Winetech
Wine Industry Network of Expertise and Technology
Netwerk van Kundigheid en Tegnologie vir die Wynbedryf

PROTOCOL

FOR CONTROL OF MEALYBUG IN VINEYARDS (PRODUCTION BLOCKS)

ARC • LNR

INTRODUCTION

Mealybug is the most important vector of leafroll viruses, therefore effective mealybug control is a prerequisite for containing the spread of leafroll infection.

VINEYARD MATERIAL

Mealybugs can survive on all live grapevine material on or under the soil surface. Where new vines are being established on old vineyard soil, the old vines should be treated with a systemic insecticide before removal, to ensure that the minimum of virus-carrying mealybugs are present when new vines are established. All live old vines and roots must be removed. Research is currently underway to determine the minimum period of fallow required to ensure that all old vine roots and mealybug in the soil are dead, as well as to investigate which herbicides kill vines and vine roots effectively. Meanwhile, the best recommendation is to allow at least a year between removal of old vines and planting of new vines. Always use certified planting material when establishing new vineyards.

CULTIVATION PRACTICES

Implements can spread mealybug, therefore implements coming from infested vineyards should be sprayed clean before entering uninfested vineyards. Try to do cultivation in newly planted, uninfested blocks first and then move on to the older, more infested blocks. Limit movement of workers in new plantings to a minimum. If workers need to move from infested to uninfested blocks, ensure that no mealybugs or egg sacks are clinging to workers' clothing or shoes (clean overalls should preferably be provided).

NATURAL ENEMIES

Try to avoid formation of dust, because dust is detrimental to natural enemies. The absence of natural enemies that can control mealybug effectively can lead to the establishment of new mealybug colonies which, in turn, can aid the spread of leafroll.

ANT CONTROL

Ants feed on the honeydew excreted by mealybugs and protect them against their natural enemies. Ant control is therefore of critical importance to ensure that biological control agents function effectively. Good ant control can enable natural enemies to suppress outbreaks of mealybug populations successfully. Ants can be controlled by applying sticky trunk barriers around vine stems, trellising posts and anchor wires or by applying stem sprays with registered pesticides.

WEEDS

Control weeds, particularly on the ridges. Several mealybug species, including those that transmit leafroll viruses, occur on weeds. Weeds growing into the vine canopy also serve as access routes to ants, which is detrimental to biological control of mealybug.

MONITORING OF MEALYBUG AND ANTS

Mealybugs can be monitored by two methods, namely regular vine inspections (also for ants) alone or by using pheromone traps in conjunction with vine inspections.

Physical monitoring by means of vine inspection

If pheromone traps are not used, monitoring by means of vine inspections every two weeks should commence from the beginning of October.

- ❖ Draw a plan of the vineyard, indicating the rows and numer of plots ("vakkies") in each row.
- ❖ Choose twenty plots of five vines each evenly distributed through the block (see attached diagrammes for examples). Larger blocks should be subdivided into units of 2 ha maximum. Ensure that areas with a history of mealybug/ant infestation are included in the monitoring regime.

PLOTS (inspect 5 vines per plot)

ROWS

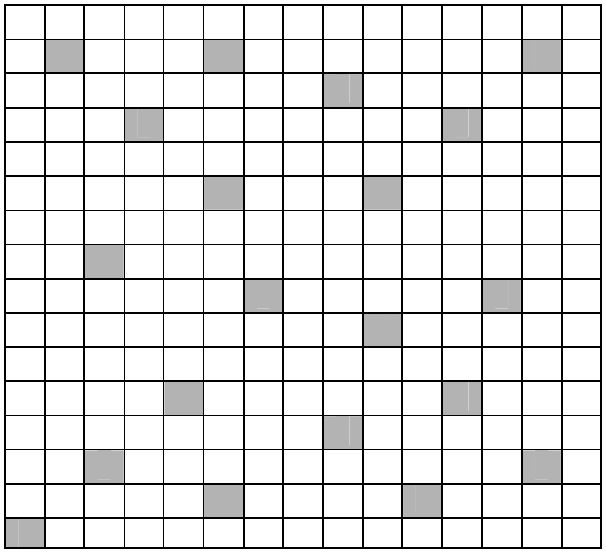

Diagram for distribution of plots ("vakkies") for vine

- Inspect each of the five vines, especially the new growth.
- Note only the presence or absence of ants and 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 or ant 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 infstation for that hectare or uni of the block is 8%.

Monitoring with pheromone traps

Start monitoring mealybug males every two weeks from **October**. The optimum distance of efficiency for a pheromone trap is 50 meters (i.e. covers an area of 1 hectare).

- Sub-divide large vineyard blocks into units of approximately 1 ha each.
- Place one trap or monitoring unit (yellow delta trap with sticky bottom and pheromone capsule) per hectare at the **beginning of October**. Continue monitoring until the **end of March**.
- Where more than one trap is placed in a block larger than 1 ha, traps in the sub-units should be 100m apart so that they do not interfere with each other.
- Use a piece of wire or an opened-up paper clip inserted through the roof of the trap to suspend the pheromone capsule just above the sticky bottom (Photo 1).

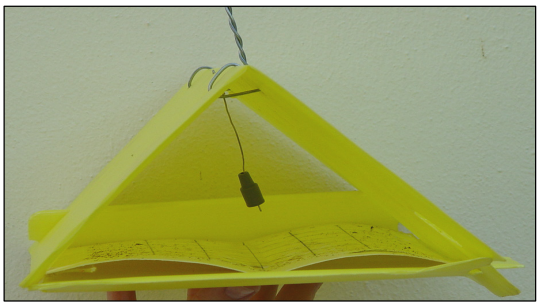

Photo 1. Pheromone capsule suspended above sticky bottom sheet.

If the capsule is covered with glue, pheromone release is affected and the capsule may not remain effective as long as it should.

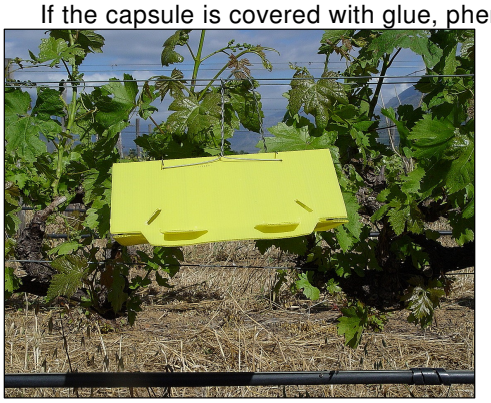

Photo 2. Hang trap in the cordon area. Ensure that open ends are not obscured by shoots or leaves.

- Place the trap in or above the cordon region (Photo 2). In vineyards subjected to strong wind, traps should be firmly attached with thicker wire just above the roof of the trap so that it cannot swing in the wind, otherwise the wind may snap the wire (Photo 3).

Photo 3. Tie the trap securely so it does not swing around in the wind. Ensure that open ends are not obscured by shoots or leaves.

- The open ends of the trap should be left open and unimpeded (remove leaves or shoots if required) in order to allow for unimpeded pheromone release.
- Replace sticky bottom sheets every two weeks:
  - Remove sticky bottom from yellow delta trap.
  - Mark bottom clearly (date and block) and fold.
- Marked sticky bottom sheets should be handed in at the laboratory so that males can be counted under a stereo-microscope.
- Note twoweekly counts of each monitoring unit or trap.
- Remember to change the pheromone capsule after 8 weeks (= 2 months).

Threshold values for action

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 be done immediately in the hectare or sub-unit of the block covered by that particular trap (20 plots/ha, 5 vines/plot).
   - 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 **high 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.

D. If **20%** of the vines are infested with **ants**, control should be applied.

Note: A degree day model is currently being evaluated by the industry as an aid for decisionmaking as to when mealybug monitoring should commence,. Information from the following weather stations are used for this purpose: Backsberg, Great Constantia, Goree, Slanghoek, Lutzville, Nietvoorbij, Windmeul (Mooigeleë). Further details are available on the IPW website [www.ipw.co.za].

CHEMICAL CONTROL

The key to effective chemical control of mealybug is timely action, but decision-making **must** be based on monitoring.

- Blocks or areas in blocks where high levels of mealybug infestation (2% and more) occurred during the previous season, must be treated during dormancy (after leaf drop and before budding). Treat problem areas during winter according to product registration. Use hand lances to achieve thorough wetting.
- Dormancy sprays are recommended to protect natural enemies as much as possible.
- Wet vines thoroughly [2 - 3 L spray mixture/vine] with hand lances at high pressure.
- If monitoring during the growing season shows that infestation already exceeds 2% before the end of November, infested vines as well as the two adjacent vines should be treated, or spray only the infested spots in the block.
- If outbreaks of more than 2% infestation occur later in the growing season, use a chemical with a short withholding period that breaks down rapidly, so that natural enemies have enough time during the remainder of the growing season to re-establish.
- Sprays after harvest should preferably be limited to instances where infestation is so severe that vines lose their leaves prematurely and vines may not be able to ripen the canes properly or may die.
- Post-harvest sprays are allowed only if monitoring records indicate that the infestation early in the season did not exceed 2% and that the outbreak really only occurred later. These applications may be made with hand lances only. Ensure that the whole vine (foliage, cordon, crotch and trunk) is thoroughly wetted. Spot applications must be made, unless monitoring indicates that the infestation is so widespread throughout the block that spot sprays are not feasible.
- If 75% or more of mealybugs are parasitized after harvest (Photo 4), spraying is not required, since most mealybugs will be dying anyway. Consult your advisor to help determine percentage parasitism.

Photo 4. Parasitized mealybugs or mummies (1.5 – 2 mm).

- Soil application of systemic products can be considered as an alternative to cover sprays.
- Ants can be controlled effectively at the beginning of the growing season using chemical stem sprays with registered pesticides. These must be applied, as per registration, as soon as ant infestations exceed the 20% threshold, but not before this threshold is reached.

BIOLOGICAL CONTROL

Under optimal conditions biological control can suppress mealybug populations to infestation levels of less than 1%. Encourage biological control by creating optimal conditions for natural enemies. These include absence of dust and ants, and judicious use of chemical products. Beneficial insects can also be encouraged by planting a cover crop that flowers early in the season (many natural enemies use pollen as an alternative food source).

Biological control by means of augmentative releases of commercially available natural enemies can be applied if mealybug populations are low enough (infestation level <2%). Biological control alone is not effective under outbreak conditions.

ADDITIONAL INFORMATION

Contact the Pest Management Division of ARC Infruitec-Nietvoorbij (tel: 021 – 809 3100, fax 021 – 809 3584) for further information on mealybug control.

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