown on the opposite page.



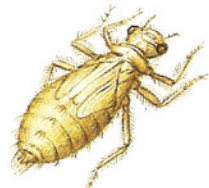
▲ **Mayfly nymph:**
Ephemera danica, a
burrowing form, p. 18



▲ **Mayfly nymph:**
Ecdyonurus sp, a crawling form, p. 20



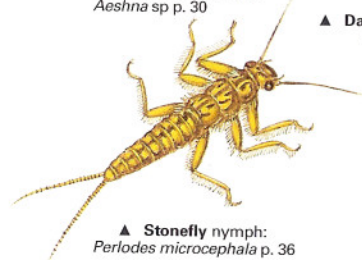
▲ **Hawker Dragonfly nymph:**
Aeshna sp p. 30



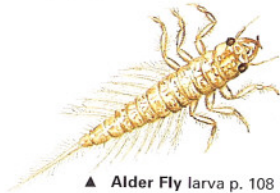
▲ **Darter Dragonfly nymph:**
Libellula sp p. 32



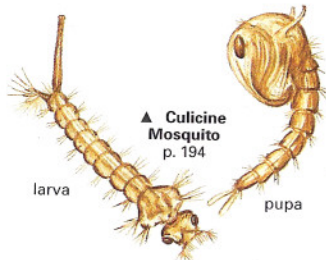
▲ **Damselfly nymph:**
Calopteryx virgo p. 26



▲ **Stonefly nymph:**
Perlodes microcephala p. 36



▲ **Alder Fly larva** p. 108



▲ **Culicine Mosquito**
p. 194

larva

pupa

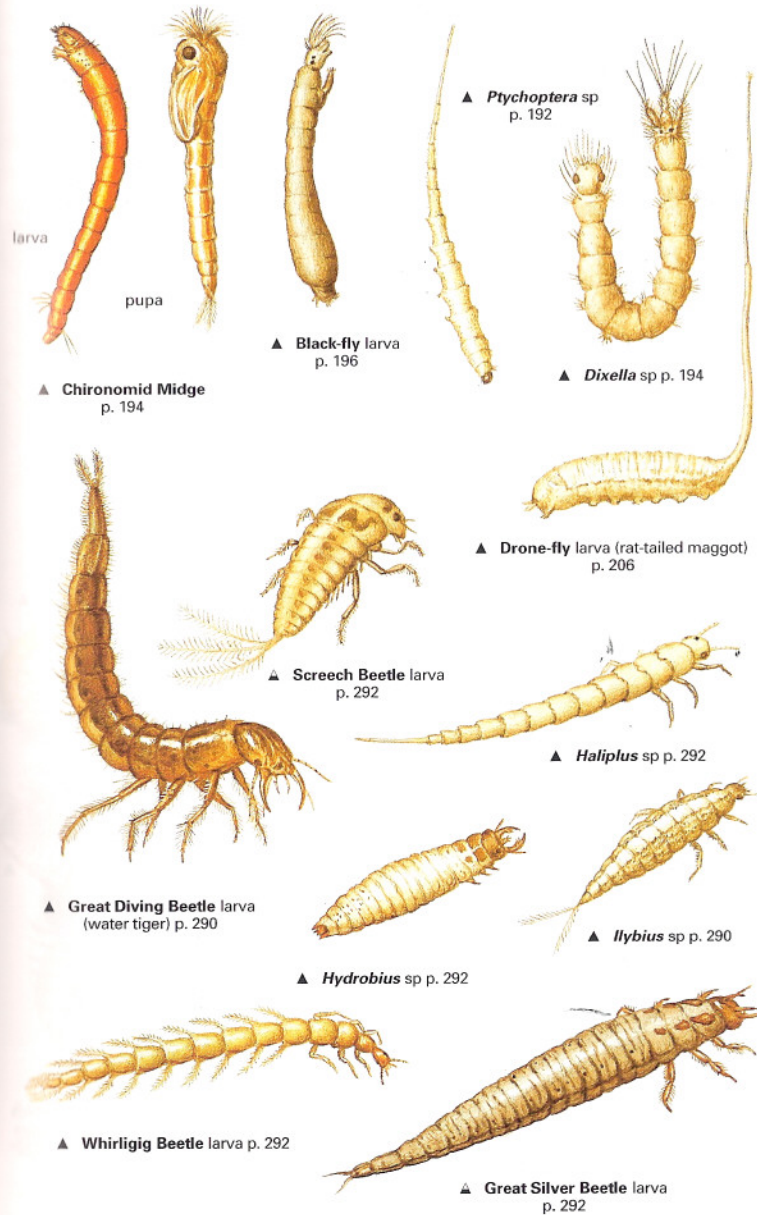


▲ **Anopheline Mosquito larva** p. 194



▲ **Phantom Larva** p. 194

AQUATIC NYMPHS and LARVAE



larva

pupa

▲ **Chironomid Midge**
p. 194

▲ **Black-fly larva**
p. 196

▲ **Ptychoptera** sp
p. 192

▲ **Dixella** sp p. 194

▲ **Drone-fly larva (rat-tailed maggot)**
p. 206

▲ **Screech Beetle larva**
p. 292

▲ **Halipus** sp p. 292

▲ **Great Diving Beetle larva (water tiger)** p. 290

▲ **Hybius** sp p. 290

▲ **Hydrobius** sp p. 292

▲ **Whirligig Beetle larva** p. 292

▲ **Great Silver Beetle larva**
p. 292

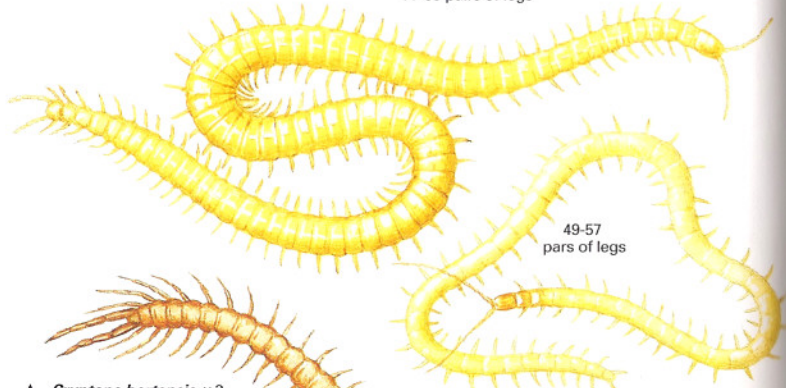
mostly somewhat enlarged

The Other Arthropods

The insects form just one class, albeit a very large one, of the immense animal group known as the arthropods, all of which have jointed limbs. Examples of some of the other classes are illustrated on this and the following pages to show how they differ from insects, with which they are commonly confused.

CENTIPEDES Class Chilopoda Elongate, predatory arthropods with just one pair of legs to each body segment: hind pair of legs long and sensory. A pair of poison claws surround the head, but no British species is dangerous to man. *Haplophilus* lives in leaf litter, and *Necrophloeophagus* lives in the soil. *Cryptops hortensis* usually lives under bark or stones, as do the many very similar species of *Lithobius* – all with 15 pairs of legs when mature. The long-legged and very fast *Scutigera coleoptrata* lives mainly on rocks and walls, often indoors. *Scutigera immaculata* is like a very small centipede, but it is a vegetarian and belongs to a group known as symphylans. It lives in soil and can be a pest in greenhouses.

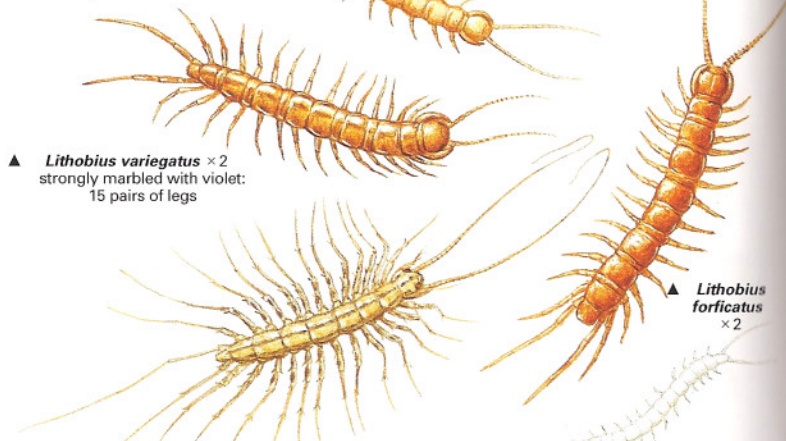
▲ *Haplophilus subterraneus* × 3
77-83 pairs of legs



49-57
pairs of legs

▲ *Cryptops hortensis* × 3
No eyes: 21 pairs of legs

▲ *Necrophloeophagus longicornis* × 3

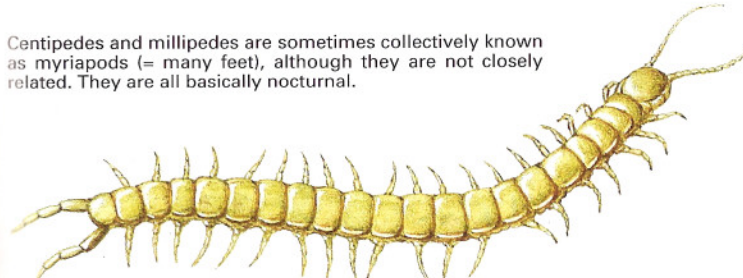


▲ *Lithobius variegatus* × 2
strongly marbled with violet:
15 pairs of legs

▲ *Lithobius forficatus* × 2

CENTIPEDES and MILLIPEDES

Centipedes and millipedes are sometimes collectively known as myriapods (= many feet), although they are not closely related. They are all basically nocturnal.



Scolopendra cingulatus, the largest European centipede, is yellowish brown to olive green. It occurs in scrubby habitats around the Mediterranean. Its bite is painful and potentially dangerous.

MILLIPEDES Class Diplopoda Generally elongate arthropods with two pairs of legs on each body segment. Relatively slow-moving and feeding on living and dead plant matter. Body segments essentially circular in cross section, but flat-backed millipedes, such as *Polydesmus*, appear flat because segments have flat extensions on upper surface. *Polymicrodon polydesmoides* and *Oxidus gracilis* have similar extensions, but upper surface remains domed. Millipedes are most common in leaf litter and other decaying vegetation, but *Tachypodoiulus niger*, one of several species that coil up when disturbed, often climbs tree to browse on mosses and algae. It is often found under loose bark. The **Spotted Snake Millipede**, *Blaniulus guttulatus*, lives mainly in cultivated soil and is a pest of potatoes. (See also p. 300.)

▲ *Polymicrodon polydesmoides* × 3
30 segments

Chordeuma silvestre × 3



30 segments:
laterally compressed

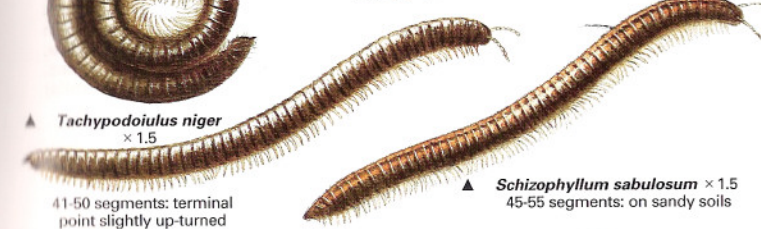
▲ *Oxidus gracilis* × 3
(greenhouses) 20 segments

▲ *Polydesmus angustus* × 3
20 segments



▲ *Tachypodoiulus niger* × 1.5

▲ *Schizophyllum sabulosum* × 1.5
45-55 segments: on sandy soils



41-50 segments: terminal
point slightly up-turned



▲ **Spotted Snake Millipede** × 4. 37-60 segments



rolled up
× 2



Glomeris marginata × 1.5



G. connexa × 1.5

▲ *Glomeris marginata*. One of the pill millipedes – short, stout species that can roll into balls. In leaf litter and debris. Glossier than Pill Woodlouse (below) and with many more legs.

G. connexa is one of several red-spotted species found under stones on the continent.

WOODLICE Order Isopoda Land-living crustaceans with 7 pairs of walking legs. Although terrestrial, most still require damp habitats. Most live as scavengers in decaying vegetation. About 30 species are native to B. *Oniscus asellus*, *Porcellio scaber*, and *Philoscia muscorum* are all common in gardens. *Ligia oceanica* lives on the sea shore. The **Pill Woodlouse**, *Armadillidium vulgare*, lives in slightly drier places. When rolled up it is distinguished from the Pill Millipede by the numerous small plates of the rear end.



▲ *Oniscus asellus*
× 1.5



▲ *Porcellio scaber* × 1.5



▲ *Philoscia muscorum* × 2



rolled up × 2



▲ **Pill Woodlouse** × 1.5
one of several similar species



▲ *Ligia oceanica* × 1.5

The Arachnids This class of arthropods, which includes the spiders and scorpions and their relatives, are the most frequently confused with insects, but they are readily distinguished by having 4 pairs of legs. They never have wings and their bodies are never clearly divided into 3 regions.

FALSE SCORPIONS Order Pseudoscorpiones Mostly minute predatory arachnids with poison claws, harmless to people. *Garypus beauvoisi* is one of the largest and lives on the seashore in S. Others, generally very much smaller (perhaps only 2mm long), live in leaf litter and even in buildings – often among books where they feed on booklice (p. 98). About 25 species occur in B.



Garypus beauvoisi × 3

TICKS and MITES Order Acarina A very heterogeneous group of arachnids, mostly very small and globular and with relatively short legs. **Sheep Tick**, *Ixodes ricinus*, lives in grassy places and feeds on many mammals: young will attach themselves to and take blood from people. Mites are vegetarian, carnivorous, parasitic, or scavenging. The carnivorous **Velvet Mite**, *Eutrombidium rostratus*, is often common on garden paths in spring. **Red Spider Mite**, *Panonychus ulmi*, is a serious pest of fruit trees. **Hydrachna globosus** is one of many very similar water mites feeding on other tiny aquatic animals.



▲ **Sheep Tick**
× 3



▲ **Velvet Mite**
× 3



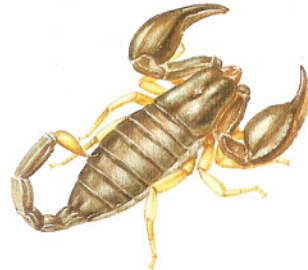
▲ **Red Spider Mite**
× 6



▲ **Water Mite**
× 3

Other Arthropods: ARACHNIDS

SCORPIONS Order Scorpiones Arachnids with large claws (pedipalps) and a slender tail tipped with a sting. Nocturnal predators, mostly tropical but with a few species in southern Europe. *Euscorpium flavicaudis* lives in cracks in walls and buildings, protruding its claws at night to catch passing insects. Harmless to man. S & C: established in some dockland areas of B. *Buthus occitanicus* lives under stones in S. Its sting is painful and can be dangerous to infants.

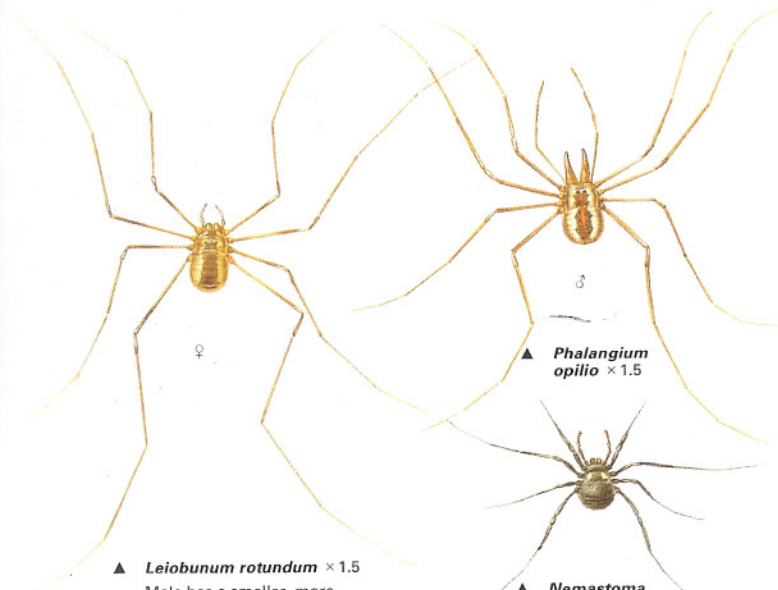


Euscorpium flavicaudis × 1.5



Buthus occitanicus
× 1.5

HARVESTMEN Order Opiliones Arachnids resembling spiders, but body undivided and 2nd pair of legs the longest. No venom and no silk. Generally mature in late summer – hence the name. Mainly nocturnal, feeding on a wide range of other small animals, both living and dead. About 24 species live in B. *Leiobunum rotundum* is abundant everywhere, often resting on walls and tree trunks by day. *Phalangium opilio*, found in dense vegetation, has a pure white underside and male has horned chelicerae. *Nemastoma bimaculatum*, like other, short-legged species, lives on the ground in turf and leaf litter.



▲ *Leiobunum rotundum* × 1.5

Male has a smaller, more rounded body

▲ *Phalangium opilio* × 1.5

▲ *Nemastoma bimaculatum* × 2