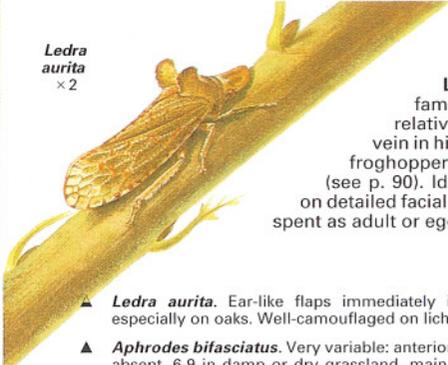


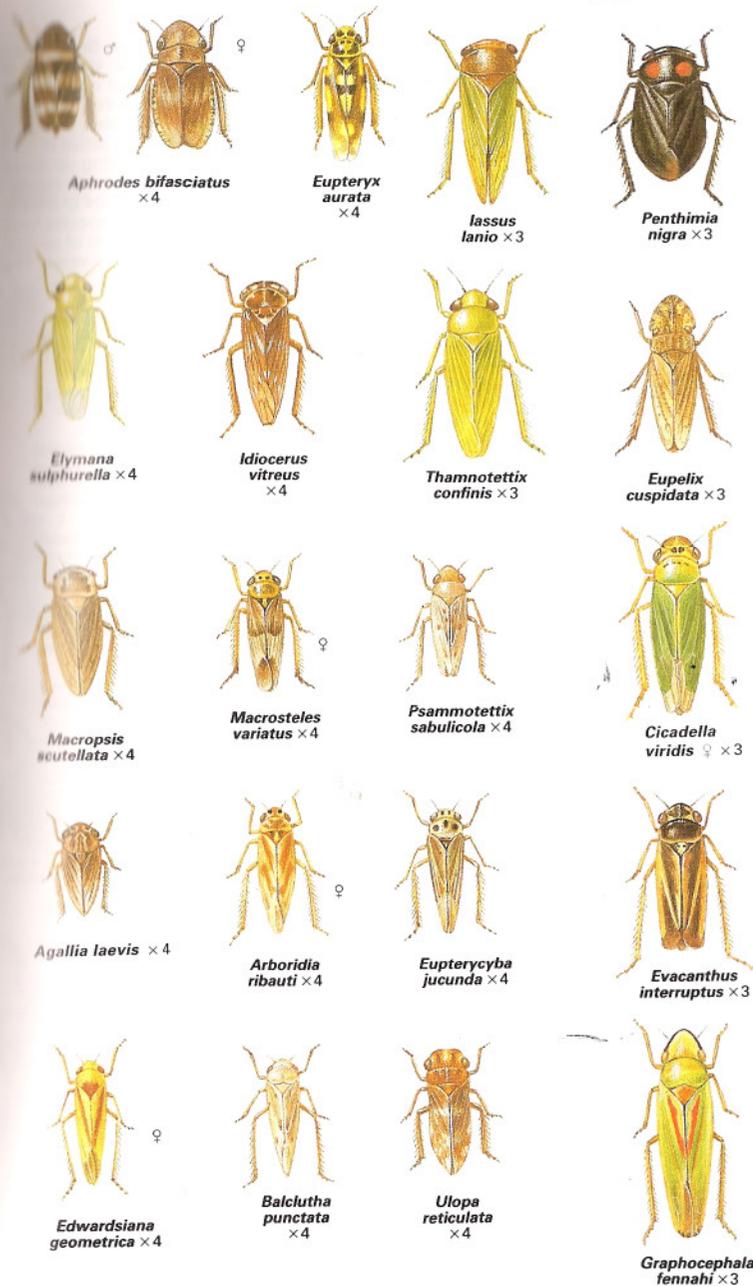
*Ledra aurita*  
×2



**LEAFHOPPERS Cicadellidae** A large family of jumping homopteran bugs with relatively soft forewings and a peripheral vein in hindwing (see p. 71). Distinguished from froghoppers by numerous spines on hind tibiae (see p. 90). Identification of many species depends on detailed facial features and measurements. Winter is spent as adult or egg.

- ▲ *Ledra aurita*. Ear-like flaps immediately identify this bug. 5-10 in woodlands, especially on oaks. Well-camouflaged on lichen-covered branches. S & C.
- ▲ *Aphrodes bifasciatus*. Very variable: anterior white band on forewing often broken or absent. 6-9 in damp or dry grassland, mainly in lowlands. Males of several related species all have light and dark bands on forewings – a generic characteristic.
- ▲ *Eupteryx aurata*. Pale areas often tinged with orange. Abundant 5-11 on a wide range of plants, especially nettles and labiates. Often a pest of tomatoes. As in all leafhoppers, its saliva is toxic to plants and destroys chlorophyll: feeding punctures are surrounded by pale spots, and if infestation is severe the spots join up and destroy large areas of leaf.
- ▲ *Iassus lanio*. Head and thorax yellowish or green, always heavily mottled with brown. Forewings green or reddish brown. 7-10 in woodland, especially on oak.
- ▲ *Penthimia nigra*. Brown or black, with or without red spots on pronotum. Forewings overlap slightly at tip. 5-8 on various trees, especially oaks. S & C.
- ▲ *Elymana sulphurella*. Greenish face with broad black spot around base of each antenna. Sides of thorax with black spots: sometimes a dark patch on top of head. 7-10 among grasses, often in quite dry places.
- ▲ *Idiocerus vitreus*. Head broadly rounded in front. Forewings overlap slightly at apex and are often redder, especially after hibernation. 3-10 on poplars. N & C. There are several similar species, not easily separated.
- ▲ *Thamnotettix confinis*. Forewings with prominent greenish veins. Pronotum may have darker markings. 5-9 on a wide range of trees, shrubs, and herbage. N & C.
- ▲ *Eupelix cuspidata*. Dark markings vary in density. Head has sharp keel on top. Pronotum has 3 keels. Forewings with prominent veins. 3-9 in dry, grassy places.
- ▲ *Macropsis scutellata*. Top of head largely covered by pronotum. Veins dark brown, with some clear cells in middle of forewing. 6-10 on nettles.
- ▲ *Macrosteles variatus*. Head and thorax yellow or greenish. Dark areas of forewing less distinct in male. 5-9 on nettles and other herbage. Several very similar bugs.
- ▲ *Psammotettix sabulicola*. Pronotum and scutellum yellowish brown, often with dark markings. 6-10 among grasses on coastal dunes, often resting on bare sand. N & C.
- ▲ *Cicadella viridis*. Top of head (vertex) smoothly rounded in front, clearly bi-coloured. Pronotum yellow at front, dark green behind. Forewings generally green in female, purplish brown or black in male. 7-10 in marshy places, generally on grasses.
- ▲ *Agallia laevis*. Pronotum with fine transverse ridges. Black marks on scutellum meet side margins. 7-9 on sand dunes. S & C.
- ▲ *Arboridia ribauti*. Top of head (vertex) with 2 black spots. Scutellum pale with 2 black triangles at front. All year on various trees. S & C.
- ▲ *Eupterycyba jucunda*. Vertex with 2 black spots. Pronotum with 3 large black spots. Scutellum has 2 black triangles at front. Forewing apex greyish. 7-10 on alder. S & C.
- ▲ *Evacanthus interruptus*. Pronotum black, with or without pale central stripe. Wings shorter than abdomen in female. 6-10 on a wide range of herbage, especially in damp places.
- ▲ *Edwardsiana geometrica*. Apex of forewing greyish. Dark streak on forewing and dark scutellum distinguish this from many related species. 7-10 on alder.
- ▲ *Balclutha punctata*. Head and thorax green or dirty yellow, often marked with brown. Forewings pale green or yellow to reddish brown, often spotted. All year, mainly on grasses but often passing the winter on conifers.
- ▲ *Ulopa reticulata*. Vertex very flat in front. Forewings horny, distinctly pitted and strongly convex. No hindwings. All year on heathers.
- ▲ *Graphocephala fennahi*. Red stripes on forewing readily identify this North American bug now established on rhododendrons in southern B. 6-10.

**LEAFHOPPERS**

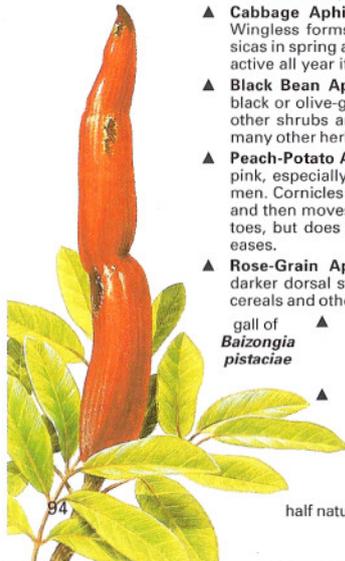


**APHIDS** Very small, pear-shaped, sap-sucking homopteran bugs. Both wings, when present, are membranous: generally held rooflike at rest. Hind end of abdomen generally has a pair of 'horns', known as cornicles, that exude waxy secretions. Honeydew is produced in abundance (see p. 71). Life cycles are generally complex, with winged and wingless forms in most species. Winter is usually passed in the egg stage, although many species can remain active in mild winters. Spring aphids are generally wingless and all female, building up dense colonies through parthenogenetic reproduction. Most give birth to active young - sometimes several in a day - instead of laying eggs. Winged aphids gradually increase in late spring and summer and spread to new plants. Most species have more than one host plant during the year. The Aphididae is the largest of several families. The forewings in this family have at least 4 oblique cross-veins. The Pemphigidae is similar but cornicles are very short or absent.

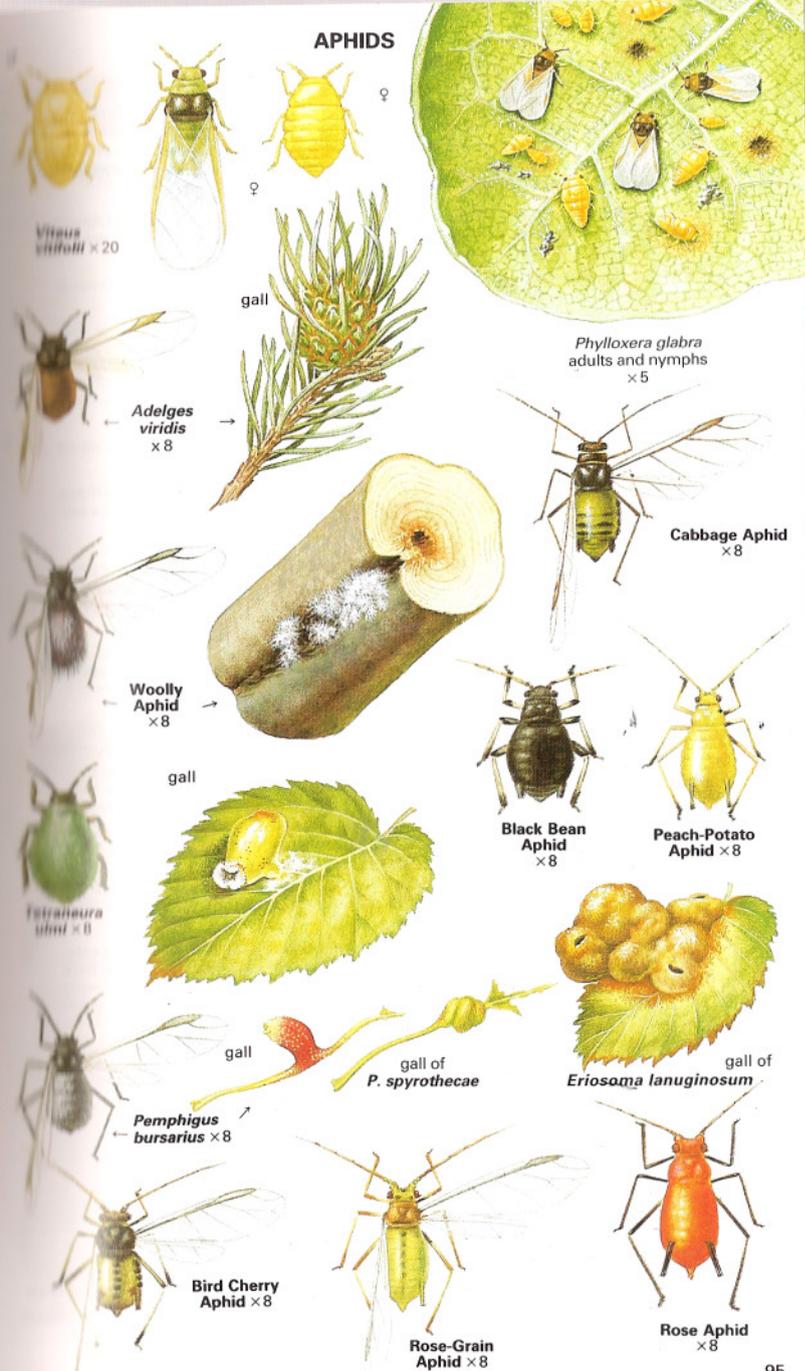
- ▲ **Viteus vitifolii** Phylloxeridae. Wings, when present, held flat at rest. No cornicles. An American vine pest, now well established in Europe. Feeds on leaves and roots. Winged forms, occurring only in late summer, are rare in Europe.
- ▲ **Phylloxera glabra**. No cornicles. Wingless females abundant under oak leaves in spring, surrounded by eggs (this family of aphids does not give birth to active young). Yellow spots develop around feeding sites on leaves. Winged forms appear in summer.
- ▲ **Adelges viridis** Adelgidae. Only 3 oblique cross-veins. No cornicles. One of several very similar species causing cone-like pineapple galls on spruce. Galls are green at first and open 6-7 to allow aphids to escape; they then become brown and woody. New aphids fly to larch and other conifers, where they produce several generations without galls, although this is not true of all the species.
- ▲ **Woolly Aphid** *Eriosoma lanigerum* Pemphigidae. Purplish brown body densely clothed with waxy fluff. In dense clusters on bark of apple and other rosaceous trees and shrubs in summer, especially where trees have been damaged. Winter is passed in bark crevices and, occasionally, on the roots.
- ▲ **Tetraneura ulmi**. Causes smooth, stalked bladder-like galls on elm leaves in spring. Summer generations feed on grass roots and are orange or brown. Galls of *T. nigriabdominalis* are similar but hairy. Larger, irregular pouch galls are caused by ▲ *Eriosoma lanuginosum*.
- ▲ **Pemphigus bursarius**. Causes pouch galls on poplar leaf stalks in spring. Summer aphids are cream-coloured and very waxy and live on roots of lettuce and other composites, often causing the plants to wilt. ▲ *P. spyrothecae* causes spiral galls on poplar leaf stalks in spring and then moves to the trunks and branches. It has no herbaceous host plant.

**Baizongia pistaciae**. Causes huge red, candle-like galls on leaves of pistachio trees. Greyish aphids live in the galls all summer, escape in autumn and fly to grass roots where they spend the winter. S.

- ▲ **Cabbage Aphid** *Brevicoryne brassicae* Aphididae. Cornicles short. Wingless forms green with mealy white coating. Abundant on brassicas in spring and early summer, causing severe damage. May remain active all year if mild.
- ▲ **Black Bean Aphid** *Aphis fabae* The familiar garden 'blackfly', with black or olive-green body. Passes winter as egg on spindle and a few other shrubs and spends summer on beans, sugar beet, docks, and many other herbaceous plants. There are several very similar species.
- ▲ **Peach-Potato Aphid** *Myzus persicae* Yellow or pale green: sometimes pink, especially the nymphs. Winged form has black patch on abdomen. Cornicles swollen in middle (lens!). Curles peach leaves in spring and then moves to a wide range of herbaceous plants, including potatoes, but does not form dense colonies. A major vector of virus diseases.
- ▲ **Rose-Grain Aphid** *Metopolophium dirhodum* Shiny green with a darker dorsal stripe. Overwinters as egg on roses. Aphids migrate to cereals and other grasses 5-6. Often swarm off the cereals in summer.
- ▲ **Rose Aphid** *Macrosiphum rosae* The gardener's 'greenfly'. Relatively large: green or pink. Long black cornicles distinguish it from other rose-inhabiting species. On roses in spring: scabious or teasel in summer.
- ▲ **Bird Cherry Aphid** *Rhopalosiphum padi* Wingless forms darker, with large rust-coloured patch at rear. Rolls bird cherry leaves in spring, when insects are clothed with white wax. On cereals and other grasses in summer: may remain there through winter if mild.



half natural size



**JUMPING PLANT LICE** Also known as psyllids, these small homopterans resemble miniature cicadas. They leap well with the aid of their enlarged hind legs. Antennae are much longer than in the superficially similar leafhoppers (p. 92). Forewings relatively tough, with prominent veins; hindwings very flimsy. Nymphs are very flat and usually gregarious, secreting large amounts of honeydew and wax.

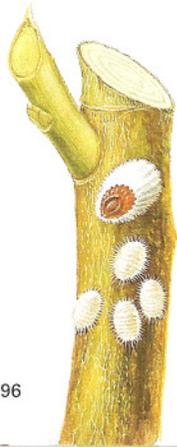
- ▲ *Livia juncorum* Liviidae. The head is elongated in this family. Lives on rushes (*Juncus* spp) in damp meadows. Nymphs live in flowerheads and induce growth of red tassel-like galls in summer.
- ▲ *Homatoma ficus* Carsidaridae. Very flat, bristly antennae darken distinctly towards the tip. Veins hairy. On figs 6-8. S & C: introduced to B.
- ▲ **Apple Psyllid** *Psylla mali* Psyllidae. Abundant on apple trees 4-10. Green at first, becoming red and brown in late summer. Nymphs damage blossom and stunt young shoots by gregarious feeding. ▲ *P. buxi* has distinctly yellowish forewings and bright green or yellowish body. 4-9. Nymphs live in young shoot tips of box, causing leaves to cluster tightly together. The presence of this insect is marked by abundant white wax.
- ▲ *Psyllopsis fraxini*. One of several similar species living on ash. Nymphs cause leaves to curl and swell up to form red-veined galls. 5-10.
- ▲ *Triozia urticae* Trioziidae. Wing membrane pale yellow. Body green to cream with dark markings. On stinging nettles in summer and evergreen trees in winter. There are several similar species.

**WHITEFLIES Aleyrodidae.** Tiny homopterans with waxy white wings spanning about 3mm. They resemble minute moths. There are numerous species, not easily separated although many are host-specific. The usually feed on the undersides of leaves.

Best known is the ▲ **Cabbage Whitefly** *Aleyrodes proletella*, common on brassicas in spring and summer. ▲ **Greenhouse Whitefly** *Trioleturodes vaporariorum* infests many greenhouse plants and is especially injurious to tomatoes and cucumbers.

**SCALE INSECTS** A large group of homopterans, belonging to several families, named for the waxy or horny scales under which most of the females live. Most females are wingless and legless and only the sap-sucking beak reveals their relationship to other bugs. In fact, these female scale insects don't really look like insects at all. A few, such as the mealy bugs, retain their legs and some mobility. Male scale insects have one pair of wings and resemble small midges, but they are rarely seen. Most species reproduce by parthenogenesis, and lifting a female scale may reveal hundreds of eggs. 1st instar nymphs wander freely, but then lose their legs and settle down to feed in one place. Because they exist in vast numbers, scale insects cause serious damage to crops, although they are less of a problem in Europe than in tropical areas.

*Icerya purchasi* and *Planococcus citri* are both citrus pests. ▲ **Mussel Scale** *Lepidosaphes ulmi* is abundant on the bark of apple and many other fruit trees. ▲ **Rose Scale** *Aulacaspis rosae* should be looked for on wild and cultivated roses, especially on the older parts. ▲ **Parthenolecanium corni** infests many cultivated trees and shrubs, including vines and currants, while ▲ *Pseudococcus longispinus* is a mealy bug found on a wide range of greenhouse plants.



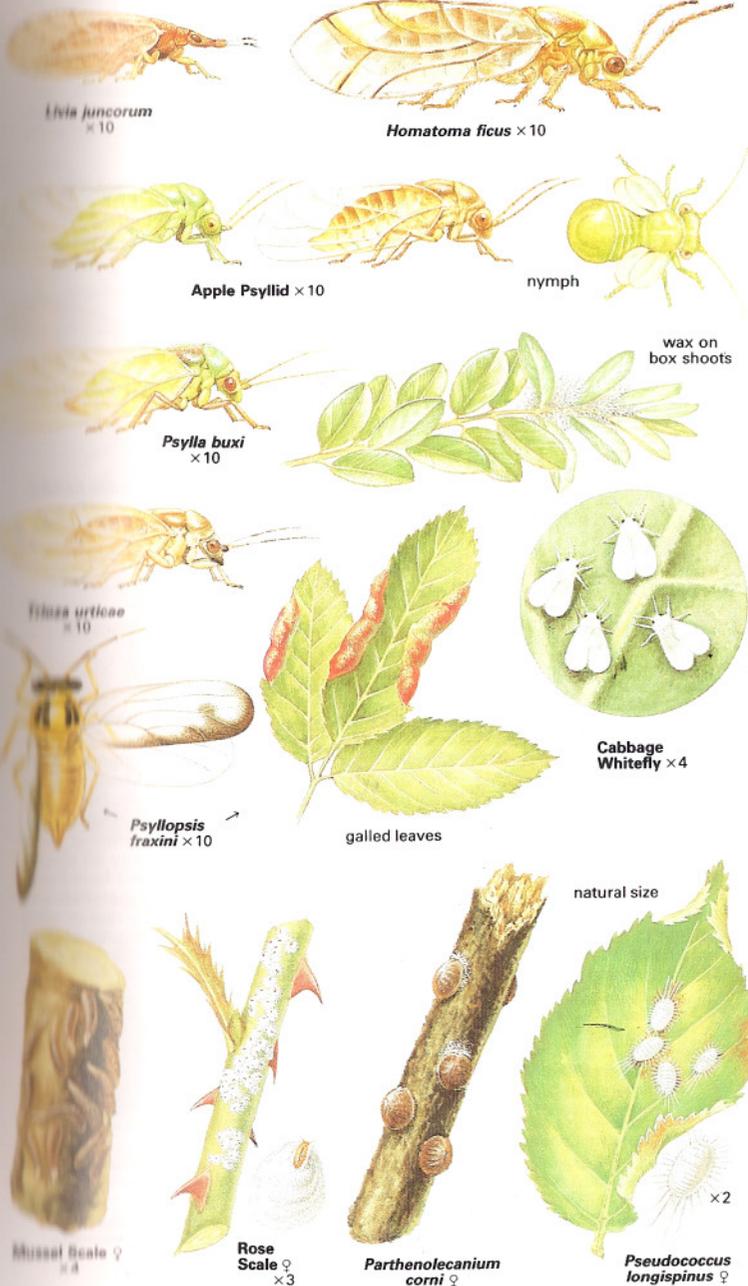
*Icerya purchasi*  
♀ × 2

*Planococcus citri*  
♀ × 2



Mussel Scale  
♂ × 20

## PSYLLIDS and SCALE INSECTS



*Livia juncorum*  
× 10

*Homatoma ficus* × 10

Apple Psyllid × 10

nymph

wax on  
box shoots

*Psylla buxi*  
× 10

*Triozia urticae*  
× 10

*Psyllopsis fraxini* × 10

galled leaves

Cabbage  
Whitefly × 4

natural size

Mussel Scale ♀  
× 4

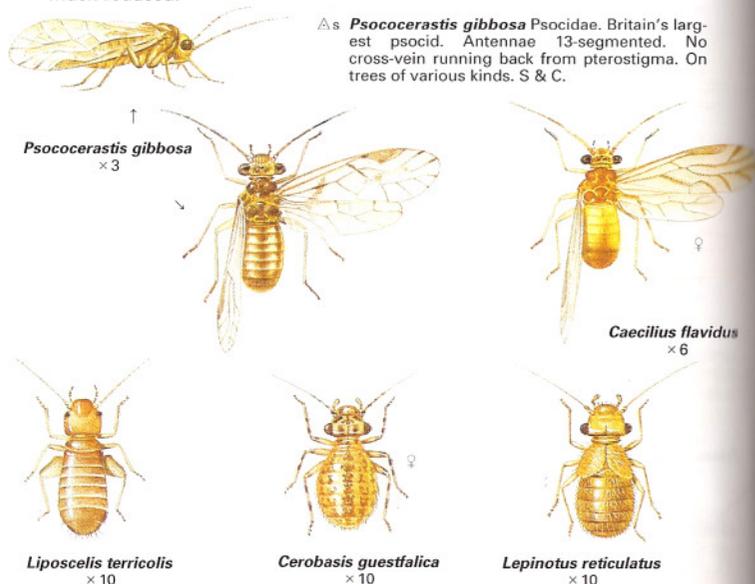
Rose  
Scale ♀  
× 3

*Parthenolecanium corni* ♀

*Pseudococcus longispinus* ♀  
× 2

## PSOCIDS Order Psocoptera

Very small, winged or wingless insects also known as booklice, barklice, and dustlice. There are about 2000 known species, but many thousands more undoubtedly await discovery. All have biting jaws and a rather wide head. Wings, when present, have a rather characteristic venation, although this is occasionally much reduced.



▲ *Psococerasis gibbosa* Psocidae. Britain's largest psocid. Antennae 13-segmented. No cross-vein running back from pterostigma. On trees of various kinds. S & C.

*Psococerasis gibbosa*  
× 3

*Caecilius flavidus*  
× 6

*Liposcelis terricolis*  
× 10

*Cerobasis questfalica*  
× 10

*Lepinotus reticulatus*  
× 10

Two cells are of particular importance in classification: the pterostigma on the front edge of the forewing is generally semi-circular or lens-shaped, and the areola postica is a similar cell on the hind margin of the forewing. The areola postica is absent in some families. Wings are held roofwise over the body at rest, the insects then resembling the psyllids (p. 96) although the venation is quite different. Psyllids also have sucking beaks. Psocids are found mainly on shrubs and other vegetation, where they chew pollen, fungal spores, and bark-living algae. Many occur indoors, where they feed on a variety of starchy materials and cause some damage. Parthenogenesis is common, with males very rare or even absent in some species. Nymphal stages are similar to adults. Because of their small size, the psocids are not easy to identify, but those shown here are fairly distinctive and should be recognised without much trouble.

- ▲ *Caecilius flavidus* Caeciliidae. One of the commonest outdoor species, easily recognised by its yellow body and bristly wings. Antennae 13-segmented. No cross-vein running back from pterostigma. Males unknown. On broad-leaved trees, mainly on foliage.
- ▲ *Liposcelis terricolis* Liposcelidae. Widespread in buildings, often damaging books and paper, stored food, and also insect collections. Occasionally found out of doors. Antennae 15-segmented. One of several similar species with a flat body and broad hind femur with a distinct 'hump' near the base. A cosmopolitan pest. Males unknown. ▲ *L. bostrychophilus* is the commonest domestic species.
- ▲ *Cerobasis questfalica* Trogiidae. A wingless species easily recognised by its densely speckled body. Antennae with more than 20 segments. Abundant on tree bark and fences; also in buildings. Males almost unknown.
- ▲ *Lepinotus reticulatus*. Forewings reduced to small flaps with dense reticulate pattern; hindwings absent. Antennae with more than 20 segments. A widespread domestic species, feeding on debris of all kinds. Will destroy insect collections. ▲ *L. patruelis* is similar but forewings not reticulate.

## THRIPS Order Thysanoptera

Minute, usually dark insects with very narrow body and usually two pairs of tiny, leather-like wings. Some are wingless. Very common in flowers, where many species pierce and scrape cells to get sap. Thousands take to the air in still, thundery weather – hence a common name of thunderflies. Most females have a curved, saw-like ovipositor for laying eggs in plants. Male abdomen usually smoothly rounded. Thrips are exopterygote insects, but nymphal development is complex, with one or more resting stages. Over 3000 species are known.

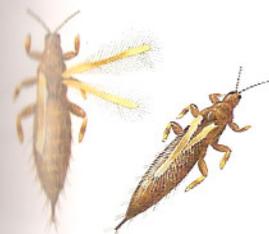


tip of abdomen of  
*Phlaeothripidae*

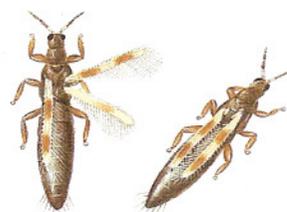


down-curved ovipositor  
of *Thripidae*

- ▲ *Phlaeothrips annulipes* Phlaeothripidae. Somewhat stouter than most thrips. As in whole family, abdomen is tubular at tip in both sexes and wings overlap strongly at rest. On dead birch twigs and branches (look at fire brooms in forests!), feeding on fungal spores and threads. 5-9.



*Phlaeothrips annulipes* × 10



*Aeolothrips intermedius* × 10

*Aeolothrips intermedius* Aeolothripidae. One of many species with banded wings. 5-9, mainly on yellow crucifer and composite flowers. In this family, wings are more or less parallel at rest, forewings rounded at tip, body not flattened, and ovipositor curved upwards. ▲ *A. albicinctus*, virtually wingless and antlike, is very common at bases of grasses 5-9. Possibly predatory.

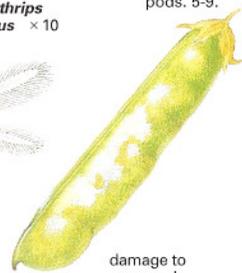
- ▲ **Pea Thrips** *Kakothrips pisivorus* Thripidae. Relatively large, with yellow tarsi. Breeds in flowers of peas and related plants and damages young pods. 5-9.



*Aeolothrips albicinctus* × 10



Pea Thrips  
× 10



damage to  
pea pod



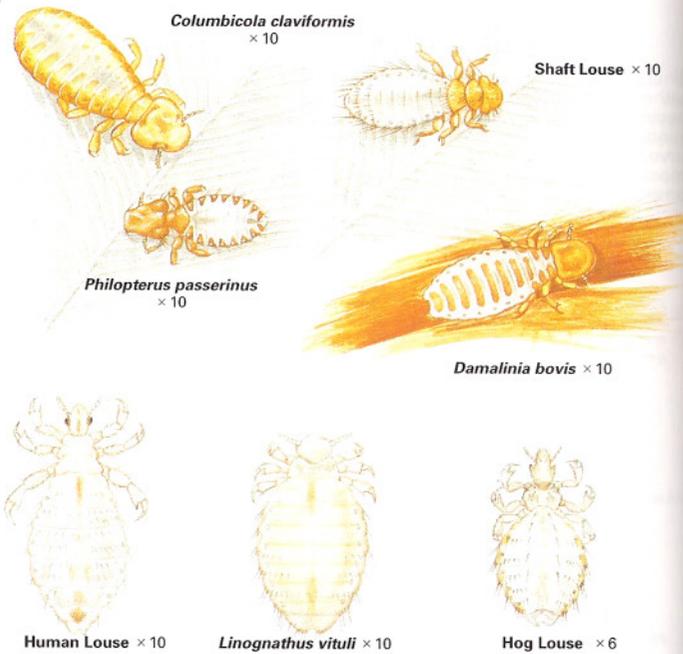
*Limothrips cerealium*  
× 10

- ▲ *Limothrips cerealium*. Breeds in cereal ears and emerges in swarms as grain ripens. Male 6-9; female all year, but hibernates – often in houses. Wings in this family are rather pointed at tip; body flattened; ovipositor curved downwards.



damage to  
wheat ear

## LICE



**LICE** Wingless parasites of birds and mammals, all strongly flattened and with strong claws to grip feathers and hair. Sometimes placed in a single order – the Phthiraptera – but mouth-parts are of two very different kinds and the insects are here regarded as belonging to two separate orders. Nymphs are very like adults, with virtually no metamorphosis.

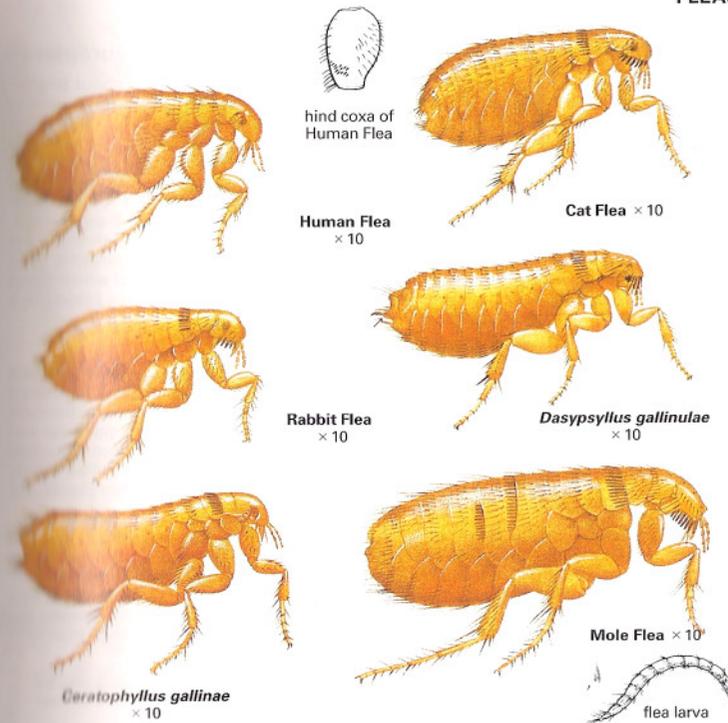
**BITING LICE Order Mallophaga** Head quite large, with biting jaws: eyes and antennae generally very small. Prothorax distinct. Mainly on birds, feeding on flakes of skin and feather and also on blood from wounds. Longer-bodied species generally among longer plumage; short species generally on head and neck. Examine freshly-dead birds to find lice. There are many species, but most have strong host preferences.

- ▲ *Columbicola claviformis* Philopteridae. A common parasite of pigeons.
- ▲ *Philopterus passerinus*. One of several similar species infesting sparrows and other passerine birds.
- ▲ **Shaft Louse** *Menopon gallinae* Menoponidae. Less flattened than *Philopterus* and with less obvious antennae – more or less concealed in grooves. A very common cosmopolitan pest of poultry and other game birds.
- ▲ *Damalinia bovis* Trichodectidae. Antennae prominent and clearly 3-segmented. Tarsi 1-clawed. Widely distributed on cattle: closely related species on other hoofed mammals.

**SUCKING LICE Order Anoplura** Blood-sucking lice confined to mammalian hosts. Head very narrow and body pear-shaped. Prothorax indistinct.

- ▲ **Human Louse** *Pediculus humanus* Pediculidae. Eyes distinctly pigmented. Exists in 2 forms – head and body lice, of which latter is the larger (about 4mm long). Carries typhus fever, but unlikely to be a problem in hygienic conditions.
- ▲ *Linognathus vituli* Linognathidae. Eyes absent. Front legs smaller than others. A parasite of cattle. Related species on other hoofed mammals and also on dogs.
- ▲ **Hog Louse** *Haematopinus suis* Haematopinidae. All 3 pairs of legs equally developed. Eyes virtually absent. On pigs.

## FLEAS



### FLEAS Order Siphonaptera

Wingless insects, strongly flattened from side to side and with enlarged hind legs for jumping. Generally dark brown or black. Adults all blood-suckers living on birds and mammals. Pearly white eggs are scattered in host nest, including sleeping quarters of domestic cats and dogs, and worm-like larvae feed there on debris, including droppings of adult fleas. Identification of fleas generally requires a microscope, and specimens should first be soaked in 10-20% caustic potash for a day or two: this makes them more transparent and easier to examine. The combs of strong bristles on head and thorax are important features. The illustrations are paler than living fleas to show up the bristles.

- ▲ **Human Flea** *Pulex irritans* Pulicidae. Small spines on inner side of hind coxa characteristic of this family. Front of head smoothly rounded. Cosmopolitan in dwellings: also on fox and badger, which may have been original host.
- ▲ **Cat Flea** *Ctenocephalides felis*. Distinguished from human flea by elongate head and strong genal and pronotal combs. The commonest household flea, often biting man. Dog Flea *C. canis* has a more rounded head, with 1st spine of genal comb much shorter than 2nd. Much less common than cat flea in B.
- ▲ **Rabbit Flea** *Spitopsyllus cuniculi*. Antennal club symmetrical. Genal comb of 4-6 blunt spines. On rabbits, usually attached to ears: carrier of myxomatosis. S & C.
- ▲ *Dasyptyllus gallinulae* Ceratophyllidae. Distinguished from *Ceratophyllus* spp by many more bristles (3 rows) in front of antennae. Male readily identified by prominent spurs at rear. Abundant on small birds.
- ▲ *Ceratophyllus gallinae*. Pronotal comb with at least 24 spines: no genal comb. On a very wide range of birds, especially those with rather dry nests. Commonest bird flea in B; abundant in tit nest-boxes and a real pest in poultry houses.
- ▲ **Mole Flea** *Hystrichopsylla talpae* Hystrichopsyllidae. One of our largest species – up to 6mm long. On moles, shrews, and some small rodents.