



I THRIPS they are among the pests that are the most difficult to control when cultivating cyclamen.

It is very difficult to eradicate thrips from greenhouses: their life cycle is short and they are fast moving insects which hide in the plants. The strategy to fight them is to limit their number.

There are many species of thrips but it is the *Frankliniella occidentalis* or WFT (Western Flower Thrips) which causes the most damage.

To plan appropriate chemical treatment, it is essential to set up sticky insect traps in order to assess the presence of thrips and their number.

In addition to the damage that they cause by feeding on the new leaves and flower buds or by laying their eggs, they are capable of transmitting different viruses. This is certainly the greatest threat they pose, potentially causing enormous damage to cyclamen crop.

I – LIFE CYCLE AND LIVING CONDITIONS

Knowing the life cycle of thrips makes it possible to understand the difficulties in controlling them and in establishing the best strategy to limit their numbers.

Their life cycle consists of 6 stages:

- 1 egg stage
- 2 larval stages
- 2 nymphal stages (one pre-pupa stage with the appearing of wings and 1 pupa stage)
- 1 adult stage

Whatever species they are, the length of their lives is dependent on the temperature. Ideal conditions for their development are between 20°C and 26°C (68–79°F), temperatures being not too high and not too low. Above 35°C (95°F) their life cycle stops.

It is during the larval and adult stages that they cause damage to the cyclamen.

The **eggs** are laid in the cells on the surface of new leaves, petals and stems and in their soft tissue cells. The eggs are, thus protected from chemical treatments.

A female lays about 150 to 300 eggs in her lifetime.

After incubation, the **larvae**, which are fairly similar to adults, appear. They have a plump, oblong body and do not yet have wings, but are already very fast moving as they have legs and feed voraciously in different places on the plant by sucking the epidermal cells.



© Morel Diffusion - *Frankliniella occidentalis*

Once the cells are emptied of their contents, they fill with air, lose their colour and dry out.

At the end of the larval stage, **pupation** occurs with a pre-pupa and then a pupa stage. The pupa is immobile and does not feed.

They are very resistant to chemical treatment, from which they are protected by their favoured location, dark places like the soil, the substrate or even in flowers with a complex structure.

Depending on the species, the **adults** are light yellow to brown coloured and measure from 1 to 2mm (0.03-0.07"). Their bodies are flattened and they feed on pollen. The males are generally lighter and slightly smaller than the females.



© Biobest - *Frankliniella occidentalis*

Their behaviour is characterised by rapidity of movement and hiding at the slightest contact, which is a very good form of defence and enables them to avoid exposure to chemical products.

II – THE SYMPTOMS

As a general rule, the damage becomes apparent when it is already too late to intervene effectively. The damage relates to the age of the vegetation.

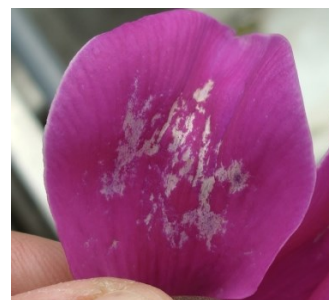
On cyclamen, these attacks result generally in symptoms on leaves and flowers.

The flowers

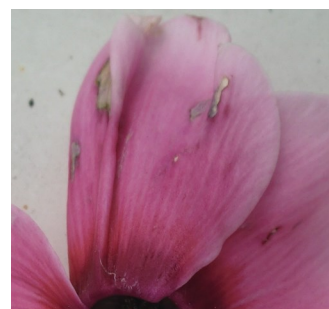
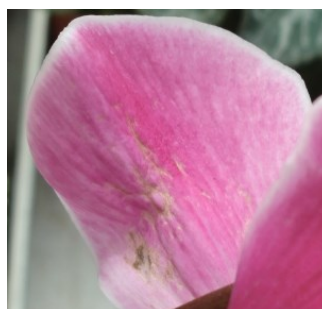
The adult *Frankliniella occidentalis* thrips feed on pollen and damage the stamens. When they penetrate the flower bud before it opens, the flower is badly damaged.

While laying, the females may cause deterioration of sub-epidermic tissues by inserting eggs into the plant material. In the places where there are punctures, the petals have a leaden and brownish appearance, a sign of necrosis.

The larvae may also feed on flower cells



Discoloration of petals





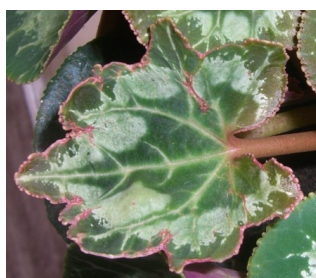
I THRIPS

The leaves

The symptoms are, essentially, of two types.

On the one hand, very marked and clear wounds on one or many isolated leaves and not on the whole plant. They are only visible from the point where these young leaves are almost fully formed. On the other hand, a general deformity of the leaves attacked which take on the very characteristic form of an oak leaf.

In very rare cases, symptoms identical to those described for the flowers appear under the leaves.



An example of the very characteristic oak leaf shape



Identical necrosis on leaf and flowers

The larvae are able to transmit the TSWV (Tomato Spotted Wilt Virus) and INSV (Impatiens Necrotic Spot Virus) to the cyclamen. The adults born from infected larvae will also be able to inoculate these viruses.

The larvae can create much more and significant damage in cultivation than that which is due to the thrips' feeding and laying

III – PREVENTION / CONTROL

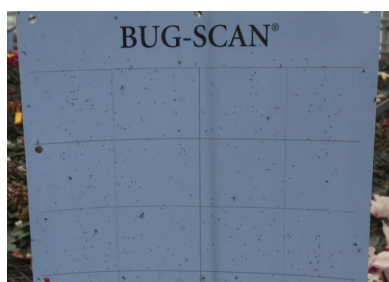
Before commencing any cultivation it is essential to eliminate any contaminated areas and potential sources of viruses by doing the following:

- Removal of remaining plants from previous cultivation
- removal of weeds
- Disinfection
- Chemical or organic treatment
- Isolation of cultivated plants potentially carrying a virus

Monitoring and rapid detection

The key to effective chemical control lies in the early detection of the presence of thrips.

In order to do this, it is best to use blue sticky traps in order to assess the existing numbers in the greenhouse and monitor its development.



When to start the treatment

With these traps placed every 100/200 m² (120/240 yard²) and a weekly total of 10 adult thrips stuck onto each trap, it would be advisable to start the required treatment.

The aim is to contain the development of their population, as we know that it is very difficult to completely eradicate them.

When the number of thrips present becomes very great and many generations are found simultaneously, only the most frequent treatments (every 3 - 4 days) can overcome their resistance and so stop their development. Treatments during the flowering phase are often useless because the damage has already been done.

Sticky traps can also increase the effectiveness of chemical treatments. If they contain pheromones, they attract males and females who are looking for a mate and will, therefore, come out of their hiding places. They will thus be exposed to the spraying treatments. This strategy may make it possible to reduce the numbers of thrips by 30% or more.

Chemical control

Most of the active substances are efficient on thrips at the larval or adult stage. The eggs and pupae are difficult to eliminate with contact or even translaminar products, but these products are very effective for larval and adult stages. Moreover, systemic products are less effective because they cannot easily reach the flowers where the adults feed.

It is, of course, recommended to alternate the different active substances and their different effects on the thrips.

Active substance	Effectiveness
ABAMECTINE <i>Translaminar and contact</i>	Larvae - adult
SPINOSAD <i>Translaminar and contact</i>	Larvae - adult
METHIOCARBE <i>Contact</i>	Larvae - adult
ACRINATHRINE <i>Contact</i>	Larvae - adult

For all information on doses for spraying or ULV, ask your suppliers for information.

WARNING: please seek information from your local branch of DEFRA (Department for Environment, Food and Rural Affairs) in order to be informed of the latest updates in regulations and directives in terms of use of phytosanitary products.

Morel Diffusion, to the extent of its own knowledge, indicates phytosanitary products for their use in the cultivation of cyclamen at the time that this document was created.

Some of these active substances may be packaged as professional phytosanitary products. These products should be used with caution: read the label and the product information.



I THRIPS

Morel Diffusion recommends that you should only use specialised services for phytosanitary protection in order to keep strictly to use of appropriate products recommended by skilled professionals. It is also advisable always to make trials on a few sample plants before any application to the whole crop.

It is exclusively up to the user to check any use of products with regard to the legislation applicable in their country.

Biological control

There are multiple possibilities: seek information from your suppliers for optimal implementation of biological control appropriate for your growing conditions.

We can provide some examples:

Amblyseius Cucumeris and *Amblyseius Swirskii* are mites which predate the young larvae. They hardly measure 1mm (0.03") in size and are often found in the flower.

The success of their introduction in cultivation depends very much on the relative humidity which should not be less than 75% and temperatures that should be between 18 – 26° C (64-79°F).

All products with anti-mite (acaricide) effects should therefore be excluded from scheduled treatments.

Atheta coriaria is a very active and voracious coleoptera which feeds on any insects present in the substrate, particularly thrips larvae.

V – INCORRECT DIAGNOSIS

Wounds made by thrips can sometimes be mistaken for damage caused by other factors.

THRIPS / MITES

Concerning **flowers**, mites deform the entire flower before it even develops petals. On the contrary, thrips create silvery abrasions on the petals, without distorting the entire flower.

Damage caused to the petals by thrips are sometimes difficult to differentiate from those caused by mites, the abrasions being almost identical.

On the other hand, mites simultaneously damage flowers and young leaves at the same stage of growth. Thrips may damage the leaves of young plants or flowers of mature plants.

Mite symptoms



Distortion of young flowers



Shiny rough patches on young leaves

Thrips symptoms



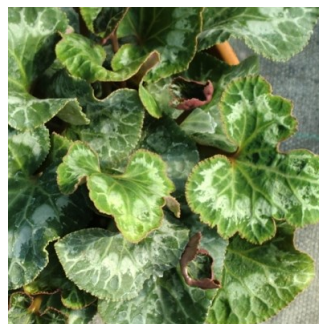
Discoloration of petals



Characteristic oak leaf shape

THRIPS / DAMAGE CAUSED BY FERTILISER

At the rooting stage, before spacing, cyclamen are usually fertilised using a watering system from above. This irrigation technique, combined with raised temperatures and a lack of shade, may cause deformation of young leaves just when they are growing. Symptoms due to attacks of thrips are very similar. However, in this case, only isolated leaves are affected and show clearer abrasions.



Deformation of young leaves exposed to fertilization combined with heat during their growth.