



Sprayed Cotton Refuge for Bollgard II[®] Cotton

GROWERS OF BOLLGARD II COTTON ARE REQUIRED TO PRACTISE PREVENTATIVE RESISTANCE MANAGEMENT.

The resistance management plan is based on two basic principles:

- (1) minimising the exposure of *Helicoverpa spp.* to the *Bacillus thuringiensis* (Bt) proteins and
- (2) providing a population of susceptible individuals that can mate with any resistant individuals and hence dilute any potential resistance.

HOW CAN WE GENERATE A POPULATION OF SUSCEPTIBLE MOTHS?

Each grower is required to grow a refuge crop that is capable of producing large numbers of *Helicoverpa spp.* moths that have not been exposed to selection with Bt. These will dominate the matings with any survivors from Bollgard II crops and thus help to maintain Bt resistance at low levels.

SPRAYED COTTON REFUGE:

Sprayed cotton refuge must be planted at 100% of the Bollgard II area (refer to point 7 in the 'General conditions for sprayed cotton refuge').

For example, for every 100 hectares of Bollgard II cotton a grower will need to plant 100 hectares of sprayed cotton refuge. This applies to irrigated and dryland cotton situations.

100 Hectares Bollgard II = 10 Hectares Sprayed Cotton

Sprayed cotton refuge acts as a host for other *Lepidoptera spp* such as Rough Bollworm.

GENERAL CONDITIONS FOR SPRAYED COTTON REFUGES:

1. Sprayed cotton must be planted and managed so that the refuge is attractive to *Helicoverpa spp.* during the entire growing period of the Bollgard II cotton variety.
2. Sprayed cotton must be planted within two weeks of planting the Bollgard II cotton.
3. If cultivation is required in the sprayed cotton refuge, the Bollgard II cotton should also be cultivated at the same time.
4. Sprayed cotton refuge must be planted within the farm unit growing the Bollgard II cotton.
5. All reasonable effort should be taken to plant the refuge either on one side, or next to a Bollgard II cotton field.
6. All Bollgard II fields must be within 2 km of the nearest sprayed cotton refuge.
7. Sprayed cotton refuge must be a minimum of 48 metres wide and each refuge area must be a minimum of 2 hectares.
8. If the Bollgard II variety planted is stacked with Roundup Ready cotton or Roundup Ready Flex, up to 200 metres of buffer between the refuge and the Bollgard II is allowed in order to prevent herbicide drift (if the sprayed cotton refuge is not glyphosate tolerant).



CONTROL OF VOLUNTEER AND RATOON COTTON:

Volunteer and ratoon cotton within fields may impose additional selection pressure on *Helicoverpa spp.* to develop resistance to the Bt proteins produced by Bollgard II cotton.

Ensure that the field the sprayed cotton is to be sown into is clean of volunteer or ratoon cotton prior to planting.

Sprayed cotton refuges must be kept clean of volunteer and ratoon Bollgard II cotton for the entire growing period.

SPRAY LIMITATIONS IN THE SPRAYED COTTON REFUGE:

No product containing *Bacillus thuringiensis* (Bt) proteins may be applied to sprayed cotton refuges for the entire growing period.

SPRAYED COTTON DEFOLIATION AND HARVEST:

Defoliation of the sprayed cotton refuge cannot commence until defoliation of the Bollgard II cotton has commenced.

PUPAE DESTRUCTION IN SPRAYED COTTON REFUGES:

Sprayed cotton refuges should be cultivated as soon as practicable after harvest.

SIMPLE STEPS TO CREATING AN EFFECTIVE SPRAYED COTTON REFUGE:

Field selection:

1. Where possible, avoid planting Bollgard II cotton into last year's cotton field
2. Do not plant sprayed cotton refuge into Bollgard II cotton stubble that has not been root cut effectively.

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