



## Bayer Expert Guide Aphids



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## Introduction

This Expert Guide has been published to aid identification of the main aphid pests of arable, field vegetable and fruit crops.

By their feeding, virus transmission and contamination these sap-sucking pests can cause substantial yield and quality loss. However, of the 620 aphid species native to the UK less than 10% are recognised to be crop pests. Accurate identification is therefore vital to IPM (Integrated Pest Management) and the avoidance of prophylactic treatment. It is also a key requirement for resistance management.

The profiles in this guide contain illustrations of the distinguishing features of 21 key aphid species to enable agronomists and growers to identify them in the field. They also provide a wealth of information on each aphid's pest status, host range, life cycle, impact on crops and timing of activity.

We hope you will find it to be a valuable reference in the identification and control of aphid pests to realise the full potential of your crops; in yield, quality and profit.

## Author

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Mark Taylor

## Acknowledgement

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Bayer CropScience would like to thank Mark S. Taylor, of the Rothamsted Insect Survey (a BBSRC-supported national capability), for writing the aphid profiles and providing the aphid life cycles and guide to distinguishing features. We are also grateful to the Rothamsted Insect Survey for provision of the data used to produce the aphid activity graphs.

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## How to use this guide

The aphid profiles in this guide are split in to sections providing the key information needed for identification and understanding of the aphids' impact on crops. This introductory chapter explains how to use them and provides further background information.

	Cereal	Brassica	Potato	Sugar Beet	Legume
Grain aphid					
Bird cherry-oat aphid					
Rose-grain aphid					
Mealy cabbage aphid					
Peach-potato aphid					
Potato aphid					
Buckthorn-potato aphid					
Glasshouse-potato aphid					
Leaf-curling plum aphid					
Black bean aphid					
Pea aphid					
Melon-cotton aphid					
Willow-carrot aphid					
Currant-lettuce aphid					
Lettuce root aphid					
Green apple aphid					
Rosy apple aphid					
Damson-hop aphid					
Blackcurrant-sowthistle aphid					
Strawberry aphid					
Shallot aphid					

## Crops affected

The common names given to aphids indicate their main hosts. The table below lists the aphids profiled in this Expert Guide and the crops they affect. This information is helpful in narrowing down the options for identification but cannot be regarded as definitive.

Carrot	Lettuce	Apple and Pear	Damson and Plum	Currant	Strawberry	Hop
						
						
						
						
						
						
						
						
						
						
						
						
						

Winged aphids are weak flyers and are largely dependent on air currents to reach their host. Often they land on non-host plants where they spend a short period before moving on. Although these transient winged aphids may not feed on that crop some are significant virus vectors.

For example, there are five aphid species that colonise potatoes but many others have been recognised as virus vectors and may pass through potato crops on the way to their host. These non-colonisers probe potato plants and in doing so can transmit non-persistent viruses in a matter of seconds. In particular cereal aphids, which do not colonise potatoes, have recently been recognised as a major source of Potato virus Y infection to seed potato crops.

When identifying a winged aphid it is therefore important to keep an open mind and consider that it may be a coloniser of the crop you are inspecting, a non-coloniser that can vector virus to it, or a non-coloniser that will not affect the crop in any way.

### Distinguishing features

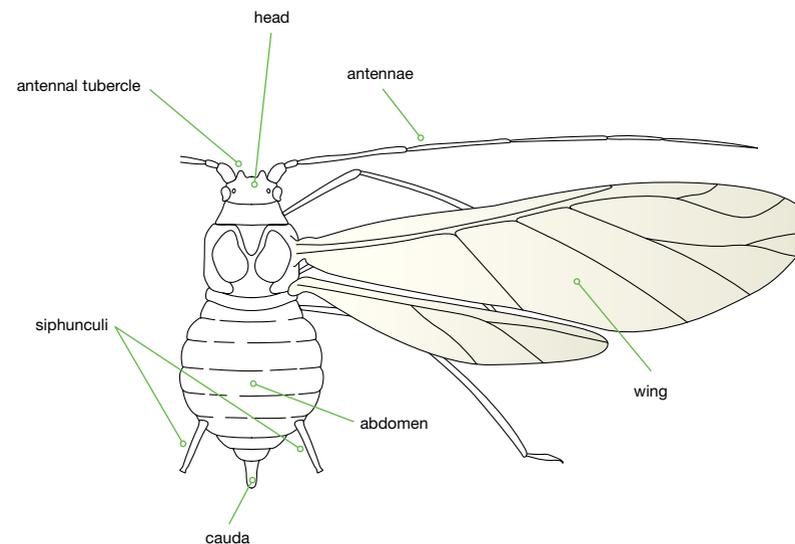
Accurate identification requires careful examination of the aphid's distinguishing anatomical features.

Most adult aphids are one to four millimetres long and are found in both winged and wingless forms. Identification should only be attempted with adult aphids, as nymph stages can be very difficult to distinguish. The best way to tell an adult is from the presence of tiny nymphs around it and a clearly defined cauda (tail) and/or wings.

Identification can be undertaken in the field by examination of the following features that are visible through a hand lens;

- ▶ head and antennal tubercles shape
- ▶ antennae length compared with body length
- ▶ siphunculi shape, size and colour
- ▶ abdominal markings
- ▶ cauda length compared with siphunculi length
- ▶ wing vein darkness

The diagram below shows where these distinguishing features are found on an aphid's body.

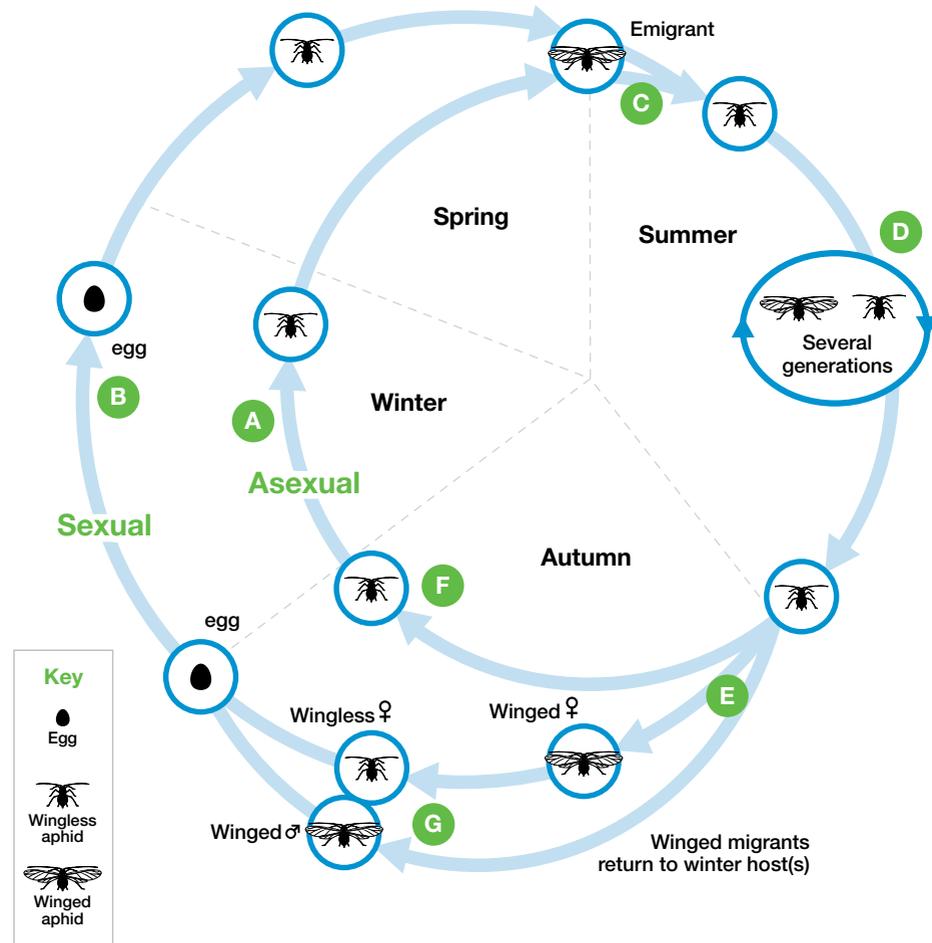


Colour cannot always be relied on for identification as within a species individuals can vary significantly. For example, although the peach-potato aphid (*Myzus persicae*) is predominantly green-bodied, pink-bodied individuals are also common and it can range in colour from almost white, to red, to almost black. Some species however are always found in the same colour, for example the black bean aphid (*Aphis fabae*) is always black.

## Life Cycle

Knowledge of aphids' life cycles is key to understanding where and when to be on the look out for them. The general life cycle diagram below applies to most pest aphid species, which alternate between different winter and summer hosts. The life cycle diagrams in the aphid profiles are based on this and simplified to highlight the aphid's hosts.

Depending on species, clone and climatic conditions aphids may overwinter either as eggs or in the mobile wingless form.



**A** Aphids that spend winter in the mobile stages are forced to remain in or around the summer crop host or can overwinter on weeds, winter crops or harvested and stored produce, so called occasional winter hosts. Mobile aphids are not cold hardy and are killed off in a severe winter. However the warmer winters of late appear to be allowing an increase in the numbers surviving through to the following spring, when they then have a head start for early migration to crop hosts **C**.

As soon as the buds of winter hosts burst, **B** over wintered eggs hatch and produce wingless individuals that start to feed on them. There are one, two or even three generations of wingless aphids on the winter host, before the switch to wing production. As spring temperatures rise, winged aphids migrate to their summer crop hosts **C**.

Aphids are weak flyers so they need still conditions to take off and are dependent on air currents to take them to their summer host crops. Once airborne they can travel long distances on air currents, sometimes hundreds of miles. Very wet or windy weather is not conducive to aphid flight and if such conditions persist during spring, migration is delayed.

**D** During the summer, aphids go through 10 to 15 asexual generations and in the height of summer will reproduce very quickly going through a generation in as little as seven days. These are mainly wingless, but winged individuals are produced if host plant tissue becomes unpalatable or population pressure gets too high. They then migrate to new hosts.

Lengthening nights trigger a proportion of wingless females to produce a sexual generation **E**. The proportion doing so is partly related to winter temperature. In areas with warmer winters fewer aphids produce a sexual generation and more will remain in the wingless asexual form **F**, and vice versa in areas with cooler winters.

Winged aphids return to their main winter hosts, usually trees or shrubs, the winged females produce wingless females to mate with the winged males and lay eggs **G**. These are cold hardy, will withstand frost and tend to be laid on bark or in crevices for greater protection.

Aphids vary considerably in the number, type and seasonality of their hosts. Most of the pest aphid species profiled in this Expert Guide alternate between winter and summer hosts but some have one year-round host, which may be a winter type woody host or summer type herbaceous host. In the life cycle sections hosts are colour coded as follows;

## Crop damage

The crop damage sections describe the pest status of the aphid species and provide a graph of its activity through the year. This gives a good indication of when first flights of aphids from winter to summer hosts can be expected and when in the year the population is likely to peak and decline.

However, it is important to bear in mind that with species that overwinter in the mobile form, first flights and numbers are strongly correlated with average January and February temperatures so there will always be seasonal variation around the averages shown in these graphs.

The weekly migration data used in these graphs come from the Rothamsted Insect Survey (RIS), which operates a suction trap network with 11 sites in England. The traps are run continuously, daily samples being taken during the aphid season, usually from early April until mid November, and weekly samples at other times. The trap at Rothamsted dates back to 1964.

The RIS provides a unique information service which growers and agronomists use as a risk indicator, to prompt crop inspection and assist in the timing of crop treatment.

To see the RIS aphid bulletin visit: [www.rothamsted.ac.uk/insect-survey](http://www.rothamsted.ac.uk/insect-survey)

## Grain aphid *Sitobion avenae*

### Crops affected

Wheat, barley, oats and maize.

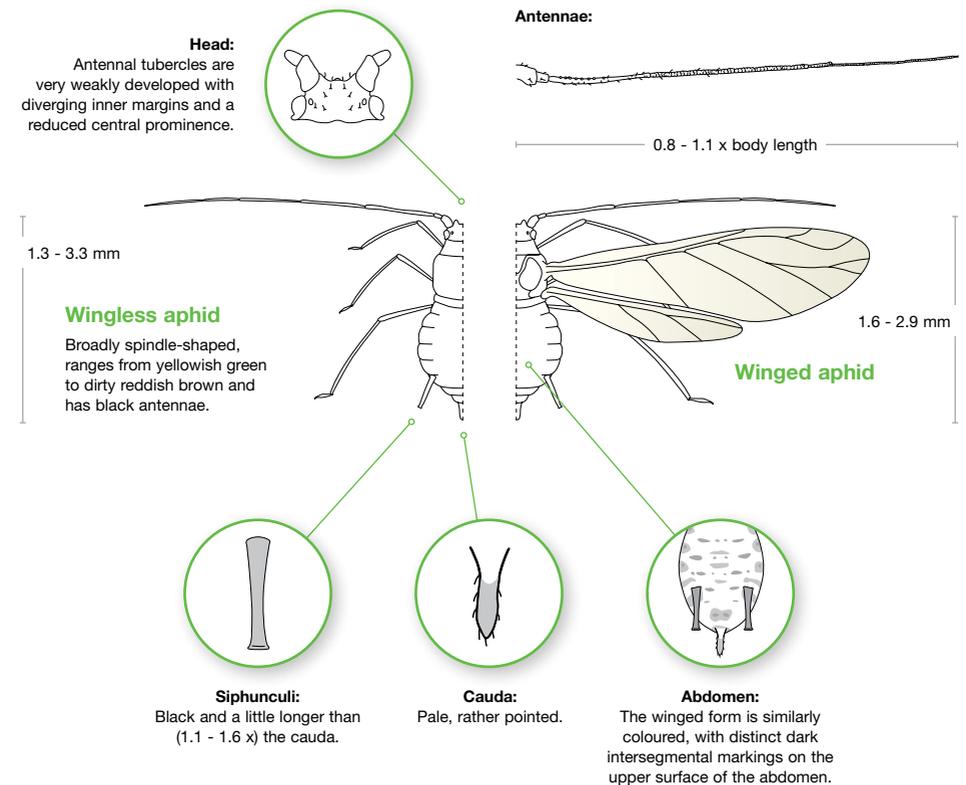
### Viruses transmitted

Barley yellow dwarf virus.



Photo © Rothamsted Research

### Distinguishing features

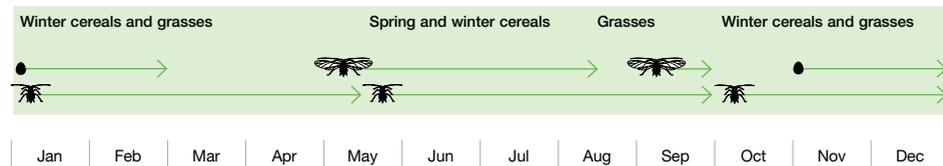


## Life cycle

This species spends its entire year on cereals and grasses.

Only a small proportion of the population overwinters on Poaceae as eggs that hatch in March. The majority of the population overwinters as mobile stages on wild grasses or winter cereals and can develop rapidly in warm springs. Colonies of wingless aphids develop on the flag and upper leaves of cereals then move to emerging ears, especially on wheat.

Winged forms usually fly in late May to June and the resulting colonies rarely become numerous before late June. In favourable conditions these colonies can increase quickly. Winged forms continue to be produced throughout summer, in response to increasing population density and declining food quality, moving to re-infest crops or other grasses. It is from these that a comparatively small autumn migration arises which infests early-sown winter cereals and wild grasses.



## Crop damage

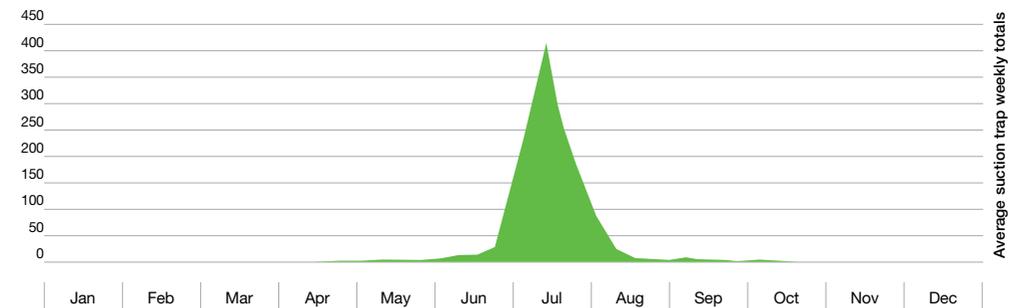
The grain aphid is a major pest on wheat, a moderate pest on barley and oats, and a minor pest on maize.

It causes direct feeding damage through May, June and early July from flag leaf to dough ripe stages (GS37-85). When present on crops before flowering it reduces the number of grains per ear. After flowering to the end of grain filling it directly reduces grain size.

This species also affects winter cereals in September to October and throughout mild winters up to GS31 as a vector of Barley yellow dwarf virus. It is more cold-hardy than *R. padi*, and thus more significant in the secondary spread of this virus in winter cereals.

Recent research has found a degree of resistance to pyrethroids in some populations of the grain aphid.

Activity of winged *Sitobion avenae* in England (Mean 2002 - 2011)



## Bird cherry-oat aphid *Rhopalosiphum padi*

### Crops affected

Wheat, barley, oats, rye and maize.

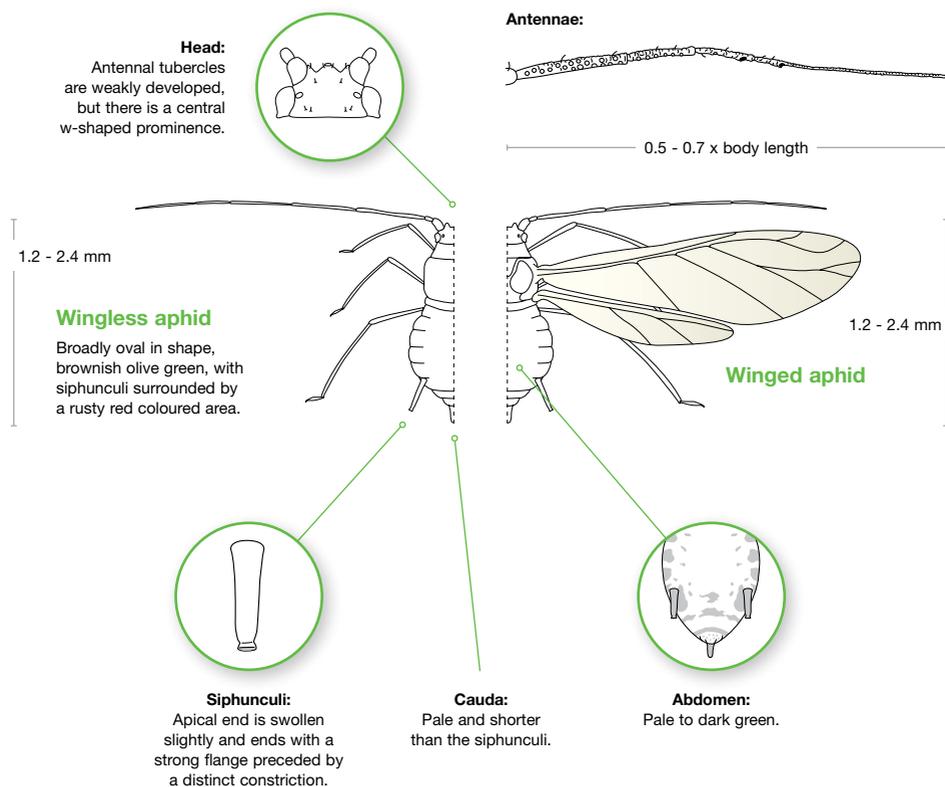
### Viruses transmitted

Barley yellow dwarf virus, Maize leaf fleck virus, Maize dwarf mosaic potyvirus and Potato virus Y.



Photo © Rothamsted Research

### Distinguishing features



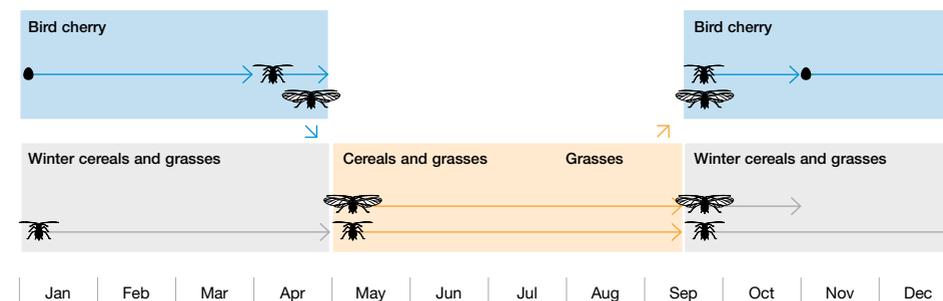
### Life cycle

Eggs of this aphid overwinter on bird cherry trees, *Prunus padus*, and hatch from April onwards. After two or more generations, winged forms are produced which migrate in May to early June to numerous species of Poaceae, including all the major cereals and pasture grasses.

This species tends to infest lower leaves and stems, moving to higher leaves only when the aphids get crowded or food quality drops. Several generations are produced before a summer migration from ripening cereals to wild grasses, particularly in eastern England, but also between grasses elsewhere.

Timing of the autumn migration back to *P. padus* to lay eggs in September to November is largely determined by night length. This last migration is usually the biggest of the year.

With warmer winters a significant proportion of this aphid population in the southern half of the country now overwinter as mobile stages on early-sown winter cereals and on grasses.



### Crop damage

The bird-cherry oat aphid is a major pest on wheat, barley, oats and maize and a minor pest on rye. It seldom gets numerous enough to cause direct feeding damage, except when heavy infestations develop on maize in late summer.

The principal factor leading to its pest status is its role as a vector of Barley yellow dwarf virus, which causes wheat and barley to turn yellow and oats to become reddish in colour. This aphid often provides the primary source of infection in early sown winter cereals and secondary spread by offspring may continue until significant frosts occur. Infected plants can be severely stunted resulting in loss of quality and grain yield. It is also known to transmit Maize leaf fleck virus and Maize dwarf mosaic potyvirus.

Although a poor vector of Potato virus Y, a non-persistent virus, it can in some years fly in such large numbers during summer for it to be an important vector in potato crops, which it does not colonise, but may probe whilst searching for its preferred host plant.

Activity of winged *Rhopalosiphum padi* in England (Mean 2002 - 2011)



### Rose-grain aphid *Metopolophium dirhodum*

### Crops affected

Cereals, potatoes and maize.

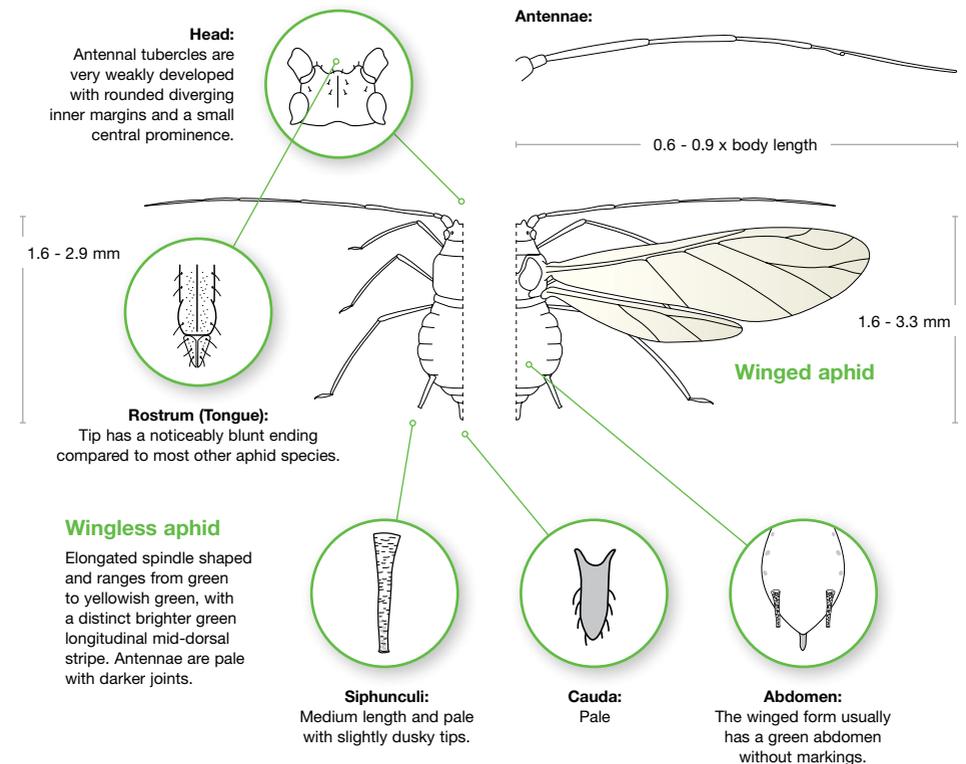
### Viruses transmitted

Barley yellow dwarf virus, Potato virus Y and Maize dwarf mosaic virus.



Photo © Rothamsted Research

### Distinguishing features

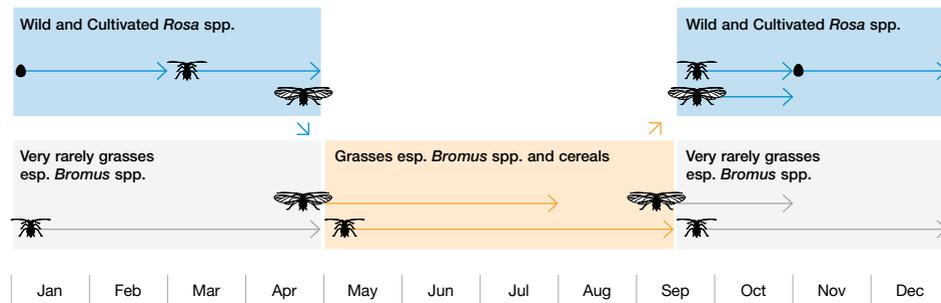


## Life cycle

The overwintering eggs are laid on wild and cultivated *Rosa* spp. in October and November and hatch the following spring. Colonies then develop and produce winged forms in April to early May which migrate to grasses, especially *Bromus* spp. and cereals, particularly wheat.

Here the population can build to epidemic proportions in some years. Preferred feeding sites are the leaves. They move from older to younger leaves and less often the ears. Later, further winged forms are produced on cereals in response to increasing population density, and these re-infest the crop or migrate to other grasses.

Return migration to *Rosa* spp. occurs in late September to October. This species can overwinter in mobile stages on grasses but is not often seen on winter cereals during autumn.



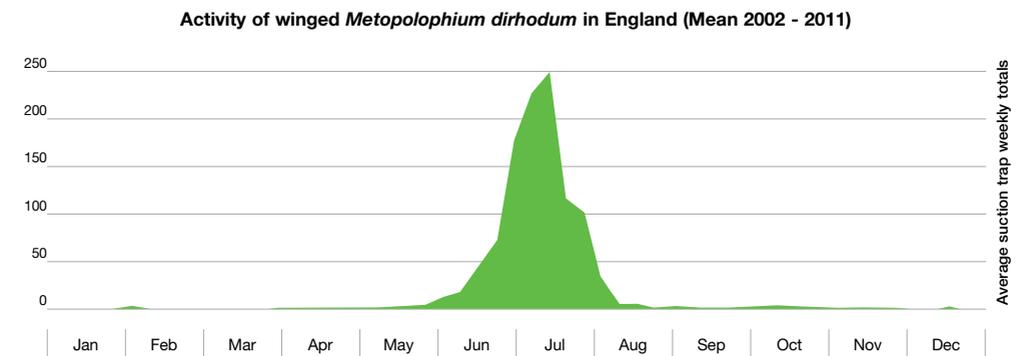
## Crop damage

The rose-grain aphid is a minor pest on cereals but occasionally very large populations can reduce yields, particularly in wheat.

Lower leaves of plants coming into ear (GS59) through to ripening may be attacked and if numbers build they move up to flag leaves. Infested leaves tend to turn yellow and senesce prematurely. This aphid is a poor vector of Barley yellow dwarf virus, although in large population years it can contribute to secondary spread within fields.

Although a poor vector of Potato virus Y, a non-persistent virus, in some years it can fly in such large numbers in summer for it to be an important vector in potato crops, which it does not colonise, but may probe whilst searching for its preferred host plant.

It is also known to transmit Maize dwarf mosaic virus and commonly recognised as a pest on cultivated roses in spring and early summer.



## Mealy cabbage aphid *Brevicoryne brassicae*

### Crops affected

Broccoli, cabbage, cauliflower, kohlrabi, radish, oilseed rape and swede.

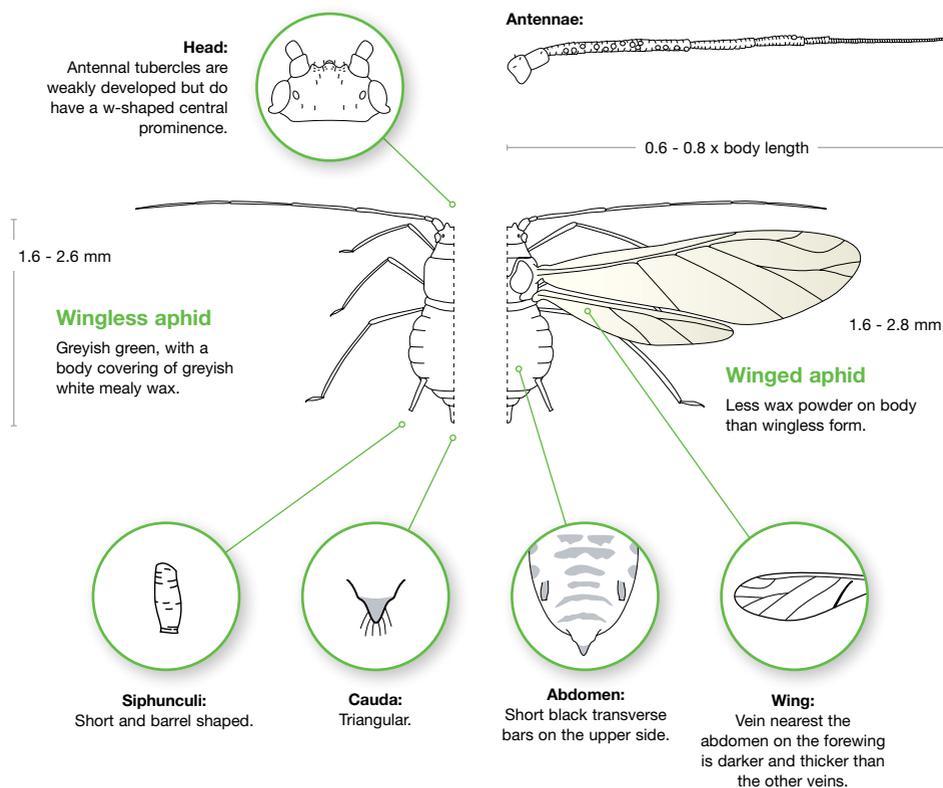
### Viruses transmitted

About 20 plant viruses, of which Cauliflower mosaic virus and Turnip mosaic virus are most important.



Photo © Bayer CropScience

### Distinguishing features



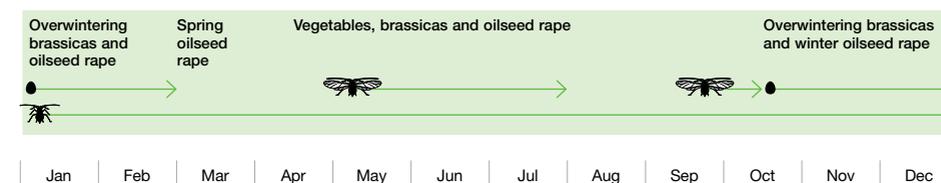
### Life cycle

This aphid is restricted to herbaceous Brassicaceae (Cruciferae) throughout its life cycle, because it requires the presence of mustard oil, sinigrin, to initiate a feeding response.

The shiny black eggs are placed on the stems and leaves of brassica crops that remain in the field through the winter such as oilseed rape or overwintering vegetable brassica crops. These eggs hatch sometime between February and April, producing nymphs that feed on leaves and shoots.

Winged forms produced in May to July migrate to newly planted brassica crops where numbers can increase rapidly. An early summer peak in abundance is reached followed by a population crash brought about by a range of natural agents. A further small migration from mid-September to mid-October lay eggs in October.

In recent years, more of the population has spent the winter as mobile stages, not eggs. The mobile stages, if they survive, have a head start in warm springs over the nymphs hatching from eggs. In this species there is considerable variation in the annual pattern of infestation.



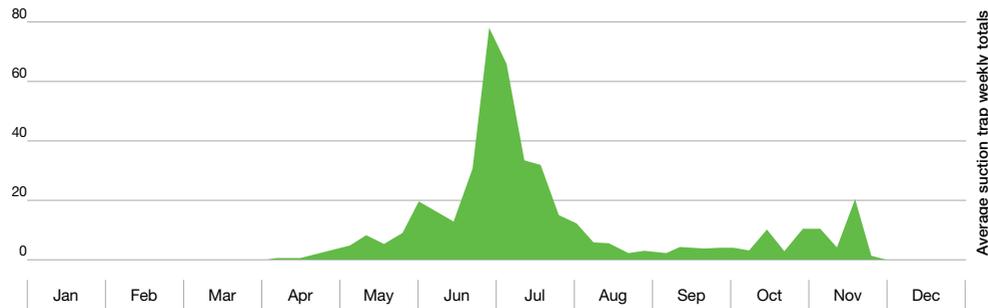
### Crop damage

The mealy cabbage aphid is a major pest on broccoli, cabbage, cauliflower, kohlrabi, radish and swede.

It causes serious feeding damage, leaving plants weakened and stunted, and heavily infested seedlings and young plants can wilt and die. Less serious distortion and fouling of leaf surfaces reduces marketability.

It attacks oilseed rape and kale to a lesser extent, and turnips appear virtually immune. This species can transmit about 20 plant viruses, of which Cauliflower mosaic virus and Turnip mosaic virus are most important.

Activity of winged *Brevicoryne brassicae* in England (Mean 2002 - 2011)



### Peach-potato aphid *Myzus persicae*

#### Crops affected

Potatoes, sugar beet, lettuce, brassicas and legumes.

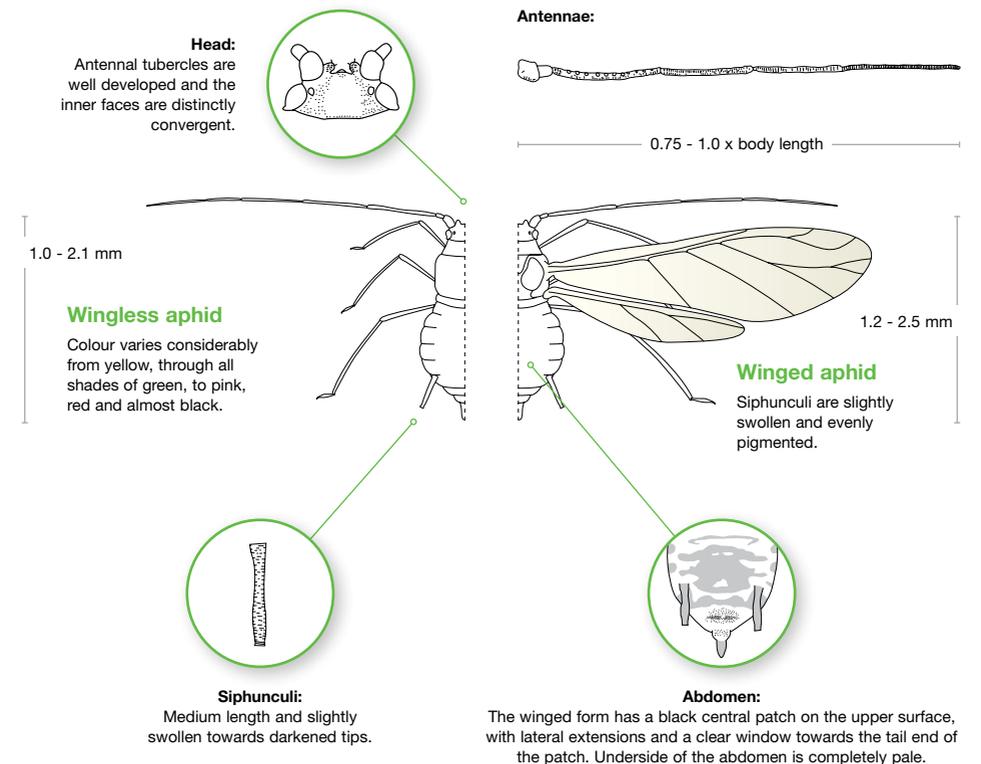
#### Viruses transmitted

Potato leaf roll virus, Potato virus Y, Turnip yellows virus, Beet mild yellowing virus, Pea enation mosaic virus and Lettuce mosaic virus.



Photo © Rothamsted Research

#### Distinguishing features

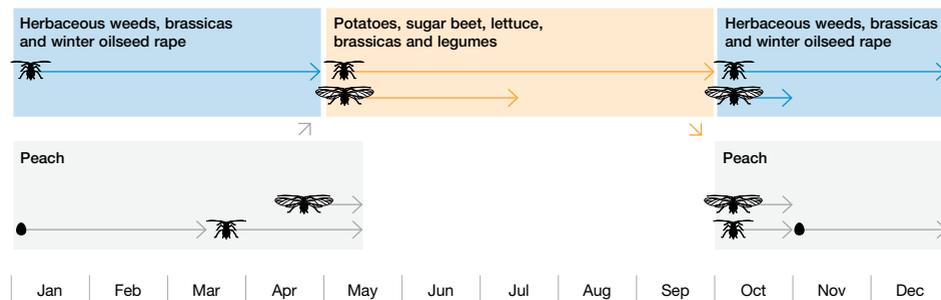


## Life cycle

The winter host is peach, *Prunus persica*, which is confined to small numbers in southern Britain. So, although some eggs overwinter on peach, overwintering is usually in the mobile stages on herbaceous weeds and brassicas.

The summer hosts are very numerous and spread over 40 plant families, and include very many economically important plants. Winged forms start to migrate from their winter hosts to fresh summer hosts from late April to early June. Numbers reach a peak in July. However this aphid does not form dense colonies, but tends to move when crowded by walking to infest other parts of the same or neighbouring plants.

Redistribution in late summer to other crops or wild herbaceous plants is followed by a migration to winter hosts in late September and early October.



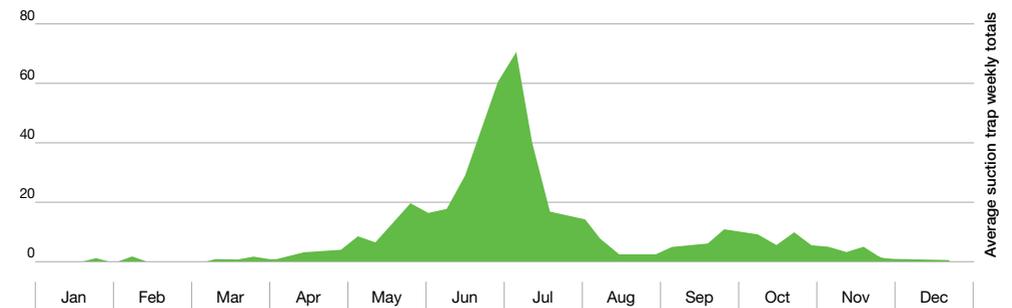
## Crop damage

The peach-potato aphid is regarded as a major pest on potatoes, sugar beet, lettuce, brassicas and legumes. This is the most important pest and virus vector aphid in Britain due to its wide host range and its proficiency in transmitting more than 120 plant viruses.

Its behaviour in not forming dense colonies means that it rarely reaches levels causing direct feeding damage. However, its tendency to walk short distances when crowded greatly enhances its importance as a virus vector. Some of the more important viruses transmitted include Potato leaf roll virus, Potato virus Y, Turnip yellows virus, Beet mild yellowing virus, Pea enation mosaic virus and Lettuce mosaic virus. Even small numbers cannot be tolerated when producing certified seed potato crops.

Control options have been restricted by the development of resistance to organophosphates, carbamates and pyrethroids in populations of peach-potato aphid. Recent research has also found resistance to neonicotinoids in the peach growing regions of southern Europe.

Activity of winged *Myzus persicae* in England (Mean 2002 - 2011)



## Potato aphid

### *Macrosiphum euphorbiae*

Potato aphid *Macrosiphum euphorbiae*

### Crops affected

Potatoes, sugar beet, strawberries and lettuce, outdoors and indoors.

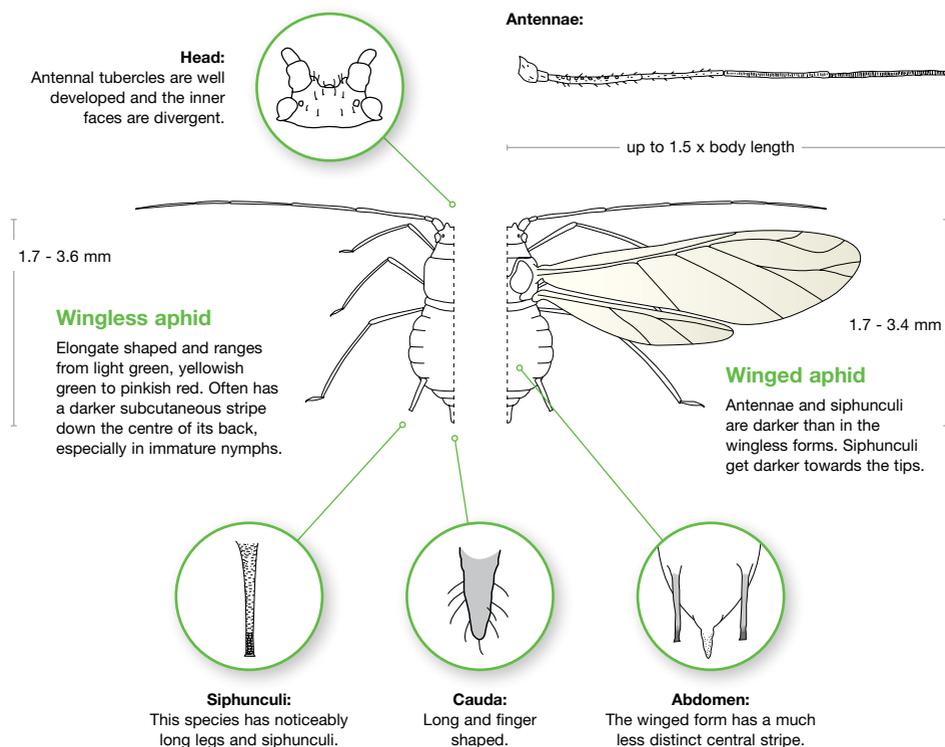
### Viruses transmitted

Potato leaf roll virus, Potato virus Y, Beet mild yellowing virus, Beet yellows virus and Lettuce mosaic virus.



Photo © Rothamsted Research

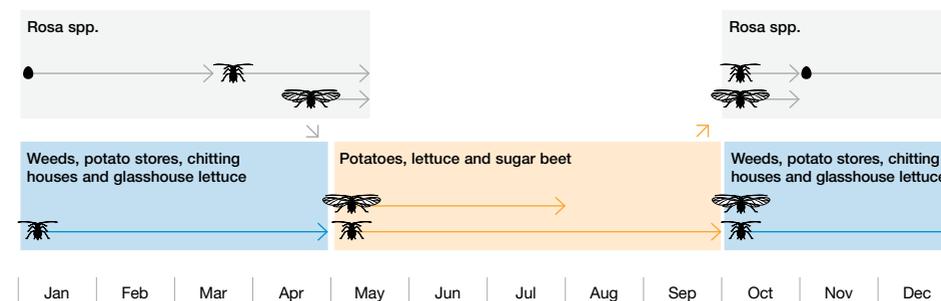
### Distinguishing features



### Life cycle

This species overwinters rarely as eggs on *Rosa* spp., but predominantly spends winter in the mobile stages on weeds, potato sprouts in stores/chitting houses, and on lettuce under glass.

In early May to June winged forms are produced and migrate to potato and other crops. This aphid is highly polyphagous in the summer, feeding on over 200 plant species in more than 20 plant families. The Solanaceae, especially potato, are its preferred summer hosts. A second summer dispersal migration in July may happen if numbers are particularly high. There is only a very small migration in the autumn.



### Crop damage

In some years the potato aphid is a major pest on potatoes and lettuce, outdoors and indoors.

It can cause physical damage to foliage resulting in yield loss when populations are high. Early large infestations may cause the upper leaves of some potato varieties to roll upward (false top roll). It can transmit over 50 plant viruses, mainly of the non-persistent variety, but with less efficiency than *Myzus persicae*.

In particular it is known to transmit Potato leaf roll virus (symptoms appear later than false top roll), Potato virus Y, Beet mild yellowing virus, Beet yellows virus and Lettuce mosaic virus. In lettuce crops small numbers can persist late into autumn and will affect marketability.

Activity of winged *Macrosiphum euphorbiae* in England (Mean 2002 - 2011)



### Buckthorn-potato aphid *Aphis nasturtii*

#### Crops affected

Potatoes and watercress.

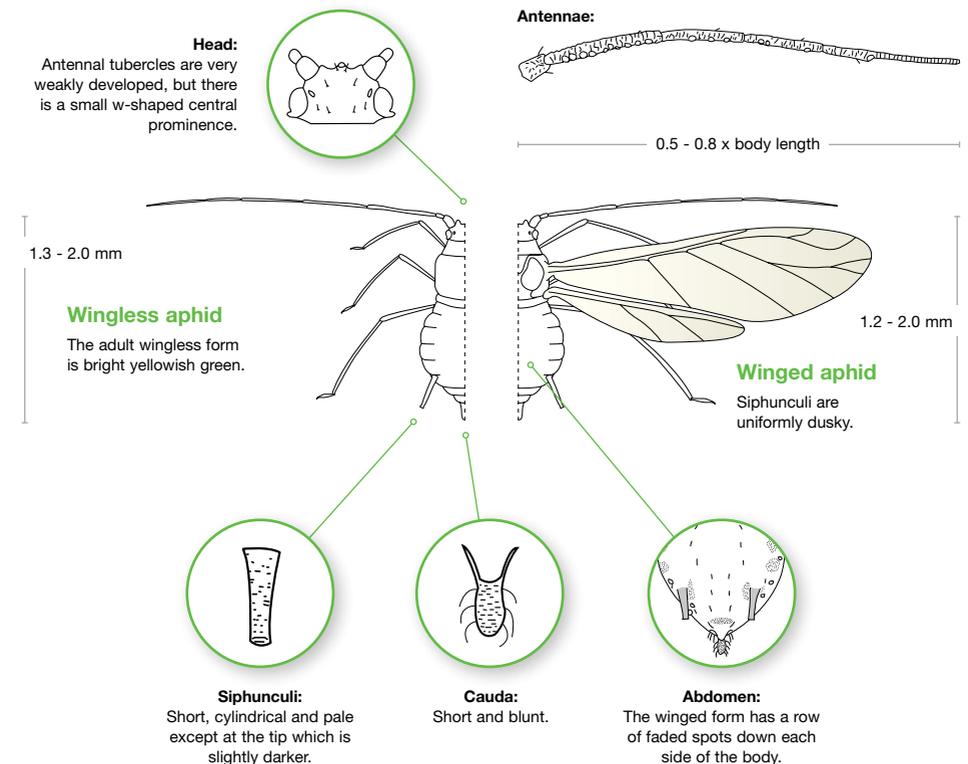
#### Viruses transmitted

Potato virus Y, Potato virus A and Potato leafroll virus.



Photo © Bayer CropScience

#### Distinguishing features

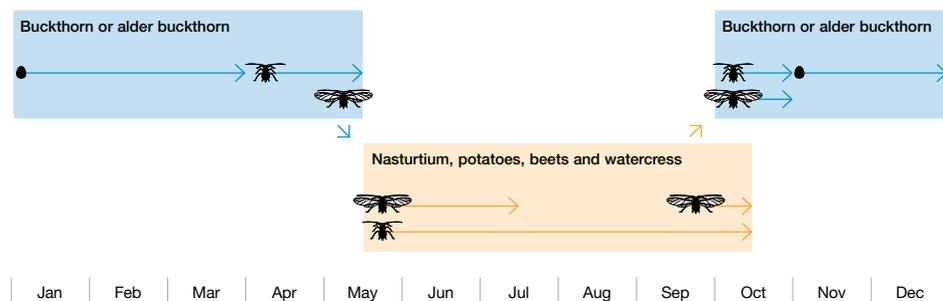


## Life cycle

This aphid overwinters as eggs at the base of buds and in cracks in the bark of buckthorn (*Rhamnus catharticus*) or the alder buckthorn (*Frangula alnus*), both of which prefer limestone-rich soils. Eggs hatch at the beginning of April and cause leaf distortion of young buckthorn leaves in spring.

Winged forms produced in late May to early June move to a wide range of summer hosts in numerous plant families including *Cruciferae* (*Nasturtium*, *Capsella* spp.), *Solanaceae* (*Solanum nigrum*, potato) and *Polygonaceae* (*Beta vulgaris*, *Polygonum* spp.). During the summer several generations follow on from each other with redistribution within the summer host range when crowding and/or food quality dictates.

In September there is a return to buckthorn where mating occurs and the females lay cold hardy eggs.



## Crop damage

The buckthorn–potato aphid is a minor pest on potatoes and watercress. It very rarely causes direct feeding damage on potatoes by sucking plant sap.

Occasionally it can occur in very large numbers, when it has the potential to cause indirect damage through the transmission of non-persistent viruses such as Potato virus Y and Potato virus A. It is thought to be a poor vector of the persistent Potato leaf roll virus.

Buckthorn–potato aphids are very rarely trapped so winged activity data are not available.

## Glasshouse–potato aphid

*Aulacorthum solani*

## Crops affected

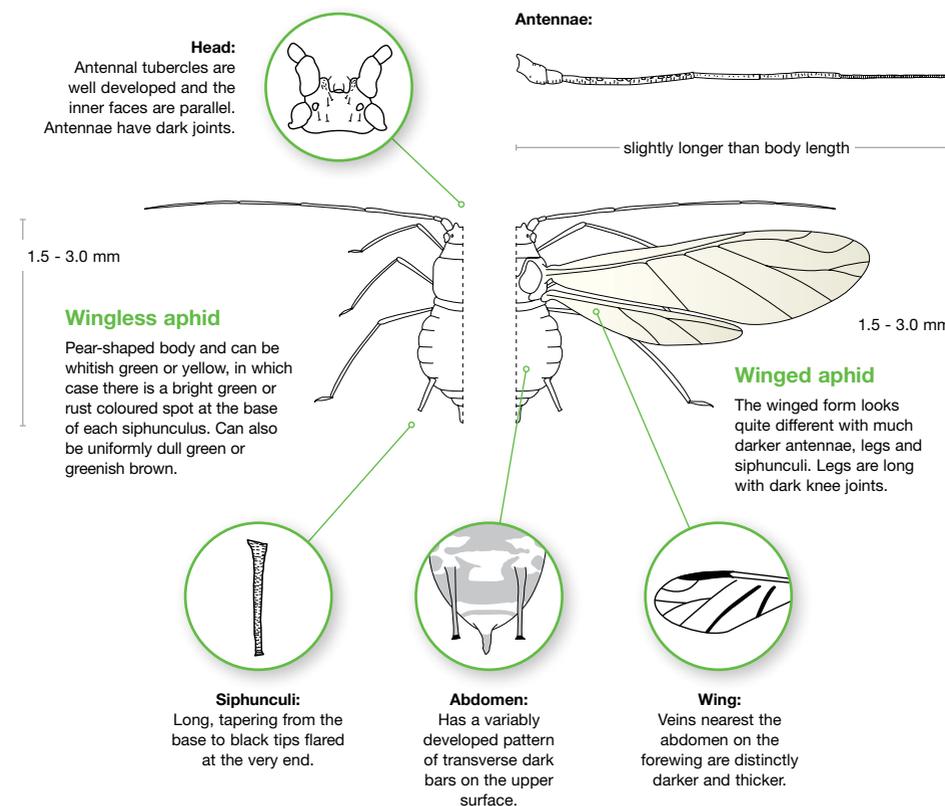
Field crops (especially potatoes), ornamentals, bulbs (especially tulips) and a wide range of 'house' plants.

## Viruses transmitted

40 viruses, both persistent and non-persistent.



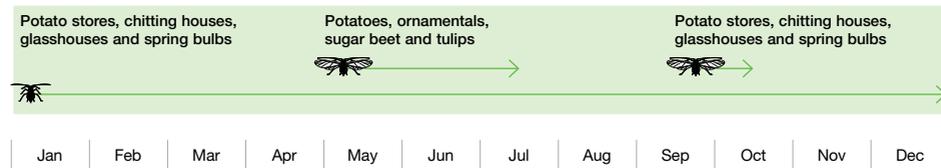
## Distinguishing features



## Life cycle

This aphid has the unusual ability of overwintering as eggs on many different host plant species. However, the majority of the population overwinters in the mobile stages, particularly on potato sprouts in stores or chitting houses and on many plants under glass. Winged adults migrate in late spring and start colonies that reach a peak in July.

This species is extremely polyphagous, colonising over 200 plant species, including both dicotyledons and monocotyledons, but not Poaceae. There is a very small autumn migration back to winter hosts.

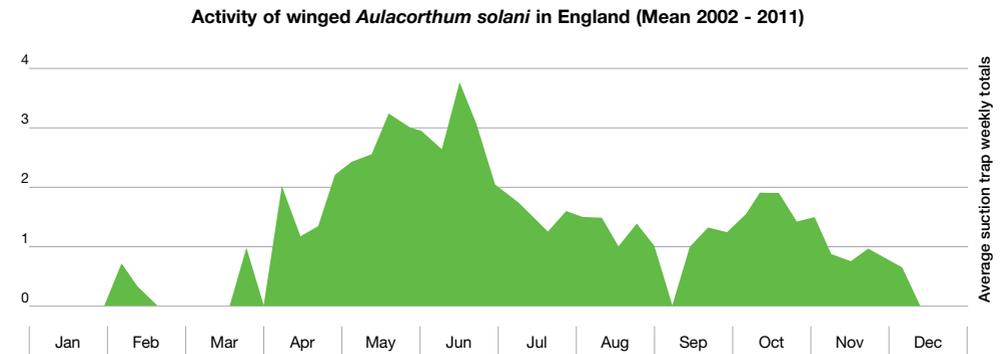


## Crop damage

The glasshouse–potato aphid is a minor pest on field crops, especially potatoes, but rarely causes significant direct feeding damage.

Although it has the ability to vector about 40 viruses, both persistent and non-persistent, its relatively poor transmission efficiency makes it unimportant as a virus carrier in the field.

However, this aphid's importance increases when found on protected crops and glasshouse plants. It is a problem particularly on ornamentals, bulbs (especially tulips) and a wide range of house plants.



## Leaf-curling plum aphid *Brachycaudus helichrysi*

### Crops affected

Plums, damsons, cucumbers, potatoes, asters and chrysanthemums.

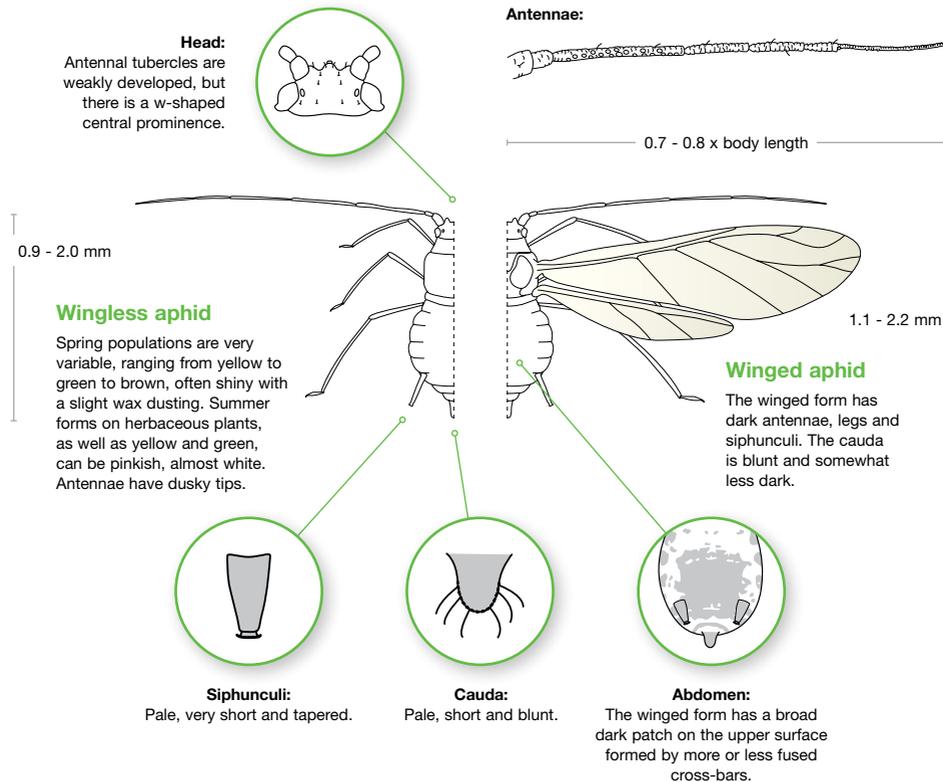
### Viruses transmitted

Plum pox virus, Cucumber mosaic virus, Dahlia mosaic virus and Potato virus Y.



Photo © Rothamsted Research

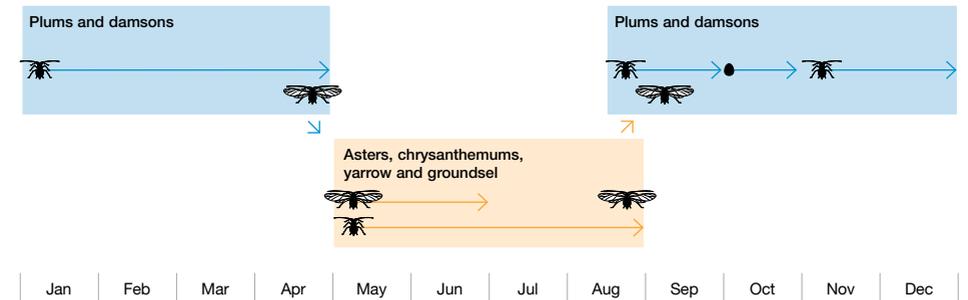
### Distinguishing features



### Life cycle

Overwintering eggs are laid on various *Prunus* spp., particularly plums and damsons. Unusually they hatch in November to December and the nymphs then feed on dormant buds. In spring successive generations feed on young foliage until in May winged forms migrate to numerous summer hosts.

They have been recorded on some 120 plant species, with a notable preference for Asteraceae such as asters, chrysanthemums, yarrow and groundsel. Migration to summer hosts is usually complete by early July. Return flight to *Prunus* spp. begins in the latter half of August and continues to mid-October.



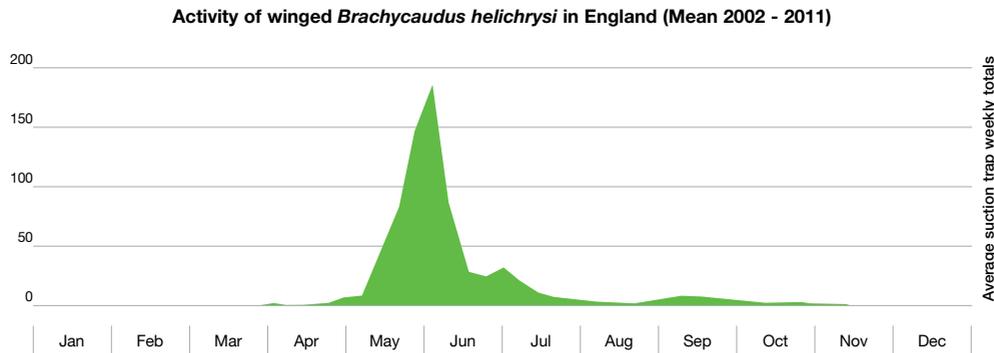
### Crop damage

The leaf-curling plum aphid is a pest on *Prunus* spp. causing leaves to roll up tightly perpendicular to the mid-rib thus severely damaging them during rapid growth and before predators are active.

It is able to transmit a number of viruses including Plum pox virus, Cucumber mosaic virus, Dahlia mosaic virus, a mosaic virus disease of cineraria, and is a notable pest of glasshouse crops and house plants.

It is also quite an efficient vector of Potato virus Y, a non-persistent virus, and in some years can fly in such large numbers in summer for it to be an important vector on potato crops, which it does not colonise but may probe whilst searching for its host plant. Sometimes it even produces nymphs on potato, but they do not survive.

A similar role for this species has been insinuated in the sugar beet crop with respect to infection by the non-persistent Beet mosaic virus.



### Black bean aphid *Aphis fabae*

### Crops affected

Beans and sugar beet.

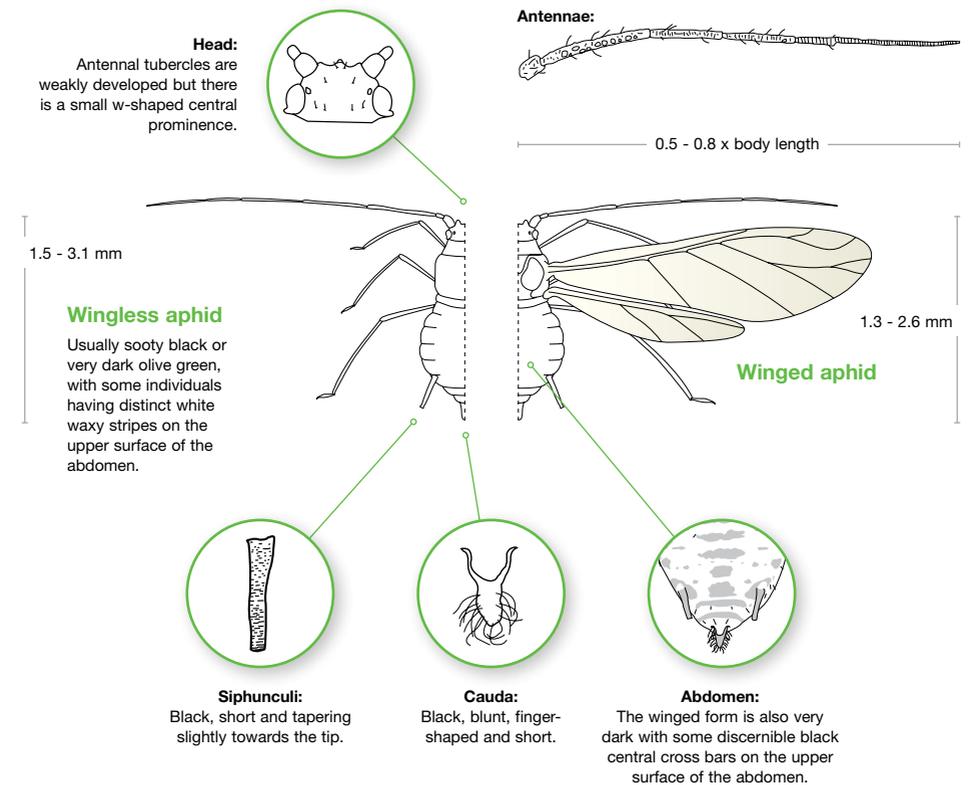
### Viruses transmitted

More than 30 viruses, mainly non-persistent.



Photo © Bayer CropScience

### Distinguishing features

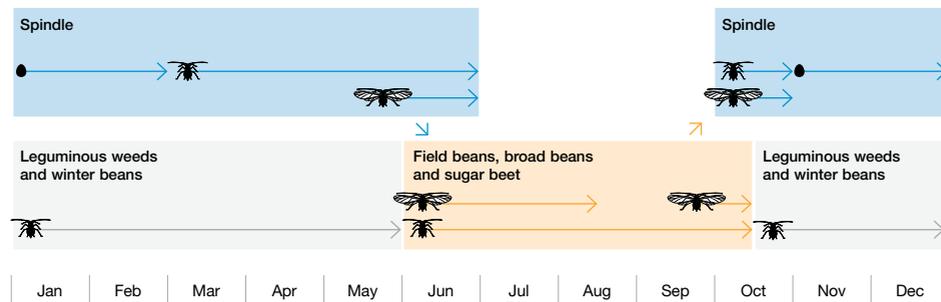


## Life cycle

This species overwinters mainly as eggs on spindle, *Euonymus europaeus*, and occasionally in the south of England in the mobile stage on leguminous weeds or winter beans. The eggs hatch from late February to early April and colonies develop on young leaves and shoots. The winged forms are produced in May/June, and these migrate to an enormous range of summer hosts.

This species has been recorded on almost 300 plant species. The principal commercial crops involved are field beans, broad beans and sugar beet, as well as most forms of garden bean. Some common summer wild hosts include docks, poppies, goosefoot and fat hen. Breeding continues throughout the summer, further winged forms are produced in response to crowding and these spread within crops and invade new crops.

The populations usually peak in July to August, and are often noticeably attended by ants. In autumn *A. fabae* migrates back to *E. europaeus* and winter eggs are laid.



## Crop damage

The black bean aphid is a major pest on beans and sugar beet, occasionally at an epidemic scale, principally by causing direct feeding damage.

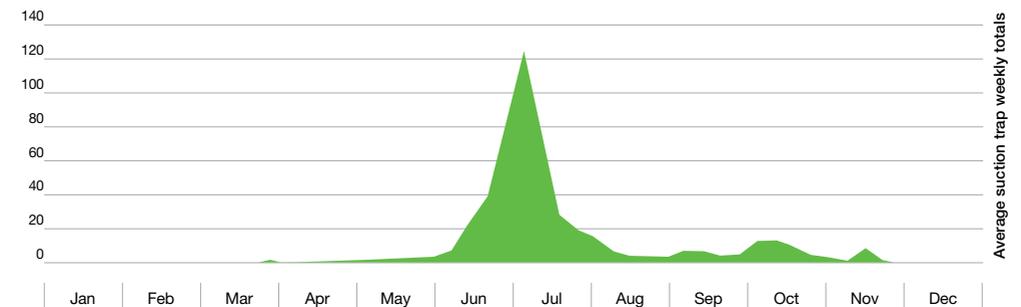
The plants lose vigour, flowers are damaged and pod development in beans may be retarded or even prevented. Spring sown field beans can be damaged severely with considerable loss of yield. However, winter and early sown spring crops are less likely to be seriously affected, because plants are well established and flowering has finished before the aphid attack starts.

In sugar beet very dense colonies can develop during the summer, causing significant wilting and poor growth.

This species is known to transmit more than 30 viruses, mainly of the non-persistent variety. Large populations can cause significant secondary spread, even when they did not provide the initial primary infection.

A by-product of such large colonies is contamination of the plant surface with sticky secretions, which promote the growth of sooty moulds. This can reduce the marketability and value of horticultural bean crops.

Activity of winged *Aphis fabae* gp. in England (Mean 2002 - 2011)



# Pea aphid

## *Acyrtosiphon pisum*

Pea aphid *Acyrtosiphon pisum*

### Crops affected

Peas.

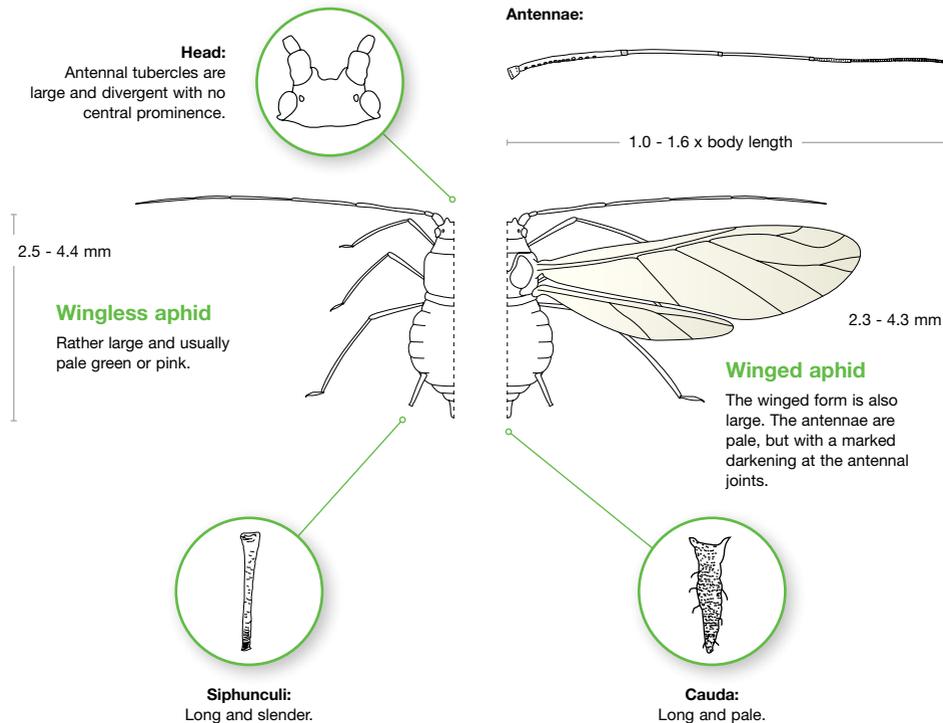
### Viruses transmitted

Pea leaf roll virus, Pea enation mosaic virus, Pea mosaic virus and Pea seed-borne mosaic virus. Also a vector of Potato virus Y.



Photo © Rothamsted Research

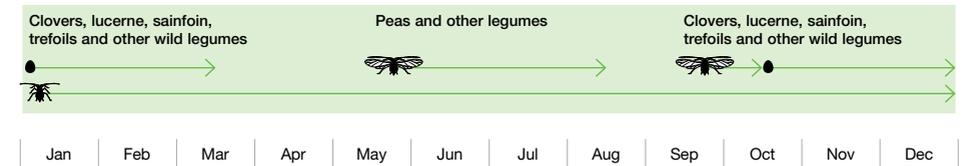
### Distinguishing features



### Life cycle

This aphid spends all year living on leguminous plants. Eggs and active forms overwinter low down on various clovers, lucerne, sainfoin and trefoils. Eggs hatch in February and March, and winged forms are produced during May, which then migrate to peas and other legumes.

Numbers usually reach a peak in late June and early July, although populations can remain noticeable on successive sowings of peas through to early autumn. There is a small autumn migration in late September back to the overwintering sites.



### Crop damage

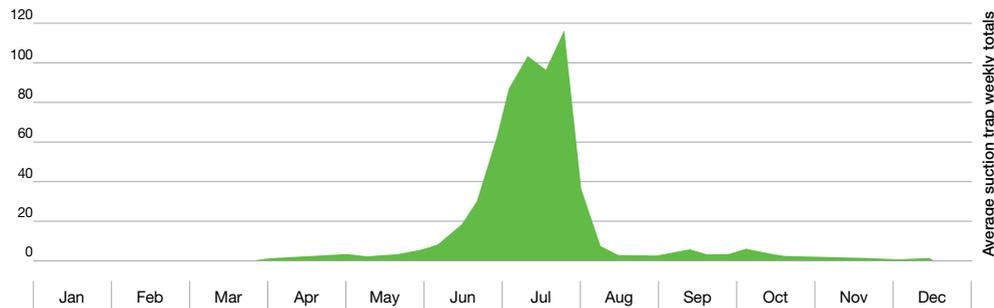
The pea aphid is generally a moderate pest on peas, only occasionally causing major damage.

It causes direct feeding damage to young growing points of peas, causing stunting, and subsequent distortion and yellowing of leaves and pods. Crops beginning to flower are most susceptible, especially if this coincides with the population peak in late June to early July.

Heavy infestation on culinary peas can significantly reduce yields. This species also merits pest status because of its ability to transmit more than 30 plant viruses, in particular Pea leaf roll virus, Pea enation mosaic virus, Pea mosaic virus and Pea seed-borne mosaic virus.

It is also known to cause economic damage to field beans by the transmission of bean leaf roll virus. Potato virus Y can be transmitted if pea aphids sample potato sap when searching for new plant hosts.

Activity of winged *Acyrtosiphon pisum* in England (Mean 2002 - 2011)



### Melon-cotton aphid *Aphis gossypii*

#### Crops affected

Cucurbits, beans, peas, crucifers, celery, lettuce, melon, onion, strawberry and herbs.

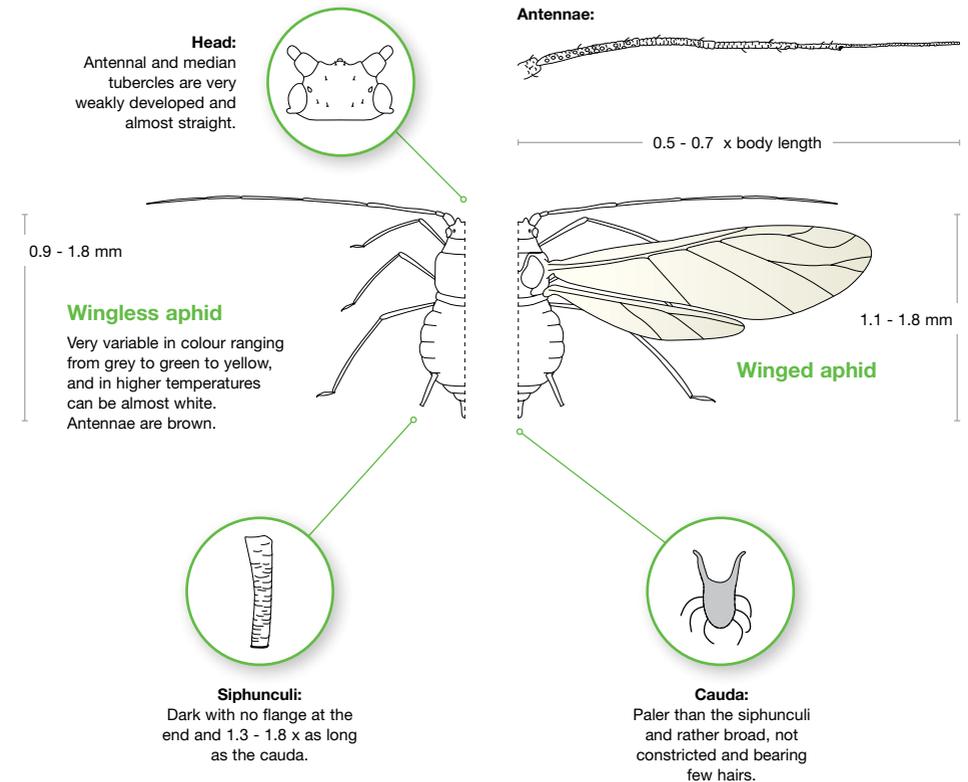
#### Viruses transmitted

Over 50 on a wide range of crops.



Photo © Bayer CropScience

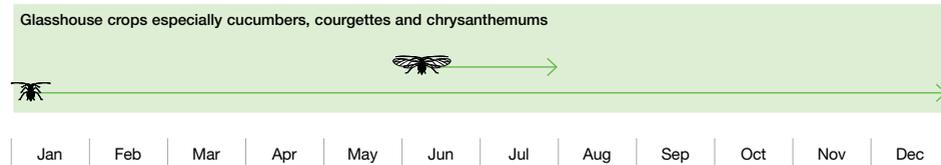
#### Distinguishing features



## Life Cycle

This aphid is especially well suited to warm climates such as southern Europe. In the UK it spends the entire year as mobile stages often within the protected environment of glasshouses.

It is renowned for its ability to feed on a very wide range of plants but is particularly well suited to cucurbits such as courgette and cucumber. It is often found in the field mid-summer on transplanted salad crops raised from glasshouse material and is often ant attended.



## Crop damage

The melon-cotton aphid is an important virus vector transmitting over 50 different viruses. These include many viruses of beans, peas, crucifers, celery, cucurbits, lettuce, onion and strawberry.

It is an especially important pest on courgette, melon, cucumber, aubergine, strawberry and in the glasshouse production of chrysanthemums. It has also been observed on glasshouse-produced herbs such as basil, coriander, lemon verbena and parsley. They feed on the growing tips or undersides of leaves which may become chlorotic and die prematurely.

Some populations have shown significant resistance to organophosphate and pyrethroid insecticides. This is particularly evident in glasshouse populations where insecticide selection pressures are most intense. Some strains also show MACE resistance making them resistant to the insecticide pirimicarb.

Melon-cotton aphids are very rarely trapped so winged activity data are not available.

## Willow-carrot aphid *Cavariella aegopodii*

### Crops affected

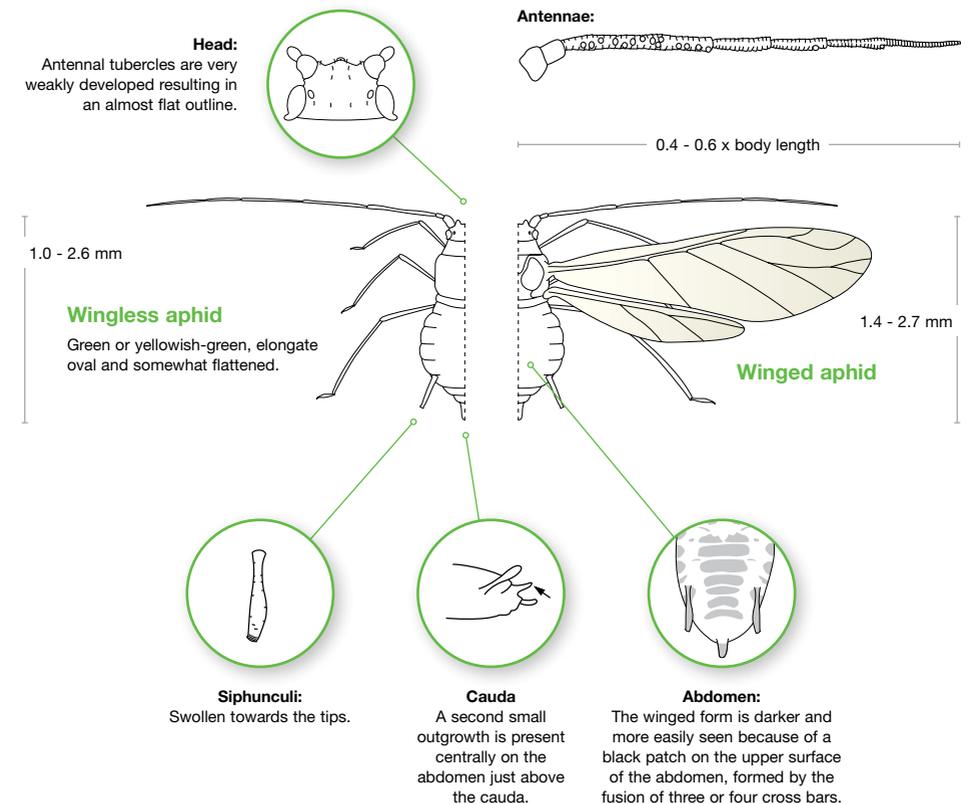
Carrots, celery, parsnips and parsley.

### Viruses transmitted

Carrot motley dwarf virus, Parsnip yellow fleck virus, Carrot red leaf virus, Parsnip mosaic virus and Celery mosaic virus.



### Distinguishing features

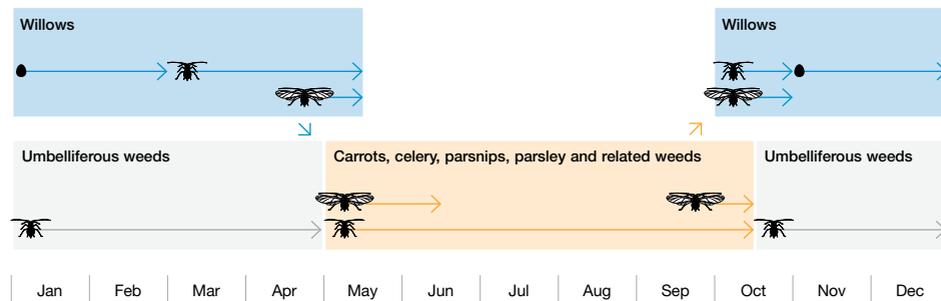


## Life cycle

This aphid principally overwinters as eggs around bud axils of willows (*Salix* spp.), in particular crack willow (*S. fragilis*) and white willow (*S. alba*). Eggs on willow hatch in February or March, with the nymphs feeding first on young shoots, then on foliage and catkins, where colonies develop.

Winged forms produced in May migrate to carrot, parsnip, celery, parsley or other umbelliferous plants over a five to six week period, usually with a peak in early June. Late seasons can delay migration for two to three weeks, but generally populations on summer hosts peak in late June and then decline.

Further winged generations disperse to hedgerow umbellifers, and finally back to willow in the autumn to mate and lay eggs. A small proportion in warmer areas can survive winter as mobile stages on umbelliferous plants or on carrots in field storage, e.g. under straw, and produce colonies early the following spring.

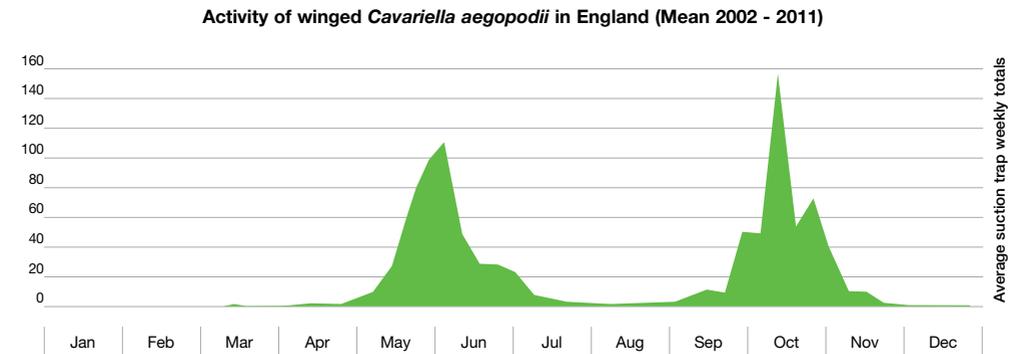


## Crop damage

The willow-carrot aphid is a major pest on carrots, celery, parsnips and parsley. It often causes considerable loss of yield in carrot crops sown in April/May, but those sown in June may escape attack. Dry sunny weather in late May/June favours a large-scale migration to host crops, but cold rainy weather inhibits it. The aphids infest carrots at the cotyledon stage, but can also invade older plants. When many are present the leaves may be discoloured, distorted and sometimes shiny from honeydew excretion. The plants and ground below may become covered with cast aphid skins.

This aphid is a vector of the Carrot motley dwarf virus complex, which produces a yellow mottling of the leaves and stunts the plants. It also transmits Parsnip yellow fleck virus, which can cause severe damage, stunted plants and blackening of the central core. It is also known to transmit Carrot red leaf virus, Parsnip mosaic virus and Celery mosaic virus.

Damage may be confused with carrot fly attack and sometimes drought stress, which produces similar foliar symptoms.



## Currant-lettuce aphid *Nasonovia ribisnigri*

Currant-lettuce aphid *Nasonovia ribisnigri*

### Crops affected

Blackcurrants, redcurrants, gooseberry, lettuce, chicory.

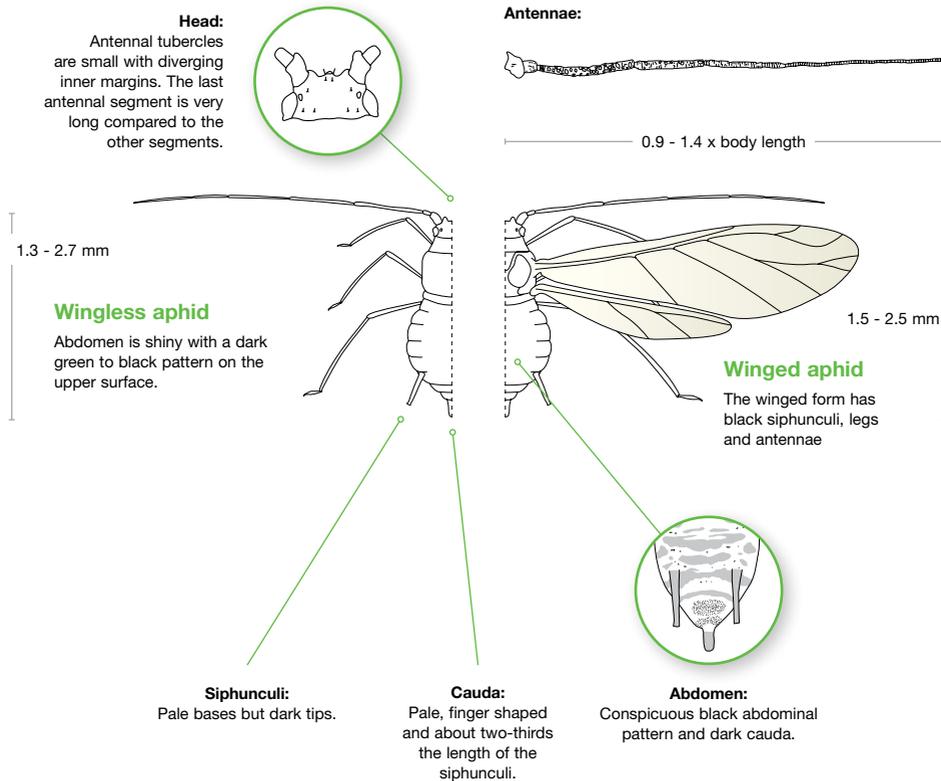
### Viruses transmitted

This species acts as a vector of Gooseberry vein-banding virus, but apparently does not usually transmit Lettuce mosaic virus.



Photo © Rothamsted Research

### Distinguishing features

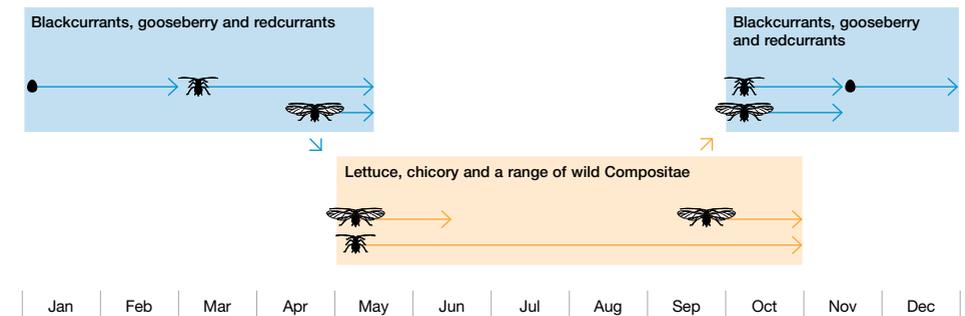


### Life cycle

The currant-lettuce aphid overwinters as eggs on currant or gooseberry bushes. These usually hatch in March or April, nymphs then infest the tips of the young shoots. Colonies are formed on developing leaves and in May or June winged aphids migrate to lettuce and other Asteraceae (Compositae).

Successive generations are produced on these summer hosts until September or October. During October and November, winged aphids migrate back to the winter hosts where eggs are laid.

In southern Britain mobile stages can survive and slowly reproduce on outdoor lettuce, chicory, hawkweed and speedwell throughout mild winters.



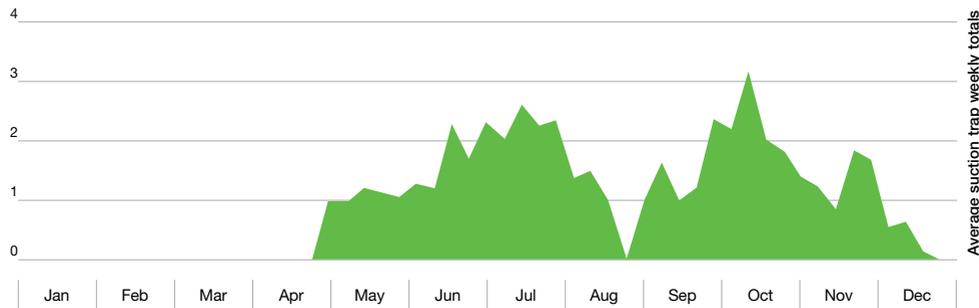
## Crop damage

The currant-lettuce aphid is a pest on both its winter and its summer hosts.

On its winter hosts *Ribes* spp. it causes leaf curl and retardation of growth. In mid August/September it is the most important foliage aphid on lettuce. Rapid development of colonies on lettuce causes plants to become stunted and unpalatable, indeed even small numbers can contaminate plants and affect marketability. In some cases large populations on young plants may prevent hearting.

This species acts as a vector of Gooseberry vein-banding virus, but apparently does not usually transmit Lettuce mosaic virus.

Activity of winged *Nasonovia ribisnigri* in England (Mean 2002 - 2011)



## Lettuce root aphid *Pemphigus bursarius*

### Crops affected

Lettuce and chicory.

### Viruses transmitted

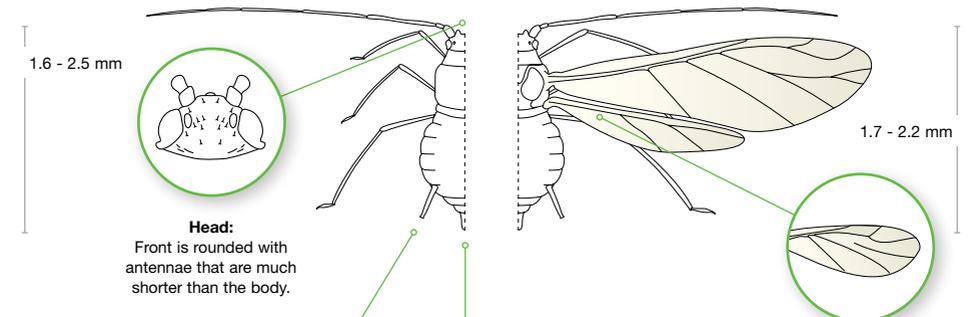
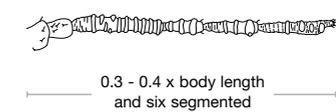
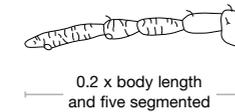
Lettuce mosaic potyvirus.



Photo © Crown copyright reproduced courtesy of the Food and Environment Research Agency

### Distinguishing features

#### Antennae:



#### Wingless aphid

Oval-shaped and yellowish white, often with white wax at the rear of the abdomen.

#### Winged aphid

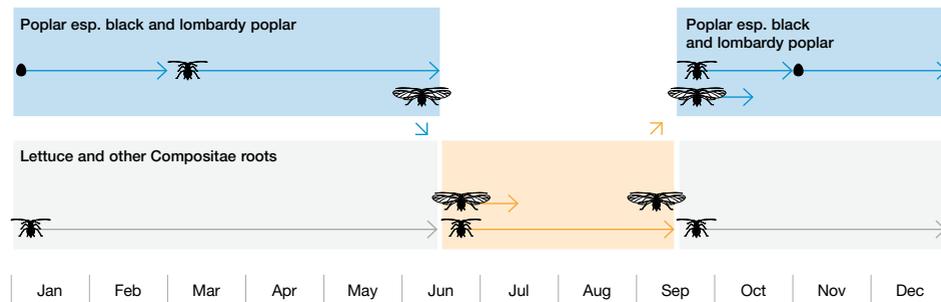
The winged form is brownish orange in colour. Scent plaques (rhinaria) on the antennae of the winged forms are transverse oval and not circular like most other aphids.

## Life Cycle

The eggs of this species overwinter on *Populus* spp., most frequently black poplar and lombardy poplar. They hatch in March and April and the wingless aphids produce purse shaped yellowish or reddish galls on leaf petioles. In June winged forms are produced which leave the galls through a lateral opening and migrate to infest a wide range of Compositae, especially lettuce and chicory.

On arrival they infest the foliage and multiply giving rise to wingless forms that move down to colonise roots. In autumn winged forms are produced which come to the surface and settle around the collar of the lettuce. Here they mature before flying back to poplar from mid-September to mid-October to produce overwintering eggs.

Some aphids of this species overwinter as mobile stages on lettuce roots or even in the soil where they may colonise plantings in the following year.



## Crop damage

The lettuce root aphid can be a serious pest of lettuce causing plants to fail to develop properly and wilt during the heat of the day.

In particular, infested lettuce plants may have difficulty forming a firm head and yields can be greatly reduced. Heavy and sustained infestations may cause plant collapse and death. The roots may be covered with white wax and individual rootlets will turn brown and die. No significant damage occurs on poplar. This aphid is a vector of Lettuce mosaic potyvirus.

Lettuce root aphids are very rarely trapped so winged activity data are not available.

## Green apple aphid *Aphis pomi*

### Crops affected

Apple and pear.

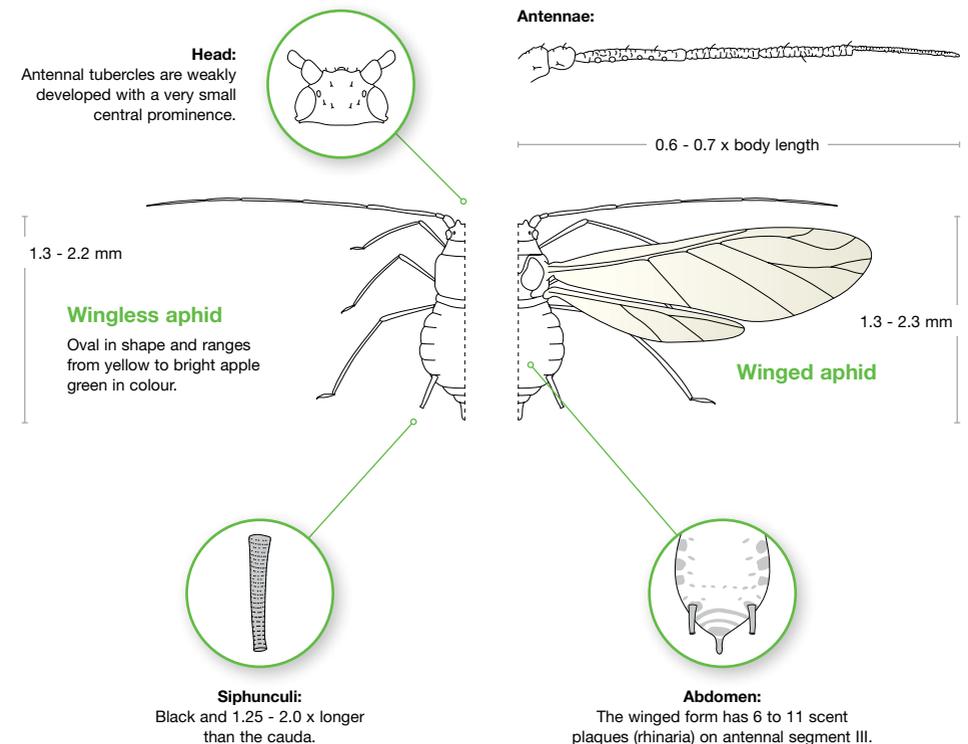
### Viruses transmitted

None known.



Photo © Bayer CropScience

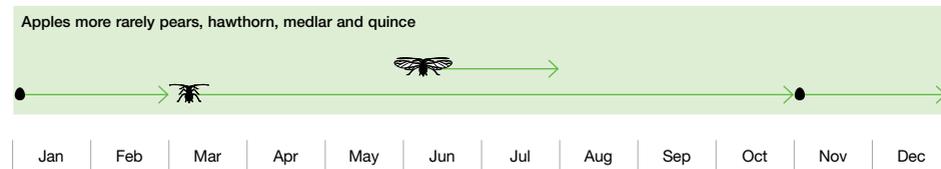
### Distinguishing features



### Life cycle

This species spends its entire year on apple, more rarely pear, and occasionally hawthorn, medlar and quince. It overwinters as eggs in crevices of buds of the previous year's new shoots. Somewhat unusually eggs are often grouped in large numbers. They hatch after bud burst but before flowering.

Spending all year on apple, this species may develop very large, dense colonies. If it gets too crowded winged forms are produced which disperse to older leaves or other trees. This species can develop on less favoured hosts and then migrate into apple orchards during the summer.

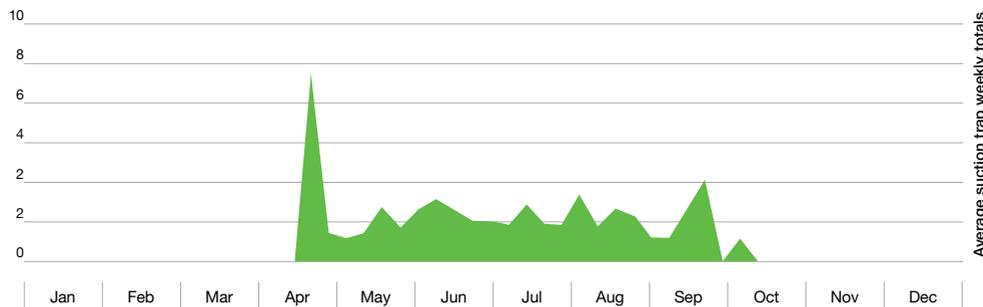


### Crop damage

The green apple aphid is principally a pest on nursery stock or seedlings where growth can be significantly retarded.

On mature trees damage is largely confined to sooty moulds promoted by honeydew droplets which soil the leaves and reduce photosynthesis. It generally has lower impact on fruit production than the Rosy apple aphid, *Dysaphis plantaginea*, with infestations often well tolerated by the tree until the arrival of natural enemies. It is not known as a virus vector.

Activity of winged *Aphis pomi* in England (Mean 2002 - 2011)



## Rosy apple aphid *Dysaphis plantaginea*

### Crops affected

Apple, pear and quince.

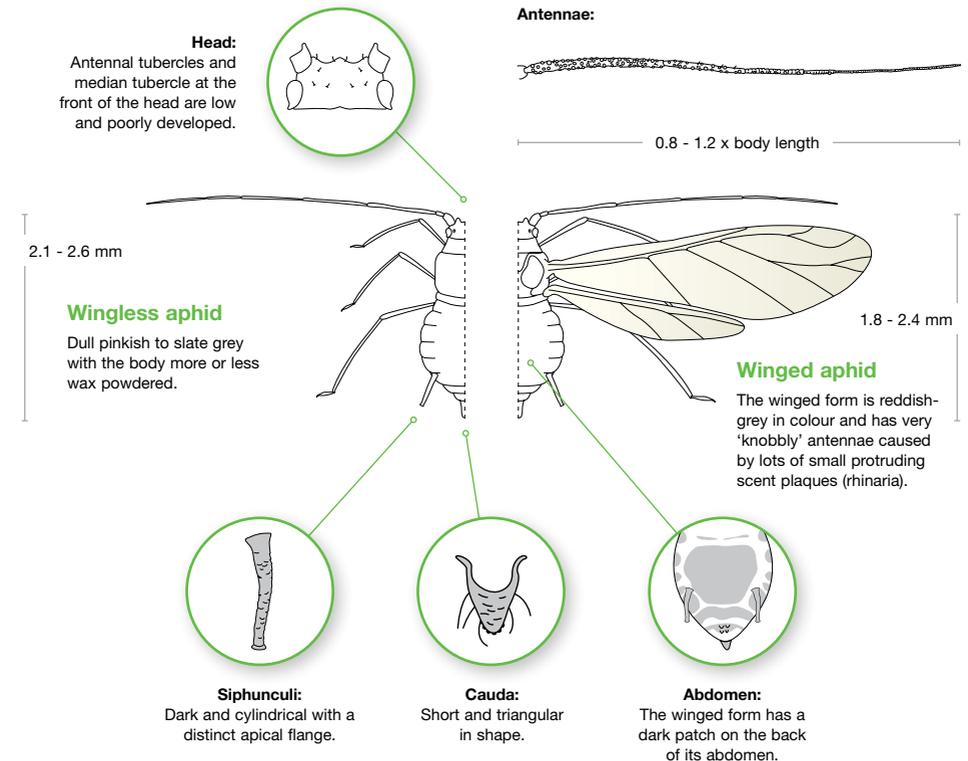
### Viruses transmitted

None known.



Photo © Bayer CropScience

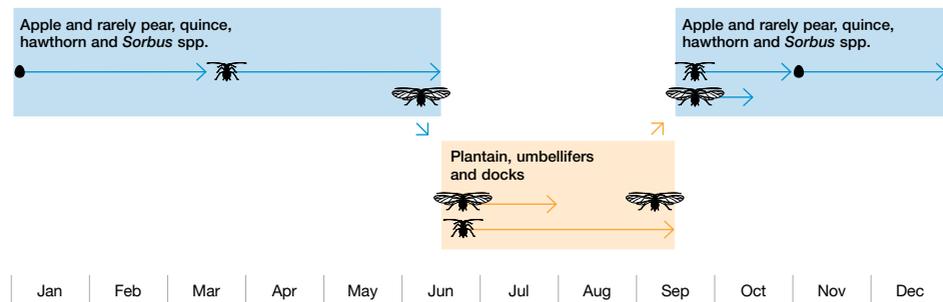
### Distinguishing features



## Life Cycle

The overwintering eggs are laid on apple and occasionally on pear, quince, hawthorn and *Sorbus* spp. Eggs can be found at the base of buds and in bark crevices and hatch mid-March to mid-April in synchrony with bud burst. Adult wingless forms are found in leaf galls.

After several generations winged forms are produced which migrate in mid-June until late-July to plantains and less commonly to umbellifers and docks. Return migration to apple occurs in mid-September to October.

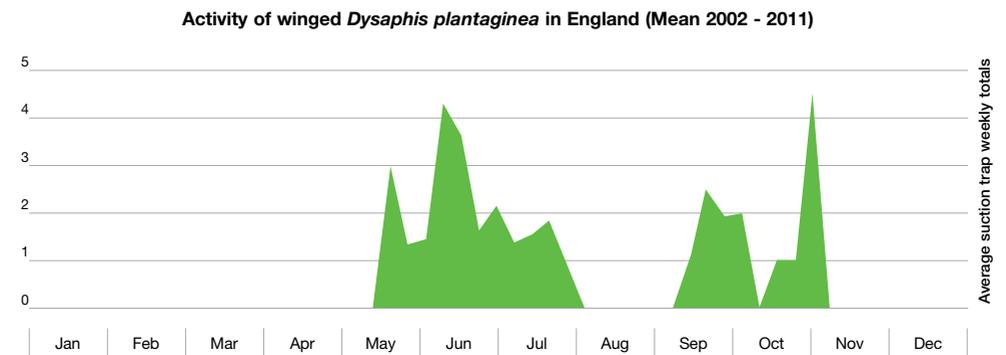


## Crop damage

The rosy apple aphid can be very damaging to apples by causing severe leaf curling and, as the colony develops, yellowing and blistering of leaves from feeding punctures.

Feeding on fruit bearing trusses also causes deformation of fruit, can halt their development and impede the natural thinning process of 'June drop' resulting in large numbers of small bumpy fruit. Some varieties of cultivated apple are more susceptible than others as the number of winter eggs laid is strongly affected by the timing and extent of leaf fall in autumn. Varieties with early leaf fall are much less affected than those with late leaf fall.

This species is not known as a virus vector.



# Damson-hop aphid

## *Phorodon humuli*

### Crops affected

Hops and plums.

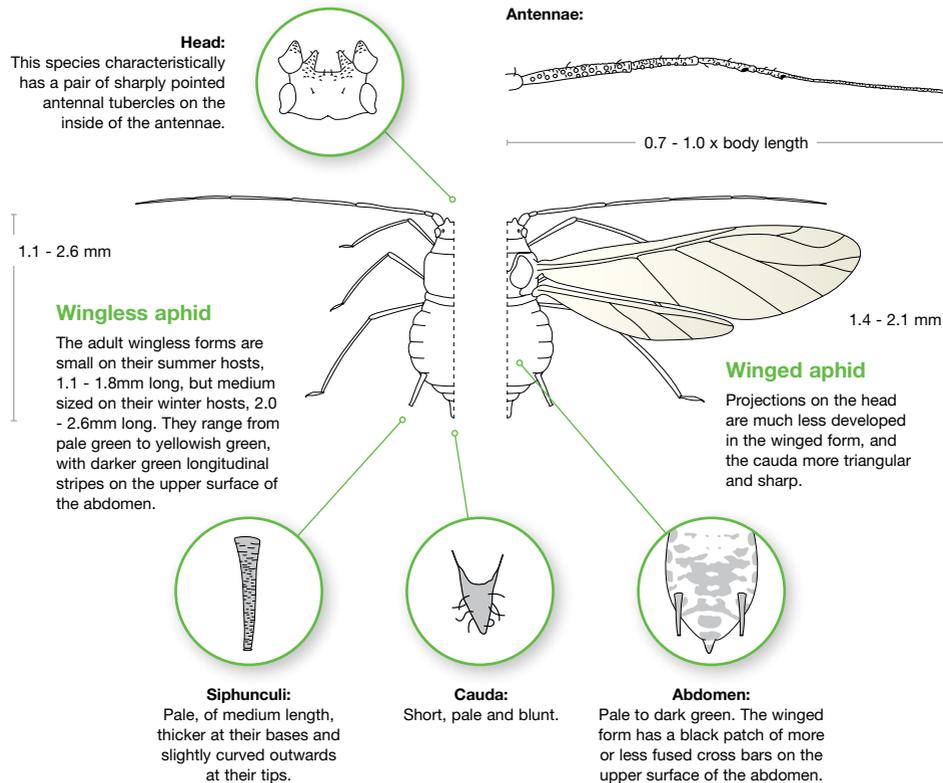
### Viruses transmitted

Hop mosaic carlavirus.



Photo © Rothamsted Research

### Distinguishing features

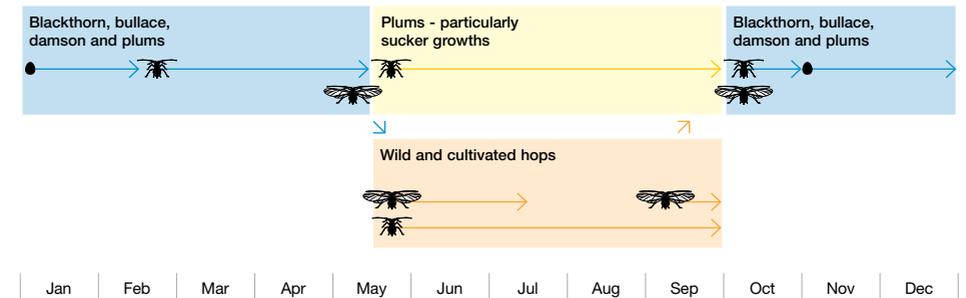


### Life cycle

This species overwinters as eggs on *Prunus* spp., particularly blackthorn, bullace, damson and plums. Eggs hatch between late February and April. After one or two generations of wingless aphids on new spring growth, winged forms appear in the latter half of May and migrate to the summer host, hops. Migration begins in earnest early in June, peaks in late June, then declines and ends in late July or early August.

Colonies occur on undersides of leaves, flowers or fruits of hops, but it appears there is little movement within or between hops, and no further winged forms are produced until autumn. Return flight to winter hosts occurs in September and October.

This species can also remain on *Prunus* spp. throughout the summer, particularly on the sucker growth of plums.



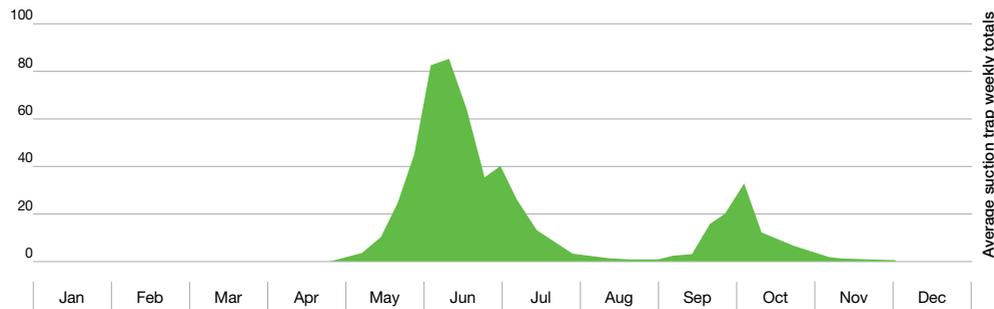
### Crop damage

The damson-hop aphid is the dominant pest species in hops and the main production-limiting factor.

Routine insecticide treatment is required every year, at the very least at the beginning of aphid flight. Heavy infestations reduce hop plant vigour and may induce defoliation. Even light infestations of harvested hop cones can reduce their value. Added to this, it is able to transmit Hop mosaic carlavirus, Hop split leaf blotch virus and Hop line pattern virus.

This species may also cause a little damage on plums, by curling young leaves and by transmitting Plum pox potyvirus. It shows some resistance to organophosphate, carbamate and pyrethroid insecticides.

Activity of winged *Phorodon humuli* in England (Mean 2002 - 2011)



### Blackcurrant-sowthistle aphid *Hyperomyzus lactucae*

#### Crops affected

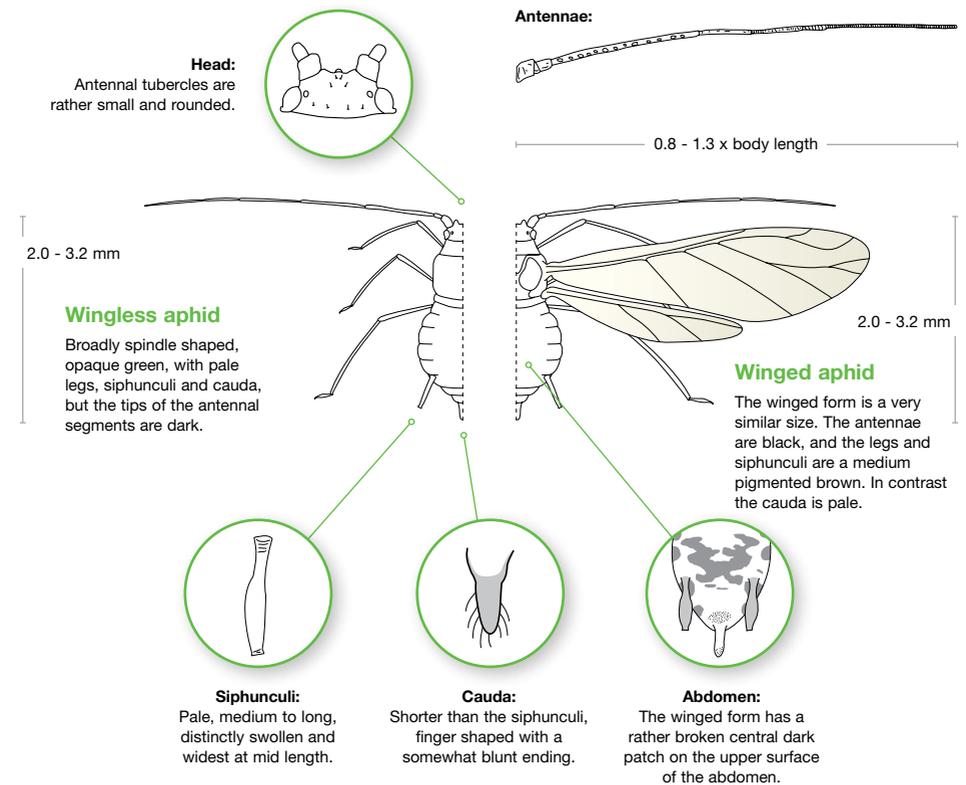
Blackcurrants and occasionally redcurrants.

#### Viruses transmitted

Lettuce necrotic yellows virus.



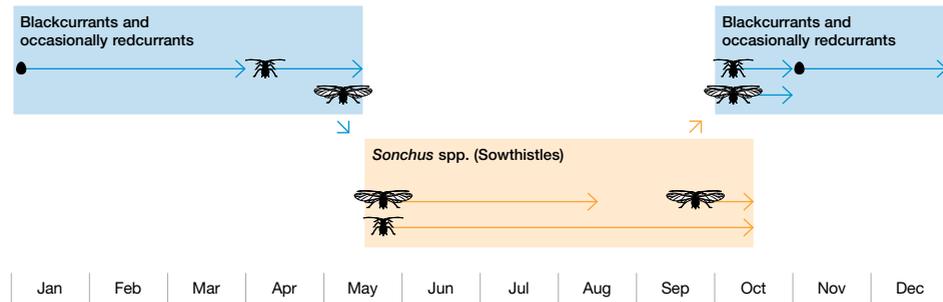
#### Distinguishing features



## Life cycle

The eggs of this species overwinter on *Ribes* spp., in particular blackcurrants, but occasionally other species including redcurrants. The eggs hatch in March and early April and spring colonies develop in the apices of young shoots. Few winged forms develop in the second generation, but more appear in the third generation and these migrate in late May to June to *Sonchus* spp., sowthistles.

On sowthistle, colonies reproduce and build up, and can be found on the upper parts of stems and on the inflorescences. There is evidence to suggest some migration between the summer hosts in July and August. Return migration to *Ribes* spp. takes place in September and October.

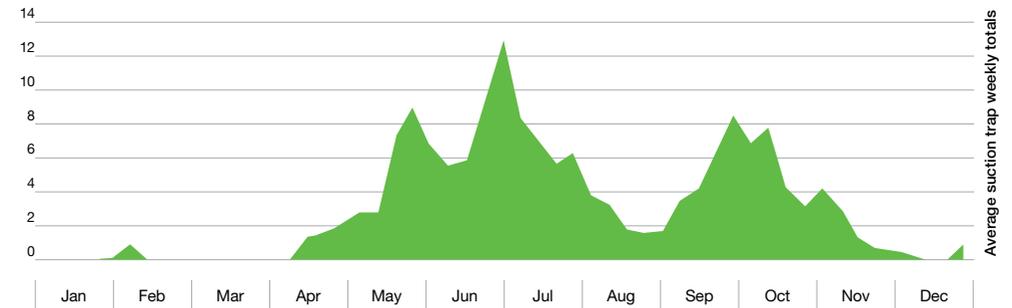


## Crop damage

The blackcurrant–sowthistle aphid causes problems primarily on its winter host, blackcurrant. Colonies found on currants cause leaves to curl downward, stunting young growth. It is also common for leaves to acquire yellow spots resulting from aphids feeding.

This species is a proven vector of some 12 non-persistent and semi-persistent viruses, but none apparently infects currants. It is known to have the ability to transmit the persistent virus, Lettuce necrotic yellows virus, but does not actually colonise lettuce.

Activity of winged *Hyperomyzus lactucae* in England (Mean 2002 - 2011)



# Strawberry aphid

## *Chaetosiphon fragaefolii*

Strawberry aphid *Chaetosiphon fragaefolii*

### Crops affected

Strawberry.

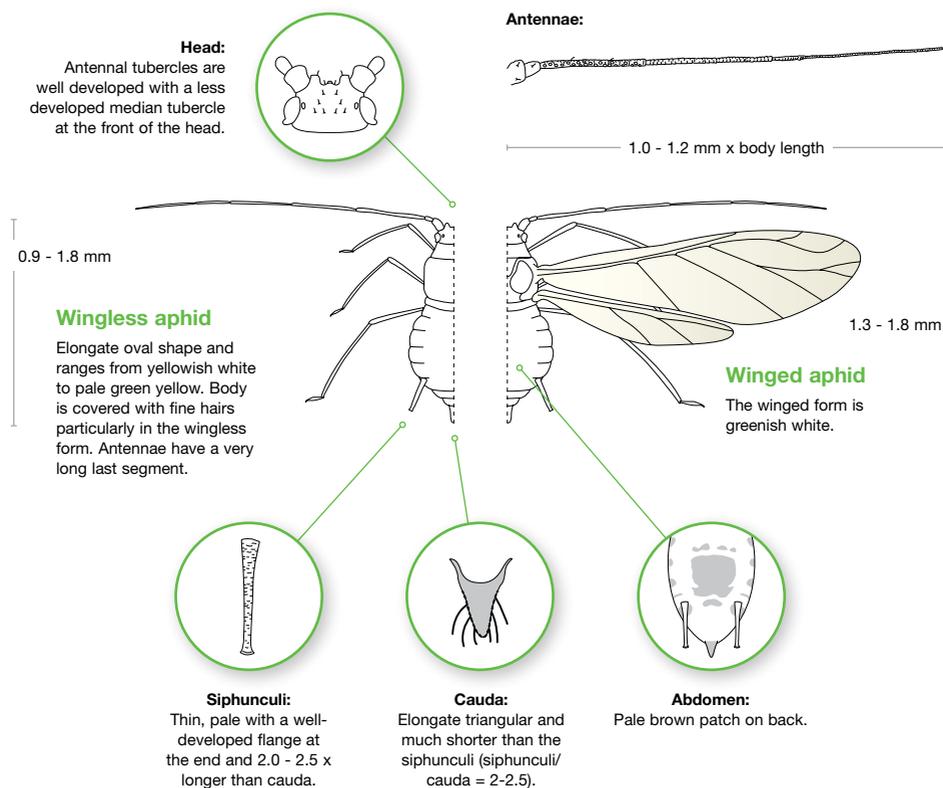
### Viruses transmitted

Strawberry crinkle cytorhabdovirus, Strawberry latent C rhabdovirus, Strawberry mild yellow edge luteovirus, Strawberry vein banding virus and Strawberry mottle virus.



Photo © East Malling Research

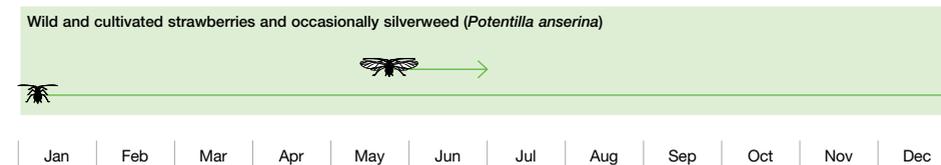
### Distinguishing features



### Life Cycle

This species spends the entire year on wild and cultivated species of strawberry and just occasionally can be found on silverweed (*Potentilla anserina*).

The vast majority of the population overwinters as mobile stages on strawberries. Numbers increase progressively from spring onwards and can be found on new shoots, in the crown and close to veins underneath leaves. A few winged forms are produced in late May and June and these disperse to infest neighbouring crops.



### Crop damage

The strawberry aphid is a serious pest on strawberries because of its ability to transmit many of the most damaging strawberry viruses.

Some of the most important viruses include Strawberry crinkle cytorhabdovirus, Strawberry latent C rhabdovirus, Strawberry mild yellow edge luteovirus, Strawberry vein banding virus and Strawberry mottle virus.

Significant economic losses can occur if plantings remain in the same field for several years. It is also a major concern in nursery production of strawberry plants. Honeydew droplets from the aphids can also cause sooty moulds on the fruit which become sticky, black and unsightly and make the berries unmarketable.

Strawberry aphids are very rarely trapped so winged activity data are not available.

**Crops affected**

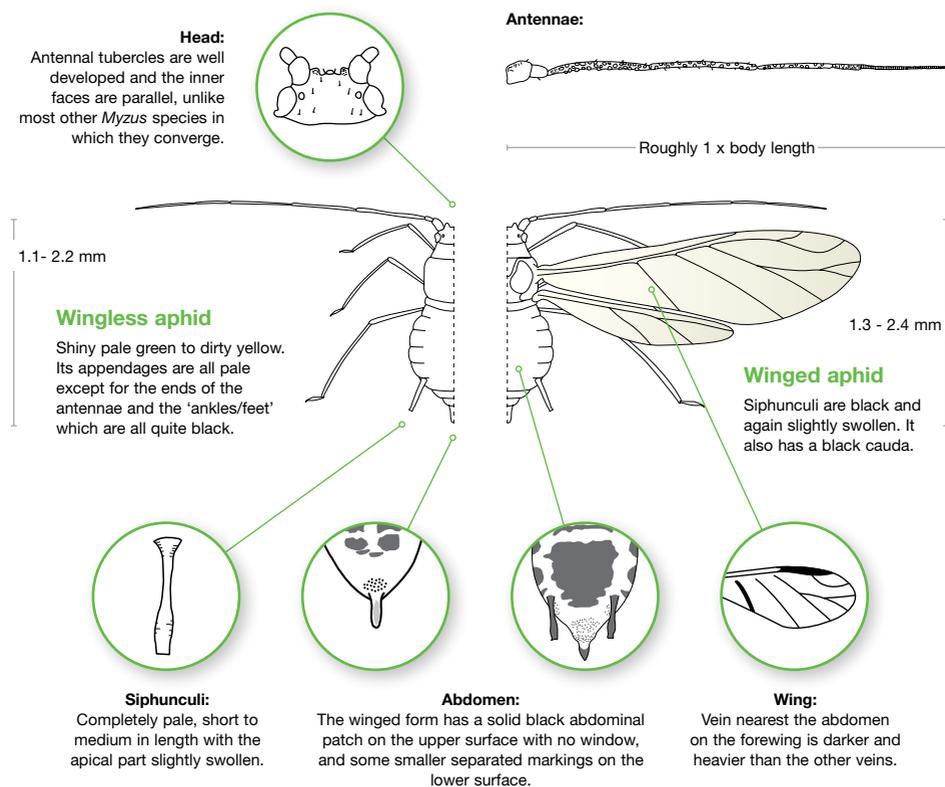
Shallots and strawberries.

**Viruses transmitted**

20 plant viruses, including Beet yellows virus, Potato leaf roll virus and Beet mosaic potyvirus.



**Distinguishing features**

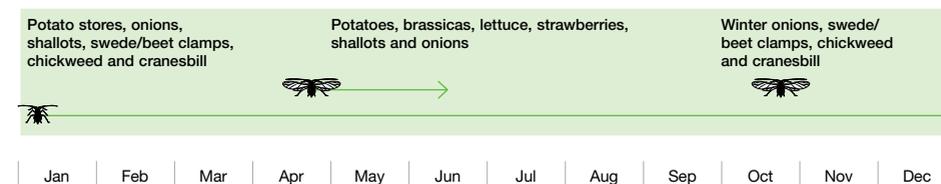


**Life cycle**

This species is not known to produce overwintering eggs at all, but is extremely polyphagous, having been recorded on over 200 plant species from 20 plant families.

Overwintering takes place in glasshouses and other protected places such as potato stores, on onions or shallots, or swede/beet clamps. It can also pass the winter in the open on plants such as chickweed and cranesbill under hedges or similar shady spots. This aphid seems quite cold hardy and apparently thrives on etiolated plants growing in the shade, where large numbers can build up even at low temperatures.

Winged forms are produced in spring, and migrate from late April through to mid June. Plants colonised in the summer are many, but include crops such as onions, shallots, strawberries, lettuce, brassicas and potatoes. It is also known to infest many economically important garden ornamentals, such as asters, chrysanthemums and polyanthus, as well as most flowers derived from bulbs. There is a very small flight in mid-October most years.



## Crop damage

The shallot aphid is a particular pest on shallots and strawberries.

It colonises strawberries in autumn, building up over winter to cause severe damage the following spring, distorting leaves and blossom, and even destroying whole crops after mild winters.

This aphid is an important virus vector and is a proven transmitter of over 20 plant viruses, including Beet yellows virus, Potato leaf roll virus and a range of strawberry viruses. It seems particularly important for its ability to transfer viruses from wild overwintering hosts to crops e.g. Beet mosaic potyvirus from chickweed to sugar beet.

Activity of winged *Myzus ascalonicus* in England (Mean 2002 - 2011)

