

Crops(s) **Tomato**

Insect(s) **Heliothis/Tomato budworm (*Helicoverpa* spp.)**

Guidelines:

1. Monitor pest levels and **do not** spray unless pest thresholds are reached.
2. Use an integrated pest control approach where both chemical and non-chemical measures are adopted as part of the overall strategy. Examples are the use of predators/parasites and relevant cultural practices (crop hygiene, rotation of planted areas, and strategic time of planting).
3. Seek local advice on pest incidence and the risk of resistance development from insecticide programs used to control heliothis in other crops or to control other pests.
4. When using insecticides/miticides to control other pests on tomato, consider the chemical group in relation to contributing to resistance development of heliothis.
5. Avoid using insecticides from the same chemical group against consecutive generations of *Helicoverpa* spp. or other pests, as this will increase the selection pressure. This does not apply to *Bacillus thuringiensis* (Bt) or Nucleopolyhedroviruses (NPV) products, as they are considered to have a lower resistance risk. To encourage beneficial insects, use *Bacillus thuringiensis* (Bt) or Nucleopolyhedroviruses (NPV) sprays and avoid broad spectrum insecticides where possible, particularly early to mid-crop cycle.
6. Do not re-spray a crop in the same season where a failure (which is known or unknown) has occurred using the same insecticide or other active ingredient from the same chemical group.
7. The Modes of Action (Groups) and registered insecticides for control of Heliothis/Tomato budworm (*Helicoverpa* spp.) are listed below:

Please note:

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MoA Group	Chemical sub-group	Active ingredient	Delivery method	No. applications permitted per crop per season
1A	Carbamates	methomyl (eg. Lannate® L), thiodicarb (eg. Larvin®)	Foliar	not specified
3A	Pyrethroids	synthetic pyrethroids (various – eg. Dominex® Duo, Karate® Zeon, Sumi-alpha® Flex, Trojan®)	Foliar	not specified
5	Spinosyns	spinetoram (Success® Neo), spinosad (eg. Entrust®)	Foliar	4
6	Avermectins	emamectin benzoate (eg. Proclaim® Opti)	Foliar	4
11A	<i>Bacillus thuringiensis</i>	<i>B.thuringiensis subsp. kurstaki</i> (eg. Dipel®)	Foliar	not specified
18	Diacylhydrazines	methoxyfenozide (eg. Prodigy®)	Foliar	not specified
22A	Oxadiazines	indoxacarb (eg. Avatar® eVo)	Foliar	3 and no more than 2 consecutive applications
22A + 15	Oxadiazines + benzoylureas	indoxacarb + novaluron (Plemax®)	Foliar	3 and no more than 2 consecutive applications
28	Diamides	chlorantraniliprole (eg. Coragen®), flubendiamide (eg. Belt®)	Foliar	3 and no more than 2 consecutive applications (including mixtures of chlorantraniliprole and thiamethoxam)
28	Diamides	cyantraniliprole (Benevia®)	Foliar	2
28 + 12A	Diamides + diafenthiuron	cyantraniliprole + diafenthiuron (Minecto Forte®)	Foliar	2
28 + 4A	Diamides + neonicotinoids	chlorantraniliprole + thiamethoxam (Durivo®)	Soil	1
31	Nucleopolyhedrovirus	NPV of <i>H.zea</i> or <i>H.armigera</i> (eg. Gemstar®, Vivus® Max)	Foliar	not specified
UN	<i>Clitoria ternatea</i> extract	clitoria ternatea extract (Sero-X)	Foliar	not specified

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Notes regarding the application of insecticides:

1. To ensure the most effective control of the pest:
 - a. Product labels should at all times be carefully read and adhered to;
 - b. Full recommended rates of registered insecticides should always be used; and
 - c. Ensure good coverage of the target area to maximise contact.

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