

Tyfu Cymru Fact Sheet: Promoting Beneficial Insects factsheet

The introduction of natural enemies (biological controls) has become a common method for dealing with certain pests. In several circumstances their use has now replaced conventional chemistry in certain conditions e.g. the use of *Neoseiulus cucumeris* for the control of western flower thrips (WFT) or nematodes for the control of vine weevil larvae.

To be effective, enough biological control agents must be released at the right time. For a long time, there has been interest in finding methods to boost or support the released or naturally occurring enemies of pests within our crops. All native pests in UK crops will have naturally occurring predators or parasitoids so these methods allow 'free' reduction in pest numbers by supporting natural enemies in the nearby vicinity. Some 'free' beneficial insects and mites include:

- Lacewings
- Hoverflies
- Predatory thrips
- Parasitoid wasps
- Ladybirds
- Predatory mites

However, 'free' methods may often have a hidden cost or disadvantage, for example they might:

- Save money but require a greater time investment
- Require additional plants to be grown that take up crop space
- Even offer the potential for pests to develop

This factsheet is designed to give some brief examples of available options for supporting natural enemies. Many factors need to be considered before using these methods and detailed advice should be sought if needed.



Figure 1: Hoverfly larvae (left) are voracious natural predators of aphids, © Jon Oakley. *Orius laevigatus* (right) feeds on both thrips and pollen and can occur naturally in flowering crops but is often released e.g. in strawberry crops, © Nigel Cattlin/FLPA.

General steps to promoting beneficial natural enemies in your crops:

- Avoid or reduce the use of broad-spectrum insecticides which kill a wide range of both pests and non-target species. This is a key step as the continued use of these persistent insecticides can damage beneficial populations for a prolonged period, whereas pest populations are often quicker to recover.
- Only use a chemical insecticide if essential and choose a product with shorter persistence to beneficials or an alternative bioprotectant product if available.
- Several biological control companies have online tools to help you check the harmfulness and persistence of pesticides to beneficials.
- Spot sprays to pest 'hotspots' will limit their non-target effects.
- Take care to avoid spray drift onto non cropping areas such as hedgerows.

Tyfu Cymru Fact Sheet: Promoting Beneficial Insects factsheet

Banker plants & alternative food for beneficials

The idea of using companion plants to support natural enemies is not a new idea. For example, plants can be used to provide pollen or nectar or as ‘banker’ plants for beneficials.

Research in AHDB project SF 120 (Hortlink project HL01107) completed in 2015 investigated the use of flowering alyssum (*Lobularia maritima*) as a host plant for the predatory bug *Orius laevigatus* (often released for thrips control) to help it establish in everbearer strawberry crops in between flower flushes when pollen is scarce. The alyssum had a long flowering period and allowed *Orius* to breed well on it, but further research would be needed to determine whether planting alyssum in strawberry crops gives a benefit in thrips control.

Similarly, MAFF and HDC-funded research in 1993 using ‘banker plants’ of wheat or barley infested with aphid species that are not pests of the commercial crop led to increased production of parasitoid wasps in a commercial cucumber crop, leading to good biological control of melon and cotton aphids (*Aphis gossypii*) on the cucumber plants. Such ‘banker plants’ should be used with care as the high numbers of parasitised aphids can lead to increased problems with hyperparasitoids that are natural enemies of the parasitoid wasps.

Pros and cons of banker plants

Pros

- Can be attractive to beneficial insects bringing them to the crop vicinity.
- Can be a food source for pollen or nectar feeding beneficial insects, enabling earlier establishment.
- Can be a lure to pull in pests to plants where predators or parasitoids are well established and away from the crop.

Cons

- Could reduce available space for crop production.
- Additional practical considerations of needing to grow a different set of plants in conjunction with a crop. Often these plants need replacing.
- Research is still limited on the specific financial benefit of using banker plants

Further reading: Please view the SF 120/ Hortlink HL01107 reports [2011](#) & [2012](#)

Tyfu Cymru Fact Sheet: Promoting Beneficial Insects factsheet

Supplementary food for boosting numbers of predatory mites

Several products are available from biological control companies for boosting numbers of predatory mites. Bulrush (*Typha latifolia*) pollen is available as 'Nutrimite' from Biobest, which has been shown to boost numbers of some species of predatory mites, including *Amblyseius swirskii* and *Transeius montdorensis*. Nutrimite is applied to the crop using an electric Makita hand blower. Two 'feeder mite' products are available, containing prey mites that biological control companies use to rear predatory mites. 'Feeder mites' such as 'Nutari' or 'Mitefood' can be used as supplementary food for some species of predatory mites, including all those supplied for thrips control. However, experience with using pollen or feeder mites in UK crops is still limited and further experience is needed on their benefits in terms of cost and improved pest control in specific crops. Crops that produce lots of pollen (e.g. sweet pepper and chillies in flower) should provide plenty of food for predatory mite establishment without extra applications of pollen or feeder mites.



Figure 2: ADAS staff testing Nutrimite™ to assist *Amblyseius andersoni* in AHDB SF 156.

Grower rearing or retrieval of biological controls

Biological control suppliers mass-produce natural enemies for growers to release into their crops. Growers with the appropriate knowledge can develop methods for either rearing or maintaining some biological controls themselves, thus saving money.

The 'DIY' method for rearing the predatory beetle *Dalotia (Atheta) coriaria* was developed by ADAS using readily available materials to rear large numbers from 'starter' beetles bought from a commercial supplier. *Dalotia* feeds on a variety of eggs, larvae and pupae of contaminant insects and pests such as shore flies, sciarid flies and western flower thrips.



Figure 3: *Dalotia (Atheta) coriaria* – predatory beetle ©Nigel Cattlin/FLPA

Boxes of *Dalotia* filled with coir compost and vermiculite were given readily available ground turkey food pellets and when kept in the correct conditions could see an increase of about 40 times the number originally added in a four-week period. A box of 60 adult beetles could lead to 2,400 mixed life stage beetles being produced over four weeks.

The beetles and the carrier material could then either be scattered into the crop or the boxes used as release stations, allowing the adult beetles to leave of their own accord. The rearing-release method can take practice to get the best results, but it can allow applications of high numbers of predatory beetles that otherwise wouldn't be cost-effective.

Tyfu Cymru Fact Sheet: Promoting Beneficial Insects factsheet

Alternatively, the collection of predators or parasitoids that have been released to crops and subsequently multiplied can be very useful. For example, AHDB funded research showed that side shoots routinely removed from tomato plants can be retained in order to collect the predatory mite *Phytoseiulus persimilis* released for biological control of spider mites. Therefore, being aware of, and avoiding the removal of predators can be financially prudent for growers.



Figure 4: *Phytoseiulus persimilis* is an effective predator of two spotted spider mite.

Phytoseiulus persimilis follow their spider mite prey onto the young side shoots. Once the spider mites are well controlled by the predators, a simple method can be used to collect surplus predatory mites that have multiplied on the tomato crop. All the collected side shoots are collected in large crates.

The predatory mites will follow the light to climb to the highest available point and this behaviour can be utilized. Paper cups mounted on vertically placed canes in the crate will collect the predatory mites that will climb the canes and congregate on and in the cups, these cups can then be removed and used to release the predators back into the crop.

Please see these two AHDB factsheets for more information

[Dalotia \(Atheta\) rearing Factsheet 06/10](#) – (ADAS) & [Phytoseiulus collection Factsheet 02/10](#) - (Dr Rob Jacobson)

Pros and cons of rearing or collecting natural enemies

Pros

- Can allow for the rearing/ retrieval of large numbers of predators at the grower site, thus saving money.
- Can allow for the cost-effective use of higher release rates that wouldn't be feasible otherwise.
- Can allow the retention of predators in a crop for a longer period.

Cons

- Some methods are very simple and quick, but others can be time consuming
- It can sometimes require some technical knowledge to successfully manage.
- Intensive rearing of some predators can sometimes lead to problems with parasitic mites/ cannibalism if not managed correctly and checked regularly.

Tyfu Cymru Fact Sheet: Promoting Beneficial Insects factsheet

Flower margins

Field margins, alleyways and hedgerows offer opportunities to maximise biodiversity. Monoculture crops often do not promote biodiversity because natural enemies do not have the ideal conditions for optimum development. There is currently much interest in growing wildflower to benefit natural enemies and pollinators. For example, recent research in AHDB project SF 174 at NIAB EMR has been investigating the use of different wildflower mixes adjacent to soft fruit poly tunnels to support natural enemies which might then aid in reducing crop pests. The addition of wildflower species might also have the added benefit of aiding pollinators during periods where the crops do not have flowers.

Selection of wildflower species to be used is important to maximise the benefits to beneficial species but also to exclude species that might attract and support pests which could then threaten the crop. Pests such as thrips, aphids and capsids can be attracted to certain flower species.



Figure 5: Sainfoin one of the flowers in the mixes that saw frequent bumblebees visiting.

This research is still in progress however so far predators such as predatory thrips, ground beetles, *Orius* species, and parasitoids have been found in the flower margins.

Pros and cons of flower margins

Pros

- Boosts biodiversity in the vicinity of the crop, allowing beneficial species to develop.
- Can help pollinators develop.

Cons

- Can become habitats for pest species as well as beneficials, therefore consideration of the flower mixes is critical.

Further reading: Please view the [AHDB SF 174 report](#)

Other helpful tips

- The presence of plants supporting beneficial species can sometimes be deemed “untidy”.
- However, even stinging nettles can be useful havens for beneficials for example the leafhopper parasitoid *Anagrus atomus* which is no longer commercially available

Images are copyright ADAS unless otherwise specified.