ADVICE SHEET

Managing vineyards for beneficial invertebrates

Wildflowers in the vineyard © Becca Bowie

Vineyards can provide a wide range of habitats and features that are beneficial to invertebrates such as pollinators and predatory insects. Ensuring these features are well managed and connected through the landscape can help beneficial insects move around, enabling them to pollinate wildflowers and assist with the control of pest species in the vineyard.

Many species of beneficial insects and other arthropods will use the vineyard. This includes species of parasitoid wasps that can help control pests of the vineyard including moth pests, beetles that feed on slugs and snails, predatory mites that can help control plant feeding pest mites, ladybirds and hoverflies whose larvae feed on aphids as well as spiders, lacewings and a range of predatory bugs. Additionally, vineyards can support many species of pollinating insects, which while not directly beneficial to the vineyard, have declined through habitat loss and provide important ecosystem services to a range of other crops. This includes species such as butterflies, bumblebees and solitary bees, and hoverflies.

Important habitats of the vineyard and their management

Grassland and wildflower-rich areas may be found throughout the vineyard, between rows of vines, around the perimeter of the vines, and in areas of habitat set aside for biodiversity within the vineyard but not associated with the vines themselves. All can provide important foraging resources for a range of pollinators and predatory insects.

Vineyards can be naturally flowery, especially if they are on unimproved soils. These areas should be well managed and retained as they can be highly beneficial to native invertebrate species. Any reduction in mowing intensity to provide longer grassland will provide shelter, nesting opportunities and if natural regeneration of flowers occurs, feeding resources, for a wide range of insects. For example, studies have shown that solitary wasp family richness (i.e., beneficial predatory insects) is greater in naturally regenerated inter-rows than mown areas in vineyards (Griffiths-Lee et al. 2022).

- Existing flower-rich areas should always be protected from spraying or fertiliser input. The use of chemicals and the frequency of application will have negative impacts on biodiversity, including beneficial predatory insects. Studies have shown that vineyard fungicides harmed non-target predatory mites more than pest mites (Reiff et al. 2021).
- If chemicals are being used on vines, position new habitat strips at least 5m from vines to reduce contamination risks.
- Uncultivated wildflower-rich margins of at least 5m width are recommended.
- Delaying the cutting of flower-rich areas until late-summer will extend foraging value for beneficial insects. Always remove cuttings from the area.
- Allow inter-rows to naturally regenerate to increase the diversity of predatory insects present. If cutting of rows is required for management access, carry this out on alternate rows. If spraying is required along the rows, ensure the sprayer is turned off when turning at the end of rows.

Bumblebee on wildflowers © Lucia Chmurova

Hedgerow with long grass and wildflowers © Buglife

- Leaving patches or some margins uncut over winter can create tussocks and areas of tall herbs which provide a refuge for invertebrate and over-wintering opportunities within woody stems. Rotate the areas left uncut each year.
- Creation of wildflower-rich areas can be undertaken through the vineyard to provide additional foraging habitat to benefit a range of species, but care must be taken that these areas will not be affected by any spraying operations. In practice this often will mean that the creation of new habitat should take place outside the vines rather than along the inter-rows. Using locally sourced wildflower seed, or the spreading of green hay, can provide foraging habitat for a range of species.
- Mixes should contain locally occurring wildflowers suited to the soils and conditions on site ensuring that plants will flourish and support local insect populations. Ensuring a diversity of flowers are sown, with a range of flower shapes and different flowering times, will suit the widest range of insects throughout the year.
- Cover crops are often planted to improve soil structure and vine health and can contain valuable food plants for pollinators, such as legumes, brassicas, Borage (*Borago offinalis*) and Fodder Radish (*Raphanus sativus*). Species such as Phacelia can be popular with bumblebees but only support a limited range of insects so a range of different species is preferred.
- Grazing with sheep often takes place in vineyards over winter. At this time there will be little flowering resource, but overwintering structure of the grassland is important for a range of pollinators and predatory insects. Aim to create a mosaic of short and long vegetation through the vineyard with areas of bare ground and some litter to benefit the widest range of insects. It may be necessary to fence off some areas of tussocky grassland from grazing unless stock densities are low.

Hedgerows and trees

Hedgerows are often found around the perimeter of vineyards, or blocks of vines, and can act as windbreaks for the vines on particularly exposed sites. Along with mature trees, they provide many resources beneficial to a wide range of pollinators and predatory insects including areas for shelter, breeding, and overwintering, and also provide food for many species. They are also important features of the landscape, providing corridors for insects to move around.

- The combination of shrubs and trees that flower early in the year, such as Blackthorn (*Prunus spinosa*), Hawthorn (*Cratageus mongyna*) and willows (*Salix sp*), and climbing species (such as brambles, and bryonys) along with Ivy (*Hedera helix*) which flowers later in the year make hedgerows a crucial component of the blossom sequence pollinators and predatory insects depend upon.
- Shrubs provide a food source for the larval stages of many butterflies and moths, and older trees may contain decaying wood that provide larval habitat for predatory insects such as some wasps and hoverflies.
- Hedgerows provide shelter from the wind and an important retreat during droughts and heatwaves.
- Hedge banks can provide sunny and sheltered nesting sites for ground-nesting bees, and often contain rodent holes, which are re-used by bumblebees. They can also be important refuge areas for predatory invertebrates such as spiders and beetles.
- When establishing new vineyards, planting native, species-rich hedgerows with species appropriate to the local landscape will bring multiple future benefits to the vines and the interdependent biodiversity. Vineyards often require fast growing tree species as shelter belts, so mixing these with native species will provide resources for beneficial insects into the future. Choosing a mix of species will ensure a longer flowering resource is available to a wide range of species.
- To allow hedgerows to flower and produce fruit, and therefore provide maximum wildlife benefits, they should be cut on a two or ideally, three-year cycle aiming to create a tall, bushy hedge where possible with a 2m uncut buffer strip below. Don't cut all your hedges in the same year, ensuring that in any given year there are always flowering and fruiting shrubs for wildlife.
- Trees support diverse invertebrate assemblages, including beneficial insects along with nesting and foraging for birds and bats which in turn support pest control.

Ponds, ditches and other wet habitats

Wet habitats in the vineyard can provide wetland flowers rich in nectar and pollen as well as being an essential breeding habitat for species such as dragonflies and some hoverflies. Native species of wetland flower such as Water Mint (*Mentha aquatica*), Meadow-sweet (*Filipendula ulmaria*) and Purple Loosestrife (*Lythrum salicaria*) all provide foraging resources for a range of insects.

- Pond or ditch management should be carried out in sections on a rotational basis, ensuring resources and refuge are always available for the invertebrates using them.
- Consider creating wet features on site if there are none present in areas away from any pesticide.
- Waterside trees such as Alder (*Alnus glutinosa*) and willows can be very important for a range of insect species, providing important sources of food and deadwood, however they should be prevented, from over-shading all of a wetland feature.

Pond with wildflowers © Craig Macadam

Other features

Other features of the vineyard can be very good for insects. Visitor areas are often kept shorter and 'tidier', but this doesn't mean they can't add value to a site. Low growing plants such as clovers, Bird's-foot Trefoil (*Lotus corniculatus*), Selfheal (*Prunella vulgaris*) and buttercups (*Ranunculus sp.*) within the grassland provide important floral resources for a range of pollinators. Rough areas of habitat alongside ditches and banks can provide nesting habitat for a range of species, such as bumblebees and bare areas along tracks and gateways can provide nesting sites for a range of solitary bees, and warm sunny conditions for a range of insects, including butterflies to bask. Scrapes or bee banks can be created in areas away from the vines to provide nesting and basking habitat for a range of species if these are not naturally occurring in the vineyard.

Comma (*Polygonia c-album*) © Alice Parfitt

How do beneficial invertebrates use vineyards?

Food - vineyards can provide a range of plants throughout the season, providing important nectar and pollen resources used by species breeding within the vineyard but can also attract pollinators from some distance away. Larval food plants for many butterflies and moths grow in vineyards along with invertebrate prey for parasitic wasps and predatory hoverflies and beetles. The larvae of some hoverfly species develop in ditches and swamps, feeding on plant material, whilst others feed on dead wood.

Breeding - vineyards can provide breeding and nesting habitats for a wide range of beneficial invertebrates. Old small mammal burrows and dense vegetation are used by bumblebees and ground beetles, with sunny slopes, short turf and dry ground used by ground-nesting solitary bees and their parasites such as bee-flies and nomad bees.

Overwintering - dense vegetation such as tussocky grassland, scrub, mature trees, and piles of wood and stone can provide essential habitat for hibernating pollinators and predatory invertebrates. Many species overwinter as adults including queen bumblebees, and some butterflies, hoverflies and ground beetles, others as eggs, larvae, or pupae.

Wildlife corridors - linear flower-rich features such as watercourses, hedgerows, ditches, and tracks and pathways, all features often found in vineyards, have an important role in connecting fragmented remnants of wildlife-rich habitat. These corridors enable pollinators to move through the landscape, helping them to become more resilient to threats such as climate change and habitat loss. Visit B-Lines to see if your vineyard is within a B-Lines pollinator superhighway and add your pollinator habitat to our map.

Invertebrates in the vineyard

Along with more common and widespread species often found in vineyards, rare and scarce species may also turn up as visitors or breeding species, especially where vineyards are close to existing wildlife-rich habitat. If rare species are known to breed, it is important to identify any particular requirements, such as food plants or nesting habitat and incorporate these into management decisions.

Pantaloon Bee (*Dasypoda hirtipes*) © Alice Parfitt

7-spot Ladybird (*Coccinella septempunctata*) © Alice Parfitt

Some rare species known to occur on vineyards are the Downland Furrow Bee (*Halictus eurygnathus*), a rare solitary bee only known from chalk grassland on the Eastern South Downs; the Pantaloon Bee (*Dasypoda hirtipes*) a solitary bee that favours sandy soils, Small Blue Butterfly (*Cupido minimus*) which is only found on warm sheltered grassland where it's food-plant Kidney Vetch (*Anthyllis vulneraria*) grows and the Wall Brown Butterfly (*Lasiommata megera*).

How does managing habitats for invertebrates benefit the vineyard?

Well managed natural and semi-natural habitats such as grasslands and flower rich habitats, woodlands and hedges, in conjunction with a reduction in tillage, can all help support a healthy soil which will benefit vine health. Healthy soils in turn can also boost soil dwelling natural predators, increase water infiltration, reduce erosion and store more carbon.

A mixture of habitats will also benefit natural predatory invertebrate populations, providing the resources they require throughout their lifecycle, thereby assisting with natural Integrated Pest management (IPM) in the vineyard. Native hedgerows and trees can act as windbreaks protecting vines and can also be an important source of predatory invertebrates. Wildflower-rich grasslands also promote populations of predatory insects in the vineyard as well as creating a welcoming, looked after, nature-rich atmosphere for visitors to the vineyard. Boosting natural predators in this way can also help in reducing the chemicals required and thereby reduce costs in the vineyard.

For further advice on a range of management options, visit Buglife's website at
buglife.org.uk/our-work/b-lines/b-lines-guidance

References and further reading

Buglife Pollinator Guidance

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