



Bud Mite

Bud mite (and blister mite) are two strains of a mite species which only occurs on grapevines. They are essentially identical except for the damage they cause by their feeding activities - bud mite feed on and damage young buds, and blister mite cause galling on leaves. The information in this Vitinote focuses on bud mite.

Naturally occurring beneficial insects and other predatory mite species often keep pest mite species under control with no need for chemical intervention, however if controls are required, for chemicals to be effective, application must be timed to target bud mites in the extremely brief period when they are exposed on the vines.

This is very difficult to achieve as bud mite spend most of their lives sheltered inside buds. Various forms of sulphur are registered for use against bud mite in grapevines, however recent trials using these compounds have indicated that even with extremely good timing of application, the level of control achieved may be very low. The number of buds infested with bud mite which develop into shoots can also be reduced by particular pruning techniques.

ENCOURAGING NATURAL PREDATOR POPULATIONS IS IMPORTANT IN MANAGING PEST MITES

Appearance

Bud mites are around 0.2mm long and can only just be seen with a x10 hand lens. They have two pairs of legs at the head end which is slightly thicker than the tail end. Both adults and juveniles are creamy-white and 'worm-like'.

Habitat and movement

Bud mites live, breed and feed within buds for the vast majority of their life. They burrow deep into developing buds during the previous season, damaging those cells which will develop in the following season into leaves and flower clusters and the cells which form the primary growing tip of the shoot. This damage results in the typical shoot symptoms seen at budburst which are associated with bud mite activity.

Adult bud mites survive over winter inside the dormant buds, in greatest numbers in the last 2-3 buds closest to the base of the shoot, though they can be found in the first 10 or so basal buds. They most often live in the primary bud of the compound bud.

Many species of mites can be spread by wind, carried on insects and birds or on vine trimmings moved about the vineyard, and inside buds on vine cuttings used for propagation. Bud mites are often preferred prey of predatory mites when they are exposed, and are prone to dehydration. They do not migrate along canes or move out to feed on the leaves like the related rust mite. Bud mite move from overwintering buds directly into the protective shelter of newly forming buds within a month of budburst, and are 'carried upward' by the growing shoot, living under the scales at the base of each leaf stem.



BUD MITES ARE ONLY VERY BRIEFLY EXPOSED IN SPRING

Population development

Small groups of 10 or fewer bud mites cluster together, along with their eggs and cast off skins. In spring, surviving adult females begin to lay eggs inside the swelling bud. Depending on temperatures, eggs can hatch in 5-25 days. There are generally around 3-12 generations per year depending on environmental conditions.

Symptoms and damage

Typical early season symptoms of bud mite damage can include:

- dead buds and shoot tips
- cut leaf margins
- 'zig-zag' veins on basal leaves
- shortened internodes
- crooked shoot growth or flattened lower portions of shoots
- increased development of lateral shoots ('witches broom').

These are all the result of feeding damage in the developing buds and are usually concentrated on the lower leaves and nodes of shoots. Bud mites may also be responsible for the 'winter bud necrosis' and bud failure generally attributed to restricted spring growth syndrome (RSG).

SOME SYMPTOMS OF RSG MAY BE THE RESULT OF BUD MITE FEEDING ACTIVITIES

The amount of shoot damage by bud mites depends on the level of infestation of new buds during the previous season. At low numbers bud mites may affect only the outermost bud scales, and the shoot that develops may not have any visible signs of damage or may have only a slight 'bubbling' of the plant tissue at the very base of the shoot. With very high mite numbers, the primary and secondary buds may be damaged, and in severe infestations buds may fail entirely.

Distribution and monitoring

Bud mite damage has been recorded in a number of grape varieties including Cabernet Sauvignon, Chardonnay, Chenin Blanc, Pinot Blanc, Sauvignon Blanc, Shiraz, and Tokay.

Monitor for:

- **Bud mites in winter using a dissecting microscope; examine inside of outer basal bud scales of dormant buds for adult bud mites and their eggs and cast-off skins.**
- **Shoot and leaf symptoms in early spring if just starting a bud mite monitoring program, or to check the effectiveness of any early season controls applied.**

Where to monitor

If you aren't sure if you have a bud mite problem, you'll need to monitor to establish if a population is resident in the vineyard, or parts of the vineyard. Generally, bud mite infestations are not uniform, either within a single vine or across a vineyard. Because of their relatively restricted movement, selection of monitoring sites should include:

- areas of the vineyard where you suspect mites may have been a problem in previous seasons
- blocks where chemical controls have been applied for mites or other pests which may have impacted on predator populations.

If sprays have been applied for early season eradication of bud mite, monitoring for subsequent damage to assess the level of control needs to be done while symptoms will still be clearly visible, before shoots have 6-10 separated leaves.

Managing bud mite

In the previous season if mites were active in the vineyard, damage on leaves and shoots will have been most apparent in the first month after budburst - this may have been deemed at the time to be caused by RSG. If symptoms occurred, control measures for bud mite are likely to be required early in the upcoming season - is there actually anything effective they can do?

Much bud mite management to date has relied on sulphur sprays which are commonly applied at 2 and 4 weeks after budburst for the control of powdery mildew. There may be some effect of such applications, but these are unlikely to give adequate control of bud mite as few will be exposed and most will have already burrowed deep into developing buds. Field trials to determine the effectiveness of lime sulphur and wettable sulphur in controlling bud mite have had little success to date. Whilst a very few exposed bud mites may be killed, their enclosure inside buds at almost all points in their life cycle makes it difficult to access them with contact sprays. Research in this area is continuing.

Vines pruned to leave only the basal two buds over winter can be severely affected by bud mite as the canes which grow from these basal buds will harbour a large number of mites. Cane pruned vines are less likely to be affected, and any bud mite symptoms will be concentrated toward the crown of the vine. There has been some success in reducing the number of bud mites on vines in the following season using pruning systems which remove the lower basal buds on each shoot?

Other topics in this Vitinotes series include:

Characteristics of rust mite
Monitoring for rust mite
Spring control of rust mite
Restricted Spring Growth

Further information

Product or service information is provided to inform the viticulture industry about available resources, and should not be interpreted as an endorsement.

A useful reference is:

Bernard, M, Horne, PA and Hoffmann, AA (2001) Preventing restricted spring growth, The Australian Grapegrower and Winemaker issues: 452, pp16-7 and 19-22, 453 p26

Also available at www.grapeandwine.com.au/sept01/010907.htm

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