New Plantings and Grafted-over Vines: Anticipate Insect Attack

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When establishing a new vineyard, the possibility of insect attack is often neglected in planning the management program. A result of this oversight, insect attack during the critical growth stages in early spring and early summer can retard growth of the young vines and may kill some, necessitating replanting. Similarly, in established vineyards where buds of a new variety are grafted onto an established rootstock, the buds may be destroyed by insect feeding.

It is essential that proper identification of the pests be made. This is now made easy by reference to Nicholas et al. (1994) for both symptoms and identification of pests.

Vineyards at risk
There are reports of insect damage to establishing vineyards from most viticultural areas in Australia, so insect attack should be anticipated in any new planting, although the types of insects may vary. New vineyards planted adjacent to areas where insect attack has previously been recorded are at risk of being invaded. Remember that some insects (for example, some weevils) which live on mature vines without causing too much damage may, if they migrate to young vines, cause considerable damage. Local conditions in a vineyard may dictate the type of insect pests likely to be encountered; for example, apple weevils are found in heavy soils while pink cutworms occur in more sandy soils.

The new vineyard environment
New vines are usually planted into cultivated strips which may be separated by an uncultivated strip of broad-leaved weeds, grasses or a cover crop, or the entire area may be cultivated. At present, there is no good evidence to link the type of ground cover to insect attack, but it should be noted that some weevil larvae (for example garden weevils) feed on the taproots of broad-leaved plants while others, such as African black beetles, feed on grass roots. Cultivation of the new site in autumn may break the life cycle of these insects by killing larvae.

Monitoring for insects
The key to avoiding insect damage in new vineyards is monitoring, which simply involves regular (at least weekly) inspections of the new vines from the time of budburst until December. Insect attack can be patchy, so inspect representative sections of the vineyard to include different soil types, ground covers and proximity to borders.

Look for symptoms of feeding on buds and leaves. Sometimes the pattern of feeding will indicate the type of insect causing the damage. Some of the more damaging insects are night feeders so inspection of the vines after dark by torchlight may reveal the insects actively feeding, whereas by day their presence is only indicated by their feeding areas.

Some of the insects spend the day buried 2–3 mm under the soil or sheltering under the bark of the main stem, so monitoring should include inspections of these places. Some non-injurious insects may also occur in these places, so it is useful to be familiar with the type of insects likely to cause damage. Some insect pests which may be encountered are listed below.

Pink Cutworms (Agrotis munda)
Source: A small moth flying into the new vineyard from pasture or cropland lay their eggs in early spring, often on bare patches of soil. The insect is likely to be present in most southern vineyard areas.

Monitoring: Look for large, regular feeding areas on leaves. Defoliation may occur very quickly. Gently scrape 2–5 mm depth of soil around the base of the young vine to a radius of 25 cm. The larva is an inert, grey-pink grub. At night, they may be found feeding on leaves.

Apple weevil (or curculio beetle in SA)
(Otiorhynchus cribricollis)
Source: A small weevil walk (the adults are flightless) from nearby hosts, such as vines, many species of fruit trees and vegetables, or may have emerged from the soil in the vineyard if host plants were planted the previous season. This weevil is likely to be present in most southern vineyard areas.

Monitoring: Look for saw-tooth feeding areas on the margins of leaves. Gently scrape away the top few mm of soil at the base of the vine to expose the adult weevils sheltering there. At night, they ascend the stem to feed on the leaves.

Garden Weevil (Phyllostethus callosus)
Source: A small weevil walk (the adults are flightless) from nearby host crops (such as ornamentals, many vegetable crops, strawberries, but not grains or grasses) or tap-rooted weeds, or they may be carried into the vineyard on machinery such as mechanical harvesters. Distribution of garden weevil is presently patchy, and there are reports of their local occurrence in vineyards in WA, SA and Vic.

Damage stage: A dult
Danger period: From budburst onwards in the life of the vine. Once established, garden weevils will continue to cause economic damage to adult vines. Conditions of attack: Damage can be expected if garden weevils have previously been found in, or near, the new vineyard.

Damaging numbers: 2–3 per vine can eat all the buds at budburst. Up to 100 weevils have been noted sheltering under the bark of old vines which have been grafted over with buds of a new variety.

Monitoring: Look for bud feeding and perforations in expanded leaves. A dults shelter during the day under bark of the stem or in trash on the ground, and at night walk up the stem to eat the foliage.

**African black beetle (Heteronychus arator)**

Source: These beetles mainly feed on grass roots so the origin in vineyards may be either from beetles overwintering on the grass cover in the vineyard or in autumn by adults moving into the vineyard from nearby grassy areas (including lawns).

Damaging stages: A dult and sometimes the larval stage

Danger period: Spring and early summer

Conditions of attack: Reported to be favoured by a dry spring. A dult swarms may be seen in autumn and to a lesser extent in spring, especially around lights. These originate from lawns or grassy pastures.

Damaging numbers: one or more per young vine

Monitoring: A dults may be found 5–15 mm beneath the soil surface, where they girdle the underground stem. During summer, affected plants may wilt and die.

**Wingless grasshopper (Phaulacridium vittatum)**

Source: Wingless grasshoppers move into vineyards from nearby pastures.

Damaging stages: A dult

Danger period: Mid to late summer

Conditions of attack: Emergence of young nymphs from egg beds near to vineyards and movement of adults into the vineyards starting in December.

Damaging numbers: More than about 5 adults per m² in the surrounding pasture may result in defoliation of border vines.

Monitoring: Walk through pasture adjacent to the vineyard in November-December and look for large nymphs and adult wingless grasshopper.

**Grapevine moth (Phalaenoides glycineae)**

The larvae of this moth feed on vine leaves. Vine moths live on ornamental and native vine hosts in addition to grapevines, but the moths in most commercial vineyards probably originate from within the vineyard.

Damaging stage: Larvae

Danger period: Mid to late summer

Conditions of attack: Young and vigorously growing shoots

Damaging numbers: Variable. Growth in nursery stock has been reported to be badly retarded by 10–20 large larvae per plant.

Monitoring: Examine vine foliage at regular intervals.

Examine vine moth larvae for presence of parasites; if significant, leave control to nature. Established vines can probably withstand up to 20% defoliation.

**Control**

**Biological control**

Control of pests using natural enemies or diseases is the main form of control in established vineyards in most Australian viticultural districts. This works where there is an established ecosystem of vines and ground covers. However, in newly-established vineyards where the vines are very vulnerable to defoliation or root damage in a very short period of time and where there is no permanent beneficial fauna yet established, biological control will not prevent economic damage by most of the pests listed.

Cultural control and quarantine

Prior removal from the vineyard of host plants may be worth trying but has not been proven. A weed and grass-free fallow of the land prior to planting in spring should reduce the overwintering larvae of a number of weevil species. Obviously, some prior knowledge of the larvae present in the soil would be helpful in this decision, but identification is difficult.

Poorly mobile insects such as garden weevils may be quarantined from a new vineyard by careful screening of implements etc. coming from vineyards where their presence is known.

**Insecticides**

If monitoring detects insects in numbers likely to damage the young vines, application of insecticide may be warranted during the danger period. Insecticides registered for use on non-bearing vines should not be applied to bearing vines because of the risk of residues and its effects on predators and parasites.

The insecticide alphacypermethrin (formulated as Dominex 100EC) is registered for control of pink cutworm, apple weevil and garden weevil on non-bearing vines. At the time of writing, this registration is valid only in South Australia. One well-timed spray of this product per 100 L water applied to vine foliage and the soil surrounding the base of the vine should control these pests; it is especially effective if applied at night when the insects are active.

Wingless grasshoppers can be controlled using flaky wheat bran bait mixed with an insecticide such as fenitrothion or carbarly.

Vine moth may be controlled by the biological insecticide Bacillus thuringiensis formulated commercially as Biobit, Delfin, Dipel Forte, Novosol or Thuricide.

**Conclusions**

Most areas of newly established vineyards develop free of insects which retard their early growth. However, where insect attack occurs, damage can occur quickly and be severe. There are few predators of likely damage; prior occurrence of the insect in the land to be planted or nearby land may be the best indicator for some beetle pests.

A successful management strategy should include an expectation of the occurrence of one or more of these pests, an ability to recognise the pest species from other insects and a regular and adequate monitoring program for the duration of the danger period.

**Reference**