

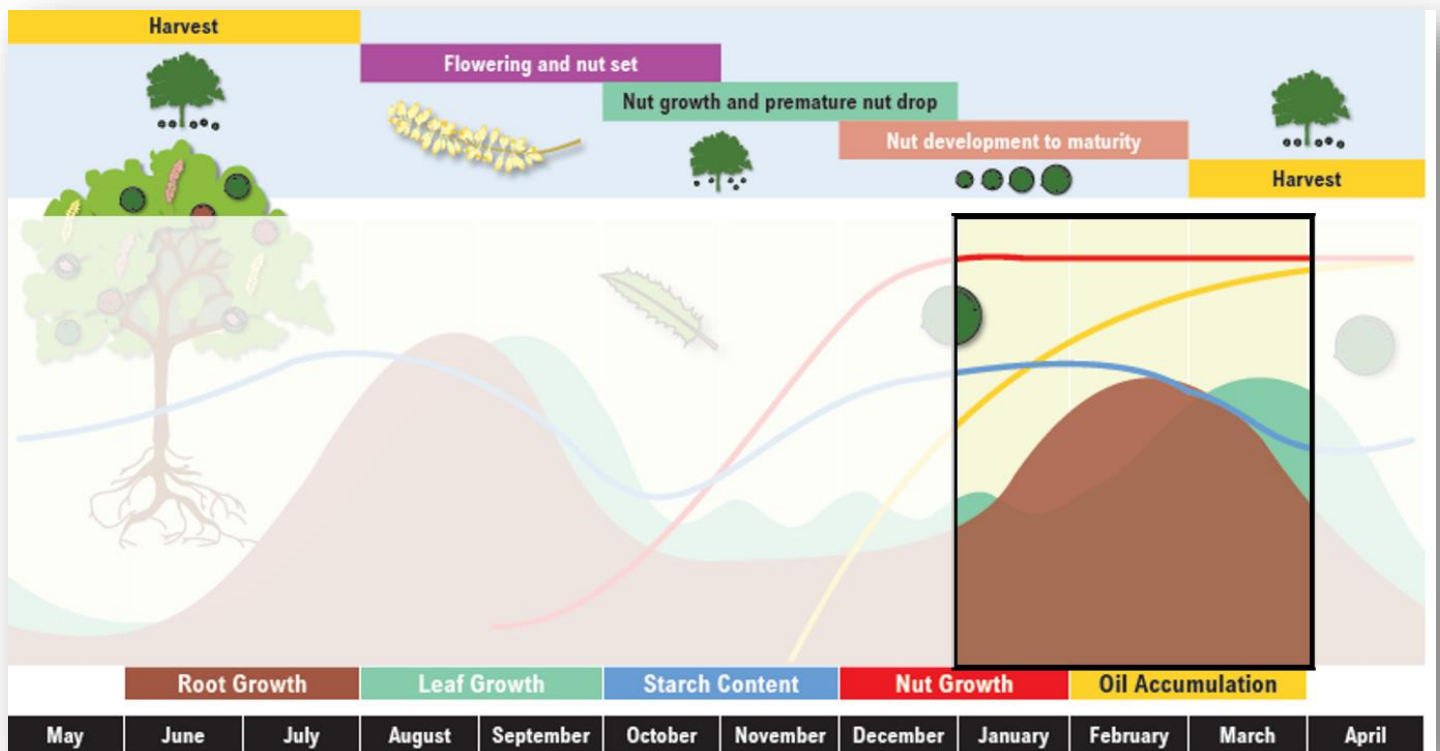


SAMAC Orchard Management News January - March 2024

Orchard Management Hints in a Nutshell

January to March is generally associated with shell hardening and oil accumulation as the nut develops to maturity. During this period, nut size does not increase significantly, and oil content increases during January and February and stabilizes from March onwards. Root growth starts to increase steadily in February, and typically peaks during late February and the beginning of March. A small leaf flush in early to mid-January is followed by

a larger flush in the middle of March. Management is focused on cleaning under trees in preparation for harvesting, ensuring logistics around harvesting are finalized (harvest equipment is clean, in working order and necessary spare parts are on-hand and seasonal workers available), and protecting nuts from damage by pests and diseases, especially stink bugs.



General Orchard Management

- During this period, a new root flush is produced, and fine feeder roots should be protected by mulching. Mulch will also counter weed growth, which reduces the amount of herbicide that will be needed.
- Continue with your irrigation and fertilization schedules as recommended by your technical advisor. Be mindful that irrigating with micro-sprinklers when there are nuts on the orchard floor can stimulate germination of the nuts.

Preparation for harvesting

- A clean orchard floor ensures that you maximise the return on your investment during the whole season – you must see it to be able to pick it up.
- Do not disturb the composted mulch, only remove rough organic material that can conceal nuts on the orchard floor. Leaves under Beaumont trees which will be subject to ethephon treatment should not be removed.
- In bearing orchards weeds are removed as this hampers harvesting, and herbicides can be used to control regrowth.
- Remove any “old” and immature nuts from the orchard floor to ensure they are not mixed with the current season’s nuts. This is especially important in orchards with nut borer infestations. These “old” nuts can introduce fungi and insects to “new”, healthy nuts, and can lower the peroxide value and shelf life of “new” nuts if mixed.
- Ensure that you have enough containers and/or bags for the nuts.

Harvesting



- Ensure that you are present in the orchard during harvesting and keep good records of harvesting progress (block number, date, quantity, cultivar etc).
- Perform maturity tests before stripping cultivars, especially those that do not drop their nuts naturally.



- Mature nuts should not remain on the orchard floor for more than two weeks; harvest nuts every week, or at least every second week. If ethephon is used, nuts can be harvested as soon as they drop to the ground. Aim to harvest nuts while the husks are still green.
- Ensure that you harvest at a rate that ensures that the capacity of drying bins is not exceeded.
- Limit the number of nuts that remain in the orchards after every round of harvesting as this will ensure that quality remains high and prevent nuts from serving as reservoirs for fungi and insects.
- Harvested nuts should be dehusked as soon as possible, preferably on the same day. Harvested nuts should not be kept in plastic bags for more than 12 hours, and preferably in the shade.

Pests and diseases

From February onwards, the population numbers of natural enemies increase, and attention should be paid to the use of softer chemicals during or before this time.

Pesticides with a narrow spectrum or a short residual action should preferably be used as they will provide existing natural enemies with the best opportunity to regulate populations of pests, especially those of stink bugs.

Examples include registered products containing various insect pathogens such as *Beauveria bassiana*. UV intensity should also

gradually decrease towards autumn which will decrease the environmental ephemerality of these insecticides.

Stink bugs

Stink bugs reside in orchards during winter and are generally found in the top third of macadamia trees during nut development. Nuts become very attractive for stink bugs during the oil accumulation phase and remain attractive up to early winter (mid-June). Monitor maturity and if nuts in an orchard are mature, harvest as soon as possible as the two-

spotted as well as other stink bugs such as the yellow-edged bug can penetrate the hard shell and feed on the kernel before harvest.

There are generally two methods used to scout for stink bugs:

1. Chemical knock-down
2. Live scouting

Target	Scout stage description	Monitoring procedure	Observation record type	Data description (replicates)	
Long-, medium- or short-mouth stink bug adults or nymphs	Stink bug adults or nymphs (including coconut bugs)	Count the number of stink bugs while noting the scouting method used: chemical knock-down, branch shaking or visual observation. The latter two methods should be applied at 4 observation points per tree	Count	1	Tree
Two-spotted stink bug (long mouth)	Parasitized or viable stink bug egg packet	Scout on the lower half of the tree on the main stem, branches, twigs, leaves, nuts, and racemes, specifically looking for parasitized (grey) egg packets	Incidence	1	Tree

Knowledge Scouting

- Randomly select data trees from the previous afternoon and place the plastic sheeting out, covering at least 80% of the drip zone. Anchor corners of sheets with rocks or pegs to ensure that the sheet is not blown away by the wind.
- Because these insects have a clustered distribution in the orchards, it is suggested that new trees be used during each successive scouting operation.





- Spray early in the morning before sunrise or when temperatures are still lower than 18°C.
- Keep the time after the spray to the collection of the bugs constant so that insect populations can be properly compared between successive weekly monitoring intervals. Practically an hour is recommended.
- Collect all bugs (immature & mature) and differentiate between coconut bugs, short-mouth, and long-mouth bugs.
- Please note that Dichlorvos is no longer registered for monitoring in macadamias.

No new products have been registered and it is suggested to use one of the registered contact insecticides. The knockdown ability of these products should not be as good as Dichlorvos. Growers are therefore cautioned to make provision for this during their weekly scouting sessions.

- Record all egg packets on the main stems of each data tree and indicate if they are parasitized (black) or alive (white).
- Threshold: Average of 0.4 stink bugs per tree over 10 trees.

Live Scouting

- Inspect at least four observation points on random data trees, including the main stem and lower branches, weekly during nut development stage 4 for egg packets of the two-spotted stink bug. Differentiate between parasitized or viable egg packets. Kill viable eggs by hand after recording. Fresh eggs are green-orange and can be parasitized by beneficials. There are usually 14 eggs in the two-spotted stink bug egg packet.
- Sucking bugs can also be scouted in the orchards (preferably young orchards) by branch shaking and visual observation. Shake at least four branches to dislodge stink bugs onto a ground cover. Place a plastic sheet or similar type of lining on the orchard floor to facilitate easy collection of dislodged sucking bugs (which includes stink bugs and mosquito bugs), nymphs and adults. The lining should cover at least 80% of the tree drip zone.

Fruit development			
A	B	C	D
Cell division	Expansion & nut drop	Shell hardening	Oil accumulation & maturity
			



Nut borers

The nut borer complex is a group of moths. Nut borers lay eggs on the nut husks, usually nut development stage C-D, and mostly at 1.5 - 2.5 cm nut in husk diameter. The larvae that hatch from the egg feed a tunnel in the husk.

Larval feeding may cause poor embryo (kernel) development, resulting in premature nut drop, immature kernel, or kernel damage. The final instars of the nut borer life stage normally drop to the ground to pupate in the organic matter or soil, but pupae have also been seen in or on the husk.

Moths emerge from pupae, mate, and lay eggs again.

- Moth numbers are monitored on a sticky liner inside a delta trap loaded with pheromones that attract the male moths.
- The number of nut borer males on the sticky liners is counted from separate traps for different species.
- Weekly trap inspections give an indication of moth flight peaks which provides an idea of mating and egg-laying. Scouting for nut borer eggs and holes in husks is important.

Target	Scout stage description	Monitoring procedure	Observation record type	Data description (replicates)	
Nut borers (adult, eggs, larvae and signs of damage)	False codling moth (FCM) and macadamia nut borer (MNB) males in a trap on a sticky liner during fruit development stages B-D.	Monitor weekly for male moths in delta traps. Rebait with a fresh pherolure at the frequency specified on the product label. Current thresholds of male moth activity are 7 and 10 moths per trap per week for MNB and FCM respectively. Flight activity indicates mating is taking place, and signs of egg laying on husks need to be monitored closely.	Count	1	Trap per 5 ha
	Nut borer egg(s) on husk during fruit development stage B-D.	Look for viable or parasitized, unhatched nut borer eggs on macadamia husks, especially between two nuts on a raceme 5-6 weeks after the main flowering event.	Incidence	4	Observation points/tree
	Nut borer entry or exit holes during fruit development stage C-D.	Look for signs on the husk of nut borer larvae entry (tiny hole) or exit holes (larvae exit husk to pupate). Visible pupae on husks are also recorded as nut borer damage incidence.	Incidence	4	Observation points/tree
	FCM or MNB larvae feeding in a husk.	Cut open any infected green nuts in the tree canopy and collect them from the orchard floor. Look for larvae and record larval presence or absence.	Incidence	4	Observation points/tree

- From mid-January onwards, larvae feeding inside the husk sever vascular bundles connecting the nut to the tree.
- These nuts will drop prematurely (Jan–Feb) and should be floated to quantify maturity before delivery to the factory. This is important if the orchard has a

history of moth infestation or in the case of known susceptible cultivars (816, 788 and most hybrids except Beaumont and 791).

- During this time no or very little nut abortion should occur. Count all aborted nuts under each data tree and record it on the scouting sheet or the hand-held device (important).

Thrips and other secondary pests

Hot, dry conditions elicit thrips population increases. Many of our production regions experience a mid-summer drought during January which also coincides with a leaf flush. If thrip numbers warrant control during this time, always consider the softest approach first. Thrips are widely regarded as repercussions or secondary pests because population flare-ups are often associated with repeated application of certain broad-spectrum insecticides.

When the natural enemies are absent, secondary pests like thrips, aphids, and mealybug numbers increase. Negative impacts to look for include raceme damage, nut drop or the loss of leaf flushes which in turn might lead to reduced carbohydrate reserves stored in the plants.

- Monitor thrips, especially on new vegetative leaf flushes of 816 and A4 cultivars.
- Scout for thrips using an A4 black beating sheet, counting the number of larvae and adults after tapping the plant part 5 times on the sheet.

- When the growth tips are monitored, ensure that only a new flush is selected. This method is suggested to gather data that is comparable between successive weeks and seasons.
- Monitor when it is cool as adults will very quickly fly away during warm conditions after being temporarily knocked down.
- Citrus thrips are the main thrips species on macadamias in South Africa.



Target	Scout stage description	Monitoring procedure	Observation record type	Data description (replicates)	
Thrips	Thrips adults on flower stage 1. Thrips larvae and adults on flush.	Tap a single raceme of flower stage 1 and/or foliar flush 5 times on a black A4 surface and count the adult thrips that were dislodged in dry climate zones, especially on '816' and the number of larvae and number of larvae + adults on foliar flush. 10% damage thresholds have been quantified as 35 adults, 25 larvae and 45 larvae + adults on average respectively.	Count	4	Observation points/tree

Felted coccid, branch dieback and bark borers

Felted coccid and bark borer beetle numbers should increase significantly from the end of January but initial infestations normally already occur during early December. Be vigilant for possible infestations, especially in the Barberton/Nelspruit/White River areas. MFC, bark borers and branch dieback occur simultaneously in some instances due to severe physiological stress induced by the MFC. Note the following:

- MFC infestations are often characterised by leaves initially dying inside the tree canopy. Some leaves have yellow speckles on the dorsal (upper) side. Branches may be affected in advanced stages of infestation with MFC.
- Branch dieback is often associated with leaves initially dying from the tips of uppermost branches and leaves appearing to have lost their sheen (dull green). Branches may be affected, and a blueish discolouration may be present in vascular bundles if branches are cut.
- The general decline of a tree as above but with sawdust present around the base of the trees is associated with bark borers. Upon closer inspection, small holes will be visible and sometimes matchstick-like projections consisting of compacted wood powder (frass) may be present.

Felted coccid	MFC crawlers on tree branches.	Look for any signs of MFC on macadamia husks, racemes, leaves, and/or branches. Count the number of crawlers in a square cm on duct tape from the observation points on each data tree. Replace tape weekly. Data trees can be kept constant in the infected area.	Count per cm ²	4	Observation points/tree
	MFC females.	Look for any MFC females on macadamia husks, racemes, leaves, and/or branches.	Incidence	1	Tree



Phytophthora

The presence of stem cankers (vertical bark cracks and gumming) and dieback are indicative of Phytophthora infections.

Growers should always use registered plant protection products and be mindful of

preharvest intervals (PHIs) and maximum residue limits (MRLs). Although tree phenology is linked to the calendar, it is important to remember that tree phenology is determined by climatic factors, thus some variation in the timing can be expected.