



Hard hitting control of Heliothis, Diamond Back Moth (*Plutella*) and Loopers in broadacre crops from multiple toxin activity

DiPel SC is a biological insecticide based on naturally occurring *Bacillus thuringiensis* (Bt). It contains a unique combination of five naturally produced toxins that set it apart from other Bt's. DiPel SC is well known for its hard hitting results on many caterpillar species delivered by these powerful toxins. With zero affect on beneficial insects, bees and the environment, DiPel SC is the first choice when controlling caterpillars in an extensive range of broadacre crops.

- **DiPel SC controls a wide range of lepidopteran larvae in:**

Canola, Chickpeas, Soybeans, Lucerne, Faba beans, Adzuki beans, Field peas, Lentils, Linola, Linseed, Lupins, Mungbeans, Navybeans, Pigeon peas, Safflower, Sunflower, Vetch and Sorghum

- **Soft option that will not harm bees or beneficial insects**



- **Powerful control of larvae that may have become resistant to standard chemistry**
- **Nil withholding period**
- **Will not harm mammals or fish**
- **Highest quality formulation**
- **Excellent storage stability**



DiPel[®] SC

Hard hitting control of Heliothis, Diamond Back Moth (*Plutella*) and Loopers from multiple toxin activity

DiPel SC has a unique toxin profile.

DiPel SC has five unique toxins naturally produced that set it apart from other Bt's. The five toxins provide multiple modes of action to control hard to kill caterpillars whilst reducing the risk of resistance developing even after under multiple applications in one season.

Bt toxins – Gene profile

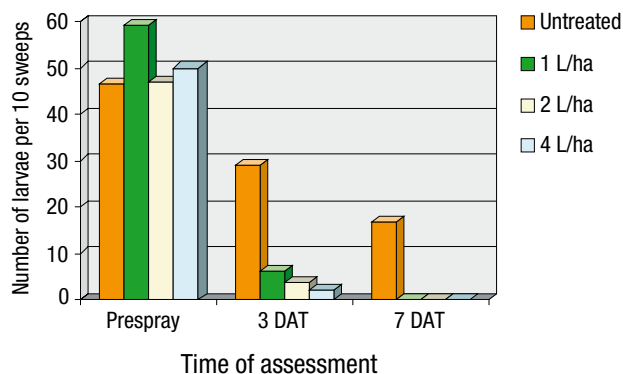
	1Aa	1Ab	1Ac	IIA	IIB
DIPEL SC	X	X	X	X	X

DiPel SC will provide control of the following caterpillar pests:

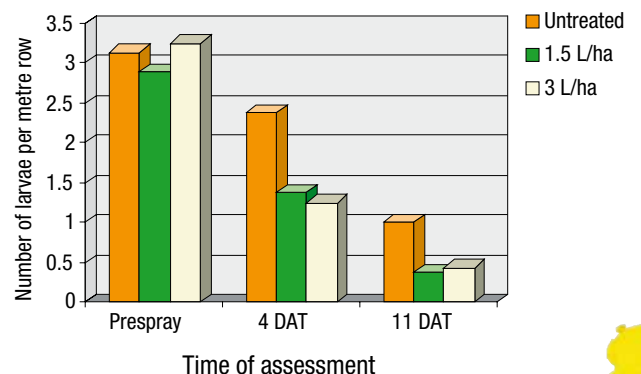


- Diamond back moth: *Plutella xylostella*
- *Helicoverpa* spp.: *Punctigera* and *Helicoverpa armigera*
- Armyworm: *Spodoptera* spp.
- Cabbage white butterfly: *Pieris rapae*
- Green looper: *Chrysodeixis erisoma*
- Pear looper: *Ectropis excursaria*
- Soybean looper: *Thysanoplousia orichalcea*
- Tobacco looper: *Chrysodeixis argentifera*

Results of a trial controlling Diamond back moth (*Plutella xylostella*) on canola in West Australia with DiPel SC at 1, 2 and 4 L/ha



Results of a trial controlling a mixed population of 88% cotton bollworm (*Helicoverpa armigera*) and 18% native budworm (*Helicoverpa punctigera*) on mungbeans in Queensland with DiPel SC



How to get the best from DiPel SC on Broadacre crops

DiPel SC is a biological insecticide containing Bt spores and crystal toxins that affect the mid-gut lining of lepidoptera larvae. DiPel SC therefore needs to be eaten by the larvae and is not a contact insecticide. Once the larvae ingest DiPel they cease feeding almost immediately, but make take one or two days to die.

Crop Monitoring

DiPel SC is most active when applied to the crop when larvae are hatching and are in the early growth or 1st instar stage. Crop must be monitored regularly for moth eggs or early larval stages to ensure applications can be made at the correct time.

Application Timing

Application should occur when eggs are just hatching. Applying too early may result in inadequate DiPel SC being left to prevent crop damage, or new leaf material being produced without protection. Late applications may result in larvae being treated beyond the optimum time for quick knockdown. Again, crop damage may result.

As larvae must ingest DiPel SC for it to be effective, application of DiPel SC must be made before larvae move into areas where the spray does not reach (i.e. sheltered positions such as, pods, deep canopy, etc.)

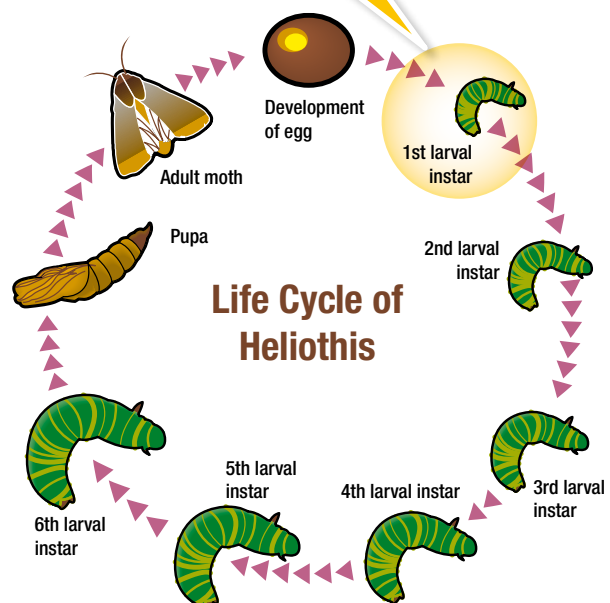
Application

Thorough coverage of all plant surfaces is critical to ensure that the larvae will consume the toxin. A total volume of at least 100 L/ha for ground application and 30 L/ha for aerial application is recommended. The pH of the spray mixture should be below 8.0.

Trials have indicated that the addition of some feeding attractants to DiPel SC may increase larval mortality.

Applications are best made late in the afternoon or early evening reducing exposure to UV light. Warm conditions during and after application are beneficial to increasing the activity of DiPel SC.

DiPel SC is active on all larval stages but is most lethal on 1st larval instars



CROP	PESTS	RATE	CRITICAL COMMENTS
Pulse crops and Oilseed crops including: Adzuki beans Canola Chickpeas Faba beans Field peas Lentils Linola Linseed Lucerne Lupins Mungbeans Navybeans Pigeon peas Safflower Soybeans Sunflower Vetch Sorghum	Lepidopteran larvae susceptible to DiPel including: Armyworm (<i>Spodoptera</i> spp.) Cotton bollworm (<i>Helicoverpa armigera</i>) Native budworm (<i>Helicoverpa punctigera</i>) Cabbage moth (<i>Plutella xylostella</i>) Cabbage white butterfly (<i>Pieris rapae</i>) Green looper (<i>Chrysodeixis eriosoma</i>) Pear looper (<i>Ectropis excursaria</i>) Soybean looper (<i>Thysanoplusia orichalcea</i>) Tobacco looper (<i>Chrysodeixis argentifera</i>)	1.0 - 4.0 L/ha (Refer to Application section for water volumes)	<p>DiPel SC is a highly selective insecticide for use against caterpillars (larvae) of lepidopterous insects. Close scouting and early attention to infestations is highly recommended. Larvae must eat deposits of DiPel SC to be affected. Close crop monitoring, timing of applications to the most susceptible pest life stage and thorough spray coverage of the crop are all essential to achieve an efficacious result. Important Note: Users should not expect high levels of efficacy where the optimum conditions (see below) for use are not possible.</p> <p>Users may need to consider alternative control methods where conditions are not optimal, or when pest pressure is high and where crops may be sensitive to damage. The suitability of DiPel SC as a control measure for each crop should be determined through consultation with local industry advisers, company representatives or small scale tests before treatment of a large area or number of plants begins.</p> <p>CROP MONITORING: Crops must be monitored regularly for lepidopteran eggs or first instar larvae (small caterpillar stage) to ensure applications can be made at the correct time.</p> <p>APPLICATION TIMING: Time the commencement of spraying to coincide with egg hatch or treat FIRST instar larvae and before damage to the plant occurs. Applications to later instar larvae or mixed populations of first and later instars are unlikely to produce acceptable levels of control. As larvae must ingest DiPel SC for it to be effective, application of DiPel SC must be made before larvae move into areas where the spray does not reach (i.e. sheltered positions such as bolls, pods, deep canopy). Application to crops where fruiting structures or dense canopies are present is therefore also not recommended unless good coverage is still possible and some level of crop damage can be tolerated.</p> <p>The activity of DiPel SC commences to decline immediately after application. Under continual pest pressure a minimum of 2 sprays separated by no more than 3 days initially, and then reapply at 3 - 5 day intervals as required. Spray late in the afternoon or early evening (before dew begins to settle) when larvae are actively feeding. Reapplication after rainfall or overhead irrigation may be necessary.</p> <p>SPRAY COVERAGE: Thorough spray coverage is needed to provide a uniform deposit of DiPel SC at the site of larval feeding. Larvae must be actively feeding on treated, exposed plant parts. Ensure complete and thorough coverage of all plant surfaces. A non-ionic wetting agent such as Agral may need to be used on difficult to wet plants.</p> <p>APPLICATION RATES: Use the higher rates of DiPel SC for higher egg laying activity, longer residual or larger first instar larvae. Higher rates should also be used against <i>Helicoverpa</i> spp. Control of <i>Helicoverpa</i> is most effective if larvae are less than 8 mm long. Control of <i>Spodoptera</i> is most effective if larvae are less than 15 mm long.</p> <p>GENERAL: Larval control is only achieved when the larvae ingest DiPel SC and activation begins in the alkaline gut. Feeding ceases once the larvae ingest DiPel SC and death of treated larvae may take up to 3 - 5 days. Under low temperatures, when larvae are less actively feeding, control may be slower. DiPel SC is safe to beneficial arthropods and is best used in conjunction with these beneficial species (e.g. <i>Trichogramma</i> spp. parasitoids). To obtain maximum assistance from beneficial arthropods, avoid the use of broad spectrum insecticides before and during the use of DiPel SC. DiPel SC should be used in an Insecticide Resistance Management Strategy.</p>



For further information

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