

Good Agricultural Practice Procedures for the control of Grapevine Mealybug (*Planococcus ficus*) on table grapes destined for export from South Africa to the People's Republic of China

Standard practice under South African conditions

1. NATURE AND SCOPE OF PROBLEM

Planococcus ficus, the vine mealybug, is a key pest in South African vineyards. It feeds on the vine roots, trunk, cordon, canes, leaves and fruit and can excrete copious amounts of honeydew, which attracts ants. Moderate to high *P. ficus* population densities can result in defoliation and infested grape bunches, both of which result in reduced crop quality and yield. Less commonly, high *P. ficus* population densities can lead to weakened vines and, with repeated annual infestations, vine death. Furthermore, *P. ficus* is the primary vector of grapevine leaf roll viruses and can, therefore, be an economic pest even at low densities.

Mealybug control is a standard practice in all areas where table grapes are grown.

2. MONITORING

Pheromone trapping

Method

- Yellow delta traps with sticky pads and pheromone lures are recommended for mealybug pheromone trapping. Training in identification is essential.
- Biweekly pheromone trapping should start in October and continue until harvest, and done monthly after this throughout the year.
- Traps can be hung at or above the cordon in the vine canopy. It is recommended that the open ends should be exposed so that vine mealybug males can easily fly into the triangular center of the yellow delta trap.
- Traps should be placed in areas where human movement takes place at regular intervals such as near roads, end rows and pack sheds. Old vineyards are often a source of new mealybug infestations. New vineyards planted on soil where old established vineyards were taken out, can also be areas where new mealybug infestations could occur and should be monitored with these traps.
- For practical reasons, blocks can be as large as 2ha for each pheromone trap. Physical stem counts should be done for verification of actual *P. ficus* infestation levels.

Threshold

These are based on the premise that 2 % mealybug infestation is equivalent to 65 males/trap over a period of 2 weeks.

- A. If a trap count is **under 65** males/trap over a period of 2 weeks:
 - **No control is required.**
- B. If a trap count is **more than 65** males/trap over a period of 2 weeks:
 - **Physical monitoring** (vine inspection) must commence in the sub-unit of the block covered by that particular trap (20 plots/ha, 5 vines/plot). There is a lag of at least three months between male trap catches and bunch infestation. Therefore, the traps provide early warning of possible bunch infestations.
 - If infestation exceeds **2%**, control should be applied in that part of the block.
 - If infestation in the block is less than 2%, but there is a spot with heavily infested vines, a spot treatment can be applied to prevent infestation from spreading further.
- C. If a trap registers **moderate counts (45-64 per trap)** twice in a row:

- **Physical monitoring** (vine inspection) must be done immediately (20 plots/ha, 5 vines/plot).
- If infestation exceeds **2%**, control should be applied.

Physical monitoring (vine inspection)

Method

- ❖ Draw a plan of the vineyard, indicating the rows and number of plots in each row. A plot consists of five vines between two trellising posts.
- ❖ Choose twenty plots of five vines each evenly distributed through the block. Larger blocks should be subdivided into units of 2 ha maximum. Ensure that areas with a history of mealybug infestation are included in the monitoring regime.
- ❖ Inspect each of the five vines. During the dormant stages of the vine, the top fork, or cordon, of each of the five vines must be examined for the presence or absence of mealybug, to a distance of 30 cm from the main stem. After bud break, shoots and leaves must also be examined. The distal 15 cm of one shoot per vine and one leaf per vine, of each of the five vines, must be examined.
- ❖ Note only the presence or absence of mealybug females (crawlers, nymphs and/or adult females) on each vine, i.e. is the vine infested or uninfested. Even if there is only one mealybug female on a vine, the vine is noted as infested. The presence of ants is also a good indicator that mealybug is present.
- ❖ The total number of infested vines out of the hundred monitored, will indicate the estimated percentage mealybug infestation for that block or unit of a block. For example, if 8 vines out of the 100 are infested, the estimated percentage mealybug infestation for that hectare or unit of the block is 8%.

Threshold

- Action should be taken when more than 2% of the vines are infested with VMB. This action may include biological or chemical control. Chemical control should, however, be limited in order to minimize the effect on native natural enemies in that particular block.

3. CONTROL

In the vineyard

Biological control

- Biocontrol is only recommended in vineyards where mealybug infestation is less than 2%.
- Control ants as they protect mealybugs from their natural enemies.
- Cultivate cover crops in order to provide refuges and alternative food sources for natural enemies during winter.
- Select herbicides, fungicides and pesticides that are less harmful to natural enemies. Use the IP classification of agrochemicals as an indicator.
- Augmentative releases of natural enemies early in the season can help to suppress mealybug populations.

Chemical control

- Vineyards or areas in vineyard blocks where high levels of infestation (5% and higher) occurred during the previous season, should be treated during dormancy (after leaf drop and before budding). Dormancy treatments are recommended to protect natural enemies as much as possible.
- Wet vines thoroughly (2-3L spray mixture/vine), using hand lances and high pressure. The insecticide must be washed in under the bark to reach over wintering mealybugs.
- If infestation exceeds 2% before the end of November, infested areas or infested vines plus the two adjacent ones should be treated.
- Spray applications later during the growing season and post-harvest sprays, in particular, are only recommended where heavy outbreaks can result in economic yield losses or where vines may drop leaves prematurely, resulting in canes not ripening properly.

- Various products are registered for dormant (before bud burst) sprays and for control during the growing season. Consult a technical advisor and follow the manufacturer's instructions for dosage, application directions and minimum time between last application and harvest. Withholding periods and residue levels applicable to the markets for which the fruit is destined should be taken into account.
- Vines in vineyards with a history of mealybug infestation can also be treated with a systemic insecticide (Confidor® 350 SC, active ingredient, imidachloprid). Apply at budburst as a soil drench around the base of the stem in 500 ml water per vine. Irrigate within 48 hours after application.

During harvest

- Mealybugs can spread from infested to clean bunches in picking crates and can be transported on workers' clothing.
- Ensure that crates and clothing are free from mealybugs when moving to new vineyards. Vineyards that are known to be infested with mealybugs should not be harvested prior to uninfested vineyards by the same picking teams.

In the packhouse

- Mealybugs from infested bunches can contaminate clean grapes in the packing line.
- Inspect bunches carefully for presence of mealybugs. Remove all bunches infested with mealybug from the pack shed and destroy them to prevent contamination of uninfested grapes.

Vineyard sanitation

All mealybug infested bunches remaining in vineyards after harvest, should be removed and destroyed, unless parasitism exceeds 75%.

4. RECORDS

The following records should be kept in good order and be available at all times for inspection on request:

- Biweekly in-season trap counts (October up to harvest);
- Biweekly scouting (physical inspection) results when the threshold levels in the traps were reached;
- Dates when lures are changed;
- Treatments applied;
- Vineyard sanitation programme.