



ADAMA

Plemax[®] insecticide

For a good looking head.

Product overview

Plemax is a highly effective insecticide that provides robust knockdown and residual control of key chewing pests in brassicas, leafy vegetables and fruiting vegetables (excluding cucurbits). Formulated as a high quality suspension concentrate (SC), Plemax is a unique combination of two active ingredients, novaluron and indoxacarb.

Mode of action

GROUP 15 | 22A | INSECTICIDE

Novaluron and indoxacarb target different mechanisms in insect pests. Using different insecticide modes of action reduces the risk of resistance developing to either active ingredient. Additionally, novaluron and indoxacarb have similar residual activity and rainfastness, which increases the likelihood of target pests ingesting both active ingredients.

Novaluron is a benzoylurea insect growth regulator (Group 15) that inhibits chitin synthesis primarily in larvae. Chitin is a key structural component of the cuticle of insects. Reduced chitin production in larvae can cause abnormal cuticle formation and abortive moulting. Exposure of larvae to novaluron can disrupt metamorphosis, resulting in abnormal pupal formation and a significant reduction in adult emergence. Due to its slower mode of action, novaluron has limited knockdown but is particularly effective when applied in combination with a partner insecticide with more rapid activity, such as indoxacarb.

Indoxacarb is an oxadiazine insecticide (Group 22A) that inhibits sodium ion entry into insect nerve cells. Larvae exposed to a lethal dose of indoxacarb usually stop feeding within four hours, with paralysis and mortality occurring after 4–48 hours.

At a glance

New mode of action	Plemax introduces a new mode of action (Group 15) for use in brassicas, leafy vegetables and fruiting vegetables (excluding cucurbits).
Dual modes of action	Plemax combines indoxacarb with novaluron for improved efficacy and resistance management.
Knockdown and residual control	Plemax provides excellent knockdown and residual control of hard-to-control pests, such as Diamondback moth and <i>Helicoverpa</i> spp., as well as other key chewing pests.
Improved yield and quality	Plemax protects yield and quality by significantly reducing feeding damage caused by chewing pests.
Integrated pest management	Plemax is ideal for use in IPM programs based on crop monitoring, economic thresholds and beneficial insects.
Flexible use	Plemax can be used in spray programs throughout the season. Workers can re-enter treated crops once the spray has dried.
Technical support	Adama's Plemax stewardship program and Trapview population monitoring technology can help you to effectively manage resistance.

Novaluron and indoxacarb act mainly by ingestion during larval feeding on treated plant surfaces. They are also taken up through the insect cuticle via direct contact with spray or treated foliage. High levels of mortality can occur in first instars hatching on treated foliage or from direct spray onto the egg.

Solo formulations of indoxacarb are already registered and used in vegetables in Australia. Plemax provides efficacy and resistance management advantages compared with existing solo indoxacarb use.



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Diamondback moth (DBM)

Diamondback moth (*Plutella xylostella*) is the most economically significant pest in brassica crops. Larvae infest brassica species exclusively and feed on all above-ground plant parts. Feeding damage on the underside of leaves are a distinctive symptom and appears as irregular, window-like patches. Intensive insecticide spraying is often required to effectively manage DBM due to its short lifecycle and the low market tolerance to feeding damage. Due to its adaptability, DBM has developed resistance to many active ingredients, including synthetic pyrethroids (SPs), carbamates/organophosphates (OPs), spinosyns (spinetoram), avermectins (emamectin), oxadiazines (indoxacarb), phenylpyrazoles (fipronil) and more recently, diamides (chlorantraniliprole, cyantraniliprole and flubendiamide). The use of IPM strategies, including strategic use of insecticides, regional management programs and conservation of beneficial insects are important for effective management of DBM.

Targeting DBM with Plemax

- Regularly monitor crops for eggs and larvae. Additionally, Trapview can be used to monitor the activity of DBM adults.
- Application should be timed to target eggs or newly-hatched larvae before they become entrenched within the crop.
- Do not apply if crop monitoring indicates high levels of predators present and/or parasitism from egg and larval parasitoids (i.e. *Trichogramma pretiosum* and *Diadegma semiclausum*) and economic thresholds have not been exceeded.
- Apply up to three applications of Plemax per crop, with a maximum of two consecutive applications. If applying three Plemax sprays in a season, do not apply any additional products containing indoxacarb (e.g. Avatar*).
- Use the higher rate under higher pressure to improve residual control and use a minimum spray interval of seven days between applications under high pressure scenarios.
- Use of Plemax is subject to a Croplife Australia resistance management strategy for Diamondback moth in brassicas. Please review this strategy before using Plemax.



DBM pupae and larvae.



DBM adult.

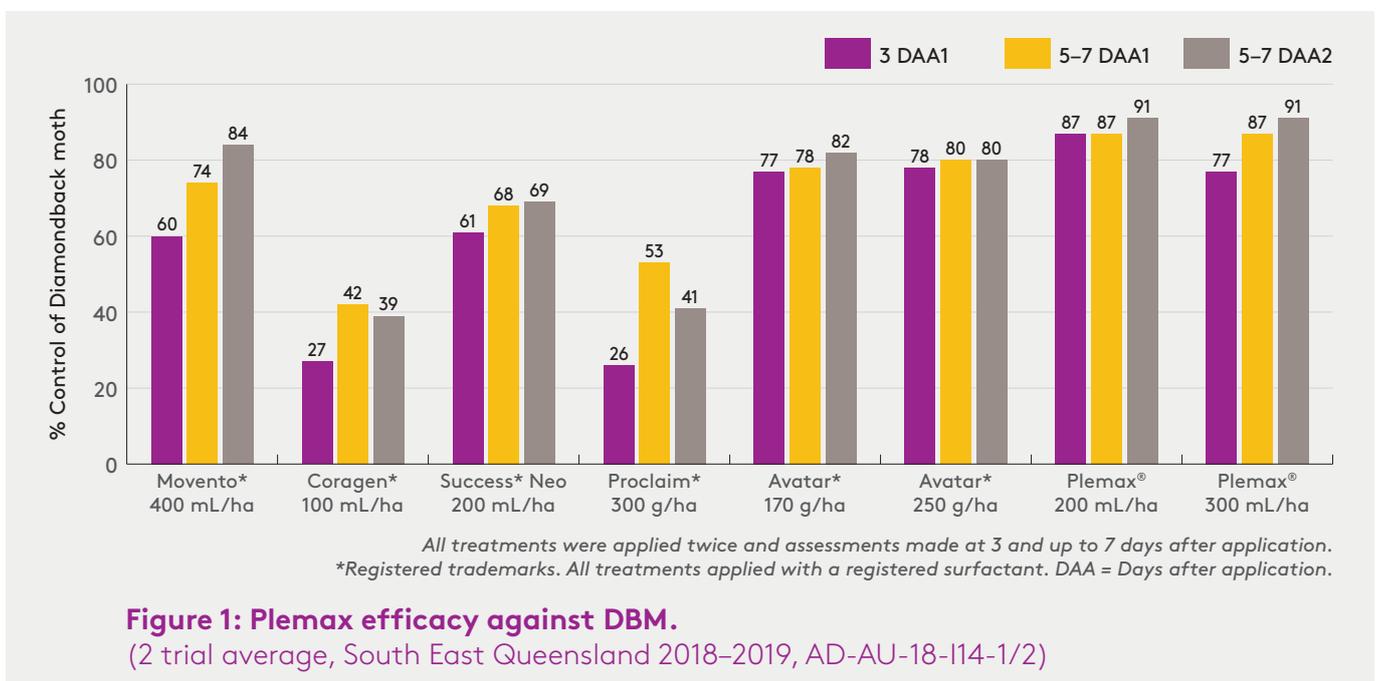


Figure 1: Plemax efficacy against DBM.

(2 trial average, South East Queensland 2018–2019, AD-AU-18-I14-1/2)

Heliothis

Heliothis (*Helicoverpa armigera* and *H. punctigera*) feed on hundreds of plant species, including all major vegetable crops grown in Australia. Cotton bollworm (*H. armigera*) is considered the more serious pest in Australia, as it has the ability to rapidly develop resistance to insecticides, a broader host range and survives within cropping regions from season to season. Populations tend to be localised, with northern growing regions experiencing high pressure during warmer months of the year. There is widespread resistance to carbamates, OPs and SPs; and emerging resistance to diamides (e.g. chlorantraniliprole) and indoxacarb. In recent years, the incorporation of selective insecticides, area-wide management, spray windows and use of parasitoids such as *Trichogramma* spp. are improving management of Cotton bollworm. Native budworm (*H. punctigera*) is less economically significant, has a narrower host range and does not infest grass species. Populations are more variable between years as they are a migratory species that breeds on flowering plants in inland Australia during winter months rather than pupating locally in high numbers like Cotton bollworm.

Targeting Heliothis with Plemax

- Regularly monitor crops for eggs and larvae. Additionally, Trapview can be used to monitor the activity of DBM adults.
- Application should be timed to target eggs or newly-hatched larvae before they become entrenched within the crop.
- Do not apply if crop monitoring indicates high levels of predators present and/or parasitism from *Trichogramma* spp. and economic thresholds have not been exceeded.
- Apply up to three applications of Plemax per crop, with a maximum of two consecutive applications. If applying three Plemax sprays in a season, do not apply any additional products containing indoxacarb (e.g. Avatar*).
- Use the higher rate under higher pressure to improve residual control and use a minimum spray interval of seven days between applications under high pressure scenarios.
- Use of Plemax is subject to a Croplife Australia resistance management strategy for Heliothis in tomatoes. Please review this strategy before using Plemax.



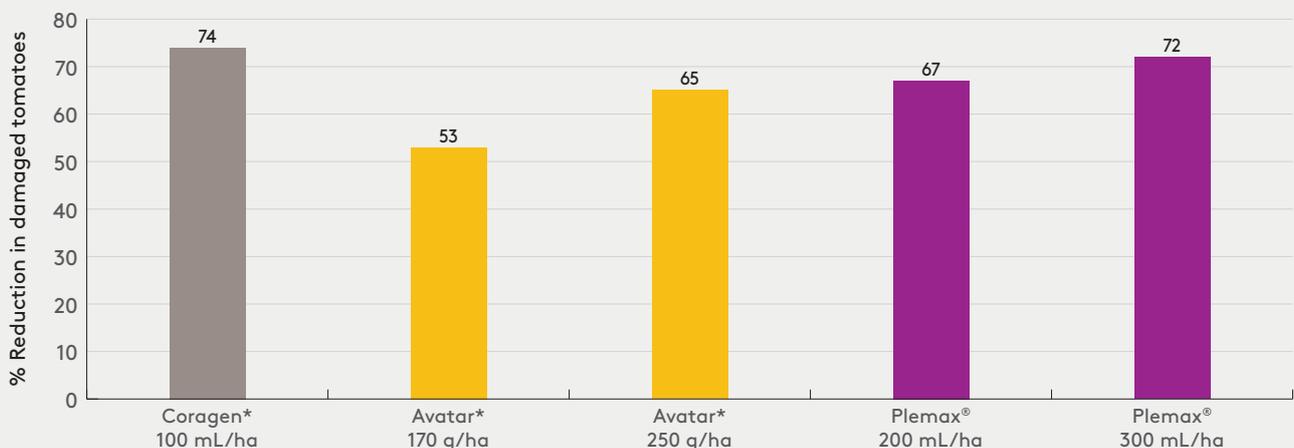
Cotton bollworm caterpillar.



Cotton bollworm adult.



Cotton bollworm damage to tomato fruit.



*Registered trademarks. All treatments applied with a registered surfactant.

Figure 2: Plemax efficacy against Cotton bollworm in tomatoes.
(3 trial average, FZ-14-I06, FZ-13-I08 & AD-AU-16-I02-3)

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Registered uses

Crop	Pest	Application rate
Brassica crops: Broccoli, Brussels Sprouts, Cabbage (closed head varieties only), Cauliflower	Cabbage white butterfly Cotton bollworm Native budworm	200 mL/ha
	Cabbage cluster caterpillar Centre Grub Cluster caterpillar Diamondback moth	200 to 300mL/ha
Leafy vegetable crops: Chicory, Cress, Endive, Fennel, Kale, Lettuce (closed head and leafy varieties), Mustard, Silver Beet, Spinach and Chinese Leafy Vegetables (Bok Choy, Choy Sum, Chinese Cabbage)	Cabbage white butterfly Cotton bollworm Native budworm Cabbage cluster caterpillar Centre grub Cluster caterpillar Diamondback moth	200 mL/ha
Fruiting vegetable crops: Eggplant, Peppers (Capsicum and Chilli), Tomato (trellis and field)	Cotton bollworm Native budworm	200 to 300mL/ha or 20 mL/100 L dilute
	Potato moth (Tomato leaf miner)	200 mL/ha or 20 mL/100 L dilute

Application

Plemax should be applied after careful monitoring of pest populations to determine the need for application based on local thresholds and to ensure the correct timing of application. More than one application of Plemax may be required to control a pest population. Where multiple applications are required, Plemax should be used in rotation with other modes of action. Plemax has only a short-term impact on beneficial insects when used in accordance with the label directions and can be incorporated into IPM programs that are using beneficial arthropods.

Mixing

Use only clean water. Half fill the spray tank with clean water and add the appropriate amount of Plemax directly to the spray tank. DO NOT pre-mix or slurry. Agitate and add other companion products or surfactant, then completely fill the tank with water. Mix thoroughly and continue mechanical or hydraulic agitation. Use the prepared spray immediately. DO NOT store the spray mixture or allow it to sit for a period of time without agitation.

Spray volume

Thorough coverage is essential. Adjust water volumes to crop stage and size to obtain point of run-off (200-1000 L/ha). DO NOT apply Plemax using ultra low volume (ULV) methods. Applying larger droplets (150-200 micron diameter) reduces drift potential but will not minimise drift if applications are made improperly or under unfavourable environmental conditions. Larger droplets may reduce the effects of evaporation.

Surfactant / wetting agent

Crop	Recommended surfactant / wetting agent
Eggplant, Peppers (Capsicum and Chilli), Leafy Vegetables and Chinese Leafy Vegetables, Tomato	Use a non-ionic surfactant / wetting agent at 15 g active/100 L (e.g. Agral* 600 or Shirwet* 600 at 25 mL/100 L).
Broccoli, Brussels Sprouts, Cabbage, Cauliflower	Use a non-ionic surfactant / wetting agent at 75 g active/100 L (e.g. Agral* 600 or Shirwet* 600 at 125 mL/100 L).

DO NOT add a non-ionic surfactant/wetting agent if mixing with another product that already contains a surfactant and/or the product label advised not to add a surfactant; or if mixing with a liquid fertiliser. DO NOT use BS1000* or Activator-90*, as they may cause crop phytotoxicity.



Scan here for more information

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