



**BEST
PRACTICES**

in a Nutshell



SAMAC
Macadamias South Africa NPC



COLD STRESS MITIGATION PRACTICES

Frost is formed when temperatures drop below 0°C and water vapor (gas) changes to ice (solid). Mature trees can survive cold temperatures, but frost has led to many cases of young macadamia tree deaths, especially in marginal macadamia production areas. Protecting young trees against the cold is thus important during the winter months.

MITIGATION PRACTICES

TREE COVERS:

- Nappy-liner material can be used to cover the main stem or whole trees, e.g. Frost Guard / Plasgro / AgFabric / Frost Cloth in very cold areas.
- Grass layered and tied to tree stems with degradable rope can be used in areas with periodic frost to protect young trees from cold air against the tree stems. This, however, comes with an increased termite damage risk.



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SPRAYS:

- Potassium silicate is effective as potassium concentrates in plant cells, lowering the freezing point of plant cells while silica strengthens cell walls. Potassium silicate products can be applied as foliar sprays or as soil treatments.
- Kaolin products could form an isolation layer on leaves against the cold. Additional white reflective properties protect plants against heat and water stress. This product could form part of a frost protection strategy.
- Foliar sprays have also been shown to improve cold tolerance.
- Test coverage before spraying, to optimize product efficacy.

GENERAL MANAGEMENT:

- Airflow is critical for cold mitigation and should be addressed by opening valleys to allow cold air to “drain”. Airflow in trees in lower lying areas can be improved by skirting higher and pruning for open canopies. Ridges also contribute to cold protection if cold air can “drain”.
- Inversion layers form when cold air close to the ground can't rise because the air on top of it is warmer. Air fans or wind machines mix the air and prevent inversion layers of freezing air at ground level.
- Heat burners can be combined with air fans under very cold temperatures or when inversion layers are not present. Some growers burn tires under very cold conditions.
- Bare ground absorbs more heat during the day to release at night, thus soil covered by vegetation will absorb less heat. Grass should be kept mowed (this also decreases the fire risk), and cover crops are typically not grown in the colder months.
- Irrigation should be monitored closely especially in young orchards in winter. Over-irrigation can lead to tree decline and predispose trees to sensitivity to frost damage. Moist soil releases more heat than a dry soil and such areas could be less prone to damage.
- Trees that have other compounding problems such as bench rooting, Phytophthora or which are exposed to stresses like compaction will be more prone to frost damage and it is therefore ideal to have healthy trees going into winter.



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