

Native Vegetation and Pest Control

Vegetable growers can make native vegetation an important part of their disease and pest management. Native vegetation is known to help with pest management through two main strategies: 1) Replacing weeds that harbour pests and diseases of vegetable crops with native plants that do not, and 2) planting native plant species and maintaining remnant vegetation that is known to attract and provide refuge for natural enemies of insect pests.

The bottom line

- ▶ Native vegetation can play an important role in the management of vegetable pests and disease by replacing weeds that harbour pests and diseases with native plants that do not.
- ▶ Remnant and newly planted native vegetation also provides a habitat for natural enemies that prey on pests.
- ▶ On-farm strategies should include the maintenance of native remnants and the edge habitat between crops and remnants, as well as the active replanting of native species to replace weedy areas.
- ▶ Growers should plan for revegetation well in advance and consider a number of factors.





Native Vegetation and Pest Control

The benefits of native vegetation have environmental and financial advantages for growers. The industry benefits from an increased reputation for caring for the environment, and growers can also experience increased profitability as they reduce the need for chemical intervention when dealing with insects and weeds.

Integrated Pest Management and Vegetable Growing

Integrated Pest Management (IPM) is a pest management strategy that relies on the integration of biological, cultural, mechanical and chemical control for managing pests, while producing a high value crop in an environmentally sustainable way. Central to the principle of IPM is a reduction in the reliance on broad-spectrum chemicals for the management of pests and diseases. IPM practices delay the development of insecticide resistance and take advantage of free pest control services from beneficial insects that feed on insect pests of vegetable crops.

The planting of native vegetation in areas or the maintenance of remnant vegetation on-farm is a cultural pest control method, and serves two functions:

- 1) replacing weedy areas that are known to provide habitats for pests with native plants that do not, and
- 2) providing a refuge from insecticides and a habitat for natural enemies known to suppress pests.

These natural enemies may be native, or species introduced through a controlled release. Once established, growers should protect these populations by maintaining their plant habitats, and reducing the use of broad-spectrum chemical pesticides.

Advantages of Native Vegetation

Native vegetation can help vegetable farmers in a number of ways. It is important to note that not all native plants are suitable for planting around farms, however when the right native vegetation is selected, growers can expect to achieve a variety of outcomes.

The active planting of native vegetation can provide enormous advantages for growers in their long-term weed management. Over time, appropriately selected

Enchylaena tomentosa (above) is a native plant which can be planted adjacent to crops to help control pests; An effective revegetation program implemented at a grower's farm (image right)

plants can reduce the need for spraying as the natives out-compete weeds for water and nutrients. Selecting low growing shrubs or groundcover can reduce the amount of weed penetration, while also retaining valuable top-soil.

Other advantages include decreased sources of disease and virus around the crops, enhanced biodiversity, landscape improvement, the establishment of new marketable crops such as native cut flowers and edible seeds or fruit, and increased profitability from native plant seeds to the revegetation industry.

Opportunities may also exist for the vegetable industry to gain market advantage through revegetation approaches. As the Australian public continues to demand clean and green food, growers can align their production strategies with consumer values, potentially capturing the consumer market that cares about the environment.

Working with Existing Vegetation

Native vegetation can be encouraged on-farm through the maintenance of existing native remnants, or through planting native vegetation.

Research has shown that native remnants adjacent to vegetable crops are significant in the fight against pests, as they often harbour the natural predators required to manage the pest populations.

"The study of native remnants can tell us a lot about the natural habitats of predators and parasitoids and how they move in and out of crops," said Nancy Schellhorn, Senior Research Scientist with CSIRO Entomology. "Remnant vegetation on-farm may allow natural enemies to respond more quickly to pests in crops than farms without natural enemy habitat."

Furthermore, by understanding whether pests use native vegetation, Nancy believes that growers are able to reduce the risks associated with certain plant species, particularly those that may exacerbate pest populations.

"Several of the top vegetable pests in Australia, such as western flower thrips, silverleaf whitefly and boll worms (*Helicoverpa* spp) feed on a wide range of crops and plants. Therefore it is important to know how they respond to native plants," Nancy said.

"Our results thus far indicate that native plants are not contributing to populations of these key pests, with the exception of some of the native insects such as Rutherglen bug, mirids and jassids."

Growers should aim to maintain healthy native remnants adjacent to their crops. Any weedy areas, such as creek and river zones, ditches, headlands and fence rows, should be replanted with natives known to provide a suitable habitat for the natural predators. When selecting these plants, growers should make sure that they do not host vegetable pests or diseases.

Planning for Revegetation

Before implementing a native revegetation program, growers should make the time to plan their project, taking into consideration their needs, available resources, and expected outcomes.

Glenys Wood, Senior Research Officer with SARDI Entomology, and co-author of the *Revegetation By Design Guidebook*, has several suggestions for growers preparing to plant native vegetation on their properties.

→ Start early

"Growers should be planning for revegetation at least six months prior to planting," said Glenys. "They will need to consider the best time to plant in order to provide the necessary conditions for the young plants to become established."



Growers should order their plants early to allow nurseries the necessary time to germinate the plants required.

"Some native seeds are difficult to source, so if growers are planning to plant hundreds of a particular variety, they need to ensure that their nursery is able to fill their order by allowing plenty of time."

→ Consider your crops

In deciding which plants are suitable, growers need to consider several factors. This includes the type of crop being grown, and the pests and diseases that are known to threaten that particular crop.

"By understanding the threats to their crops, growers are in a better position to select vegetation which will provide a habitat for beneficial insect populations, as well as ensuring that pest populations are discouraged."

Glenys also encourages growers to consider their production methods, as this may require the selection of plants that are able to survive high traffic conditions or excessive run-off from greenhouse facilities.

→ Clean up before planting

In preparation for planting, growers should invest some time in cleaning up the area to be planted. In particular, weed management prior to revegetation will ensure that the newly planted natives have the opportunity to establish solid deep roots, without competition from weeds. In the longer term, this will reduce the need for spraying, and ensure the best possible chance of survival for the newly planted species.

"Growers should consider their native vegetation in the same way they consider their crops by spending the time to prepare the area, and nurturing their native plants until their roots are longer than those of the weeds. Growers will not only support their beneficial populations, but they will also reduce the amount of weed management they will need to undertake in the longer term."

→ Choose the right plants

Growers should select plants according to several criteria. Firstly, the selected plants should not host vegetable pests or diseases. Research currently being conducted by SARDI has led to the development of a screening system to test plants for the management of western flower thrips. This system enables the speedy assessment of plants suitable for the control of the thrips by identifying native species that are not hosts to thrips.

"We also recommend that growers select perennial species, to provide year-round refuge for beneficial populations. Growers may also consider growing plants that create a groundcover which restrains weed growth," Glenys said.

In selecting native vegetation, growers should also consider the aesthetic value of their plants, and choose natives that they like the look of.

"Although the primary purpose for revegetation may be to control pests and disease, there is also the secondary benefit of adding value to the property by making it look more attractive."

Before starting the revegetation process, weeds (such as those pictured) must be removed to ensure the survival of the native plants; Cover image, Native plants such as *Rhagodia parabolica* are useful in the fight against pests

Dealing with Exotic Plant Species

Growers should be cautious about the role of exotic species in exacerbating pest control issues. Most of the key pests affecting the vegetable industry are introduced species that may seek refuge in exotic flora.

By comparison, native species present less of an environmental risk, as they provide greater native biodiversity, and create habitats that encourage native fauna populations and beneficial insects. For example, native plants have been shown to support a huge range of parasitoids useful in vegetable pest control.

Despite this, researchers do not encourage growers to embark on the complete destruction of exotic plants on their properties. A better approach is to add to the existing vegetation by introducing native plant species according to a carefully planned planting strategy.

Further reading

Taverner, P. D. & Wood, G. M., (2006) *The Virginia Integrated Pest and Sustainable Land Management Project*, Project HG02103 South Australian Research and Development Institute

Taverner, P., Wood, G., Jeremov, D. & Doyle, B. (2006) *'Revegetation by design' guidebook: A guide to using selected native plants to reduce pests and diseases in the horticulture region of the Northern Adelaide Plains*, South Australian Research and Development Institute

Schellhorn, N. (2007) *Native vegetation to enhance biodiversity, beneficial insects and pest control in horticulture systems*, Project VG05014, CSIRO Entomology, <www.ausveg.com.au/levy-payers/login.cfm>

Landcare Australia: www.landcareonline.com

Trees for Life: www.treesforlife.org.au

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vegenotes is produced by: AUSVEG Ltd

PO Box 563, Mulgrave VIC 3170

T: (03) 9544 8098 | F: (03) 9558 6199

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