

Spraying Locusts with *Metarhizium*

March 2015 Primefact 1393 Second edition
Farm Chemical Unit, NSW Biosecurity & Food Safety

What is Green Guard?

Green Guard® is the registered product name for *Metarhizium*. Although a registered pesticide, Green Guard® is not a conventional insecticide. Green Guard® is a biological insecticide, based on the naturally occurring fungus *metarhizium*. Green Guard® does not have a knockdown or immediate effect like most conventional insecticides used for locust control. Locusts sprayed with Green Guard® take 8-12 days to die during summer and 12-15 days under mild spring temperatures. Green Guard® is most effective when used as a preventative spray, targeting nymphs.

For further information on locust behaviour, the need for early detection and action and spray timing see the locust section of the NSW DPI website at: www.dpi.nsw.gov.au/locusts.

What formulations are available?

Green Guard® is available in three formulations.

- 1 **Green Guard SC Premium** is a suspension concentrate but comes as a premix with the spores already in a vegetable oil carrier. Instead of mixing the different components, all that is required is to shake the pack well before diluting with water.
- 2 **Green Guard SC** (suspension concentrate) is designed for ground based application equipment. The pack contains a container of emulsifiable oil, the fungal spores and a surfactant solution. The spores and surfactant are first mixed then the oil is added. The resultant suspension is then diluted in water for spraying.
- 3 **Green Guard ULV** (ultra low volume) formulation is mainly designed to be applied by air, in a mix with petroleum oil. However, it can be applied by mister.

How do I get Green Guard®?

In NSW, growers can obtain Green Guard® through their Local Land Services (LLS) office or directly from the local reseller. The responsibility to control locusts rests with the grower. Growers who do not own their own application equipment may be able to borrow dedicated application equipment through their LLS, depending upon availability. Due to likely strong demand, application equipment may not always be available. If growers do not have their own equipment, they will have to hire a contractor at their own expense.

To contact your local LLS call 1300 795 299.

What formulations are acceptable to organic certifiers?

Only Green Guard® Premium and Green Guard ULV are acceptable during the 2015-2016 season for Australian and USDA NOP certified properties.

USDA certified organic growers will need to use Caltex Organic Summer Oil with the ULV formulation of Green Guard. This oil can be obtained from the LLS or from a rural supply store.

This information is current at the time of publication. Be sure to check with your organic certifier before spraying. (See contact list in the table at the end of this Primefact).

What if I can't get Green Guard®?

Organic certification standards contain clauses relating to 'application of prohibited substances to certified areas of land'... 'mandated by state authorities'. Locust control falls into this category. If you do have to control locusts with conventional insecticides, the land to which it was applied may be ineligible for recertification for a period, e.g. 12 months, and residue testing may be required. Livestock grazing treated or over-

sprayed pastures have to be identified and quarantined for longer withholding periods. e.g. 3 times the usual, or even months, and their produce such as meat may lose certification permanently. Requirements vary depending on what standard applies. Before using a prohibited substance, contact your certifying body. (See contact list in the table at the end of this Primefact).

How 'green' is Green Guard®?

While a biological, Green Guard® has some side effects. Although it is relatively specific to locusts and grasshoppers, there is some hazard to honey bees in that bees can pick up a great deal of the product when foraging for pollen and nectar. Consequently, Green Guard® should not be applied within 1.5km of commercial bee hives, and honey bees should be kept out of sprayed areas for 7 days.

Do not contaminate wetlands, water bodies or watercourses. For boom sprays, do not spray within 10m of any wetland, water body or watercourse, downwind. For aerial spraying or spraying with misters, do not spray within 100m of any wetland, water body or watercourse downwind.

Green Guard® may provoke an irritant or allergic reaction in sensitive people. PPE (personal protective equipment) is specified in the label Safety Directions and for re-entry into treated crops for 24 hours after application.

How should Green Guard® be stored and transported?

As a biological, Green Guard® is not as robust as conventional insecticides. Containers need to be stored between 2-8°C but not frozen. To be kept within this temperature range, refrigeration is required. Just prior to use, short term storage at room temperature (<30°C) is acceptable. DO NOT transport or store in direct sunlight.

How should Green Guard® be applied?

SC or Premium SC through a boom spray

Nozzles: Extended range flat fans should be used, e.g. XR TeeJet (XR11002) or XRC TeeJet (XRC11002), or equivalent, as these nozzles will produce the fine droplet spectrum required.

Pressure: refer to nozzle charts, inputting tractor speed and water application rate.

Rate: 75g spores in 150-450 L water treats 2 hectares (SC) or 500mL in 75-225 L water per hectare (Premium SC).

Premium or Premium SC through a mister

Nozzles: TeeJet even flat fans TP6504E.

Pressure: 3.5 bar.

Fan speed: low.

Rate: 75g spores (SC) or 500mL (Premium SC) in 10-20L water per hectare (10L for average pasture/crop growth, 20L for tall dense pasture/crop growth).

ULV through a mister

Nozzles: TeeJet even flat fans TP6504E.

Pressure: 3.5 bar.

Fan speed: high.

Rate: The ULV should be bulked up with oil to enable the mix to be applied at 2L per hectare.

For average pasture or crop growth, mix 1L of ULV with 20L of Summer Spray Oil. This will treat 20ha. To treat 1ha, mix 100mL (30g spores) of ULV with 2L of Summer Spray Oil.

For pasture or crop that is denser or taller, mix 150mL (45g spores) of ULV with 1.85L of oil to treat 1ha.

For very dense and tall crop or pasture, mix 250mL (75g spores) of ULV with 1.75L of oil to treat 1ha.

How do I calibrate a mister to apply ULV Green Guard®?

For help, use the mister manual and calibration video, both of which are on the NSW DPI website, on the locust page.

Refer to tables at back of mister manual. These can be used for any brand of mister, provided it is fitted with the correct nozzles.

Flow rates from nozzles can be checked by attaching tubing to the nozzle and measuring the output into a measuring jug over one minute. This should be done with the fan off.

The tables give the application rate in L per ha for TP6504E nozzles, depending on swath width and vehicle speed. The first things to determine are the swath width (which depends on fan speed) and how fast you want to travel in the conditions. The mister manual tells you how to measure swath width under 'Basic Operation'. For ULV a swath width of 50m is suitable; for SC reduce to 30m.

Use the table for your chosen swath width.

Look up the jet number in the left hand column, i.e. 6504. Then look up the flow rate in L/min (3rd column from left) for the recommended operating

pressure, i.e. 3.5 bar (remembering 1 bar = 100 kPa). The flow rates are per nozzle.

The calibration formula, which is in the manual is:

$$L/ha = \frac{[\text{total spray output (L/min for each nozzle} \times \text{no of nozzles)} \times 600]}{[\text{speed (km/hr)} \times \text{swath width (m)}]}$$

For more than 1 nozzle, obtain the total flow rate by multiplying by the number of nozzles, e.g. 2 x 6504 nozzles at 3.5 bar in a swath width of 50m and a speed of 20km/hr will apply 2.05L/ha. This would be suitable for ULV, as the high fan speed will give a wider swath width.

$$L/ha = \frac{(1.71 \times 2) \times 600}{20 \times 50}$$

For the SC, a narrower swath width will result from running the fan at a low speed, e.g. 30m. 2 nozzles at 3.5 bar with a 30m swath width and a speed of 10km/hr will apply 10.3L/ha which is suitable for the SC formulations.

$$L/ha = \frac{(1.71 \times 3) \times 600}{10 \times 30}$$

How do I decontaminate spraying equipment before applying Green Guard®?

DO NOT decontaminate on organically certified land. Decontaminate on the property where the last conventional spray occurred, immediately after spraying.

- Wear PPE: cotton overalls, gumboots and PVC or nitrile gloves as a minimum. Check label Safety Directions to see if more is necessary.
- Clean down ALL the exterior of the boom within 30 minutes of finishing the spray application. Use a brush or chlorine solution (see below).
- Drain and flush the tank, boom and lines with clean water for 10 minutes. Activate pressure relief and dump valves.
- Remove and clean separately all filters and nozzles in water with a soft brush such as toothbrush. Do the same for tank lids, caps at the end of spray lines and pressure relief valves. Remove pressure gauges if not isolated by taps and flush lines. Flush external tank sight gauges with clean water.
- Fill the tank with clean water and add the chlorine bleach. For every 100L of water, add 300mL chlorine bleach (4% solution). Flush the boom and allow to stand for 15 minutes

with the solution in the tank continuously agitating, then drain. Do this twice.

- Refill with clean water and repeat the initial flush.

Always read the label

Users of agricultural or veterinary chemical products must always read or have read to them the label and any permit, before using the product, and strictly comply with the directions on the label and the conditions of any permit. Users are not absolved from compliance with the directions on the label or the conditions of the permit by reason of any statement made or not made in this publication.

More information

- NSW Department of Primary Industries Locusts page
www.dpi.nsw.gov.au/locusts
- Australian Plague Locust Commission (APLC)
www.agriculture.gov.au/pests-diseases-weeds/locusts
- Local Land Services
www.lls.nsw.gov.au

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Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing (June 2015). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of the Department of Primary Industries or the user's independent adviser.

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