Fastac Duo
An Australian guide to pest management

BASF
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This guide is designed to be used in conjunction with the product label provided. Please refer to inside back cover for the complete FASTAC Duo label. If your copy is missing - contact BASF Australia Ltd on 1 800 501 940 for further information.
A Remarkable Insecticide

FASTAC™ Duo is a contact and residual synthetic pyrethroid insecticide. It can be used as a protective treatment when applied at regular intervals or as a knockdown treatment to control existing infestations. The product can be applied mixed either with water carrier or oil based bulking agents such as D-C-TRON® cotton spray oil or compatible ULV products.

Some Advantages

- One formulation for all applications: EC or ULV.
- “Environmentally, the best insecticide we have ever made.”
- Active against most commercially important pests.
- Effective against many insects resistant to other non-synthetic pyrethroid insecticides.
- Can be used on a wide variety of crops which allows year round usage.
- Can be used as a high volume, low volume or ultra low volume application.
- Has repellent and antifeedant effects.
- Low dose rates minimise the environmental impact.
- Minimal hazard to non-target species.
- Convenient pack sizes of 5L, 20L and 200L.
- New armyworm control rate in winter cereals.
- New registration for RLEM bare earth pre-emergent control.
Low Volume and High Volume applications by ground rig or aircraft when FASTAC Duo is applied with a water carrier:

FASTAC Duo can be applied by ground or aircraft with a water carrier. Thorough coverage is essential to ensure adequate control. Always apply with a non-ionic surfactant unless detailed on the label or a tank mix partner. Apply during the cooler part of the day or night.

Ground application - water carrier:
For low volume spraying of field crops with ground rigs, use a total volume of 50-200 L/ha, except for sweet corn, tomatoes and tobacco where higher volumes should be used. Drop arms should be used on ground rigs in row crops taller than 30 cm (0.3 m). The application should be made as a fine spray, preferably using hollow cone nozzles, unless otherwise directed in the Critical Comments.

Aerial application - water carrier: Use a minimum spray volume of 20 L/ha. For spring/early summer application to cereals, linola, canola, rice and to other dense crops, apply in a total spray volume of 30 to 35 L/ha. If possible, spray in a crosswind. Avoid spraying in calm conditions or when wind is light and variable in direction. Apply as a spray of 100-150 microns VMD. Do NOT apply to trellis tomatoes by aircraft.

Ultra Low Volume (ULV) application by aircraft:
FASTAC Duo, mixed with D-C-TRON cotton spray oil or other compatible products should be applied in a minimum total spray volume of 1.5 L/ha. It should only be applied by aircraft with suitable equipment to provide a droplet size of approximately 80-100 microns VMD. Applications should be made during the cooler parts of the day or night. Avoid application in calm or very windy conditions. Preferably apply in light to moderate cross winds.

Misting machines:
These, generally will NOT provide the same level of control as a boom due to poor coverage, so are not recommended.

Surfactant:
The addition of a non-ionic surfactant at label rates per 100 litres of spray mix will improve droplet deposition and control when using a water carrier.

Rainfastness:
Best results are obtained if heavy rain does not occur within 6 hours after application.

Length of Control:
FASTAC Duo kills pests through contact and ingestion. The active ingredient in FASTAC Duo, alpha-cypermethrin, is only slightly soluble in water and therefore is not degraded in the same manner as other insecticides.

Compatibility:
Low Volume and High Volume applications by ground rig or aircraft when FASTAC Duo is applied with water carrier:
This product is compatible with Dithane M45, dicamba, Kalthane EC, Kocide, NUDRIN Insecticide, NUDRIN 225, Parathion 500 EC, Parathion M500, Predator '300, Ridomil, Wuxal, Select, dimethoate, paraquat, diquat, glyphosate, Tigrel, Jaguar, simazine, SPINNAKER, 2,4-D amine and ester, 2,4-DB and MCPA. Do NOT mix FASTAC Duo with wettable powders and water dispersible granules BEFORE addition to the spray tank. FASTAC Duo can be mixed with Dithane WDG providing the mixture is agitated efficiently and used immediately.

Ultra Low Volume (ULV) application by aircraft:
This product should be used only with specific ULV formulations of other insecticides, e.g. NUDRIN 225, Predator 300 and PBO synergists, when mixed according to the directions on the PBO synergist labels.
**Fastac Duo**

**Mixing:**
FASTAC Duo mixes readily with hard and soft water. Add the required quantity of FASTAC Duo to water under agitation. Do not allow mixed solution to stand for longer than 16 hours. In extremely alkaline water (pH9), spray immediately after mixing, or use a proprietary neutralising agent.

**Environmental considerations:**
FASTAC Duo is of low hazard to the user and the environment when used in accordance with label directions.
Always consult the label for full application instructions.

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**More Pests More Crops.**
**- A Truly Versatile Insecticide.**

### Registered Pests
- Aphids
- Apple Weevil
- Banksia Moth
- Blackheaded Pasture Cockchafer
- Blue Oat Mite
- Bollworm
- Brown Pasture Looper
- Cabbage Moth
- Cabbage White Butterfly
- Cluster Caterpillar
- Common Armyworm
- Cutworm
- Garden Weevil
- Green Mirid
- Grey Cluster Bug
- Helicoverpa armigera
- Helicoverpa punctigera
- Pea Weevil
- Plague Locust
- Plague Thrips
- Redlegged Earthmite
- Rough Bollworm
- Rutherglen Bug
- Sorghum Midge
- Southern Armyworm
- Tasmanian Eucalyptus Leaf Beetle
- Tobacco Looper
- Vegetable Weevil
- Webworm
- Wingless Grasshopper

### Registered Crops
- Banksia
- Broccoli
- Brussels Sprouts
- Cabbages
- Cauliflowers
- Chinese Cabbage
- Canola
- Cereals (winter)
- Cotton
- Eucalypt Plantations
- Field Peas
- Grape Vines
- Kale
- Kohlrabi
- Lettuce
- Linola
- Linseed
- Lucerne
- - (Seed and Forage crops)
- Lupins
- Maize
- Mung Beans
- Navy Beans
- Pastures
- - (Legume & Grass Based)
- Pome Fruit
- Rice
- Sorghum
- Soybeans
- Stone Fruit
- Sun Flowers
- Sweet Corn
- Tobacco
- Tomatoes
- Turnips
FASTAC Duo

Environmentally the best insecticide we have ever made...

An Overview

FASTAC Duo is a highly active synthetic pyrethroid insecticide used at relatively low rates of application. At these rates, FASTAC Duo controls a wide range of pests on most of the world's economically important crops.

Note: Reference is made to the original FASTAC® 100 EC formulation in these environmental studies. The same conclusions apply to FASTAC Duo; so to avoid confusion FASTAC Duo is referred to in this section.

It is known that FASTAC Duo and compounds related to it are not hazardous to birds and mammals when used as recommended. However, their high level of biological activity suggest that they might put at risk non-target species such as honey bees, insect predators and fish in waterways near farms. A series of extensive studies was set up, several of them unique, to investigate the behaviour of FASTAC Duo in relation to the environment. These studies demonstrated that, despite its high level of activity against pests, FASTAC Duo, when used as recommended generally has little effect on non-target species.

Despite toxicity to bees in the laboratory - extensive field tests have established that Fastac Duo has no adverse effects either short or long term when used under field conditions. This is because of the very low rates FASTAC Duo is used at in field applications, and by the fact that freshly sprayed FASTAC Duo deposits repel bees so they quickly move away from the area being sprayed.

Similarly, FASTAC Duo is toxic to fish in laboratory test but has been shown to have no significant effect on them in natural water. This is again partly because of very low dose rates but also because of the unusual physico-chemico properties of FASTAC Duo. Combined, these factors prevent all but extremely low concentrations of FASTAC Duo passing into the sub-surface water.

Environmental studies have also shown that at the rates used for insect pest control in crops, FASTAC Duo has less effect on beneficial insects like chalcid wasps than many other widely used insecticides.

These studies have demonstrated that despite the high intrinsic level of activity of FASTAC Duo, it has a minimal effect on non-target species under practical conditions of use. FASTAC Duo therefore offers a definite advance in insecticides suitable for both conventional pest control and pest management systems.

Beneficial arthropods such as dragonflies, spiders and hymenopterous parasites, show only transient or no effects from exposure to FASTAC Duo.

Honey Bees

For the farmer, foraging honey bees pollinate his crops; for the bee keeper, large areas of crops like canola dramatically increase his honey production. But if the crop is attacked by pests during the flowering period the farmer needs to spray. Because FASTAC Duo can be used to control many pests of flowering crops, considerable effort has been put into establishing its safety to honey bees. A sequence of detailed experiments were carried out, beginning with simple laboratory tests and progressing stage by stage to large-scale field trials to prove this.

FASTAC Duo is known to have a deterrent effect on foraging bees for a short period of time after spraying. Risk to bees is reduced by spraying in early morning and late evening while bees are not foraging.
Honey bees are frequently attracted to cereal crops where they forage honeydew secreted by aphids. Unlike nectar and pollen, which are normally protected by flower petals, aphid honeydew is exposed and can be contaminated if the crop is sprayed.

In the wheat study, bee hives were put inside large mesh covered tunnels placed over a crop of wheat. A sugar solution which simulated aphid honeydew was then sprayed on the crop. Once the bees were used to foraging the sugar solutions, insecticides were applied to two-thirds of the enclosed area. The rest was left untreated so the bees could choose it as an alternative area for foraging and thus show if they were repelled by any of the sprays which were used. The data showed that none of the three dose rates of FASTAC Duo, even the highest, which was up to three times the expected European commercial dose nor pirimicarb, produced any increase in bee mortality. Dimethoate, on the other had, caused large numbers of bee deaths - over 50 per cent of the total population of the hive. Residue levels of FASTAC Duo in honey and in wax collected from the hive exposed to two FASTAC Duo applications were very low.

Foraging activity was greatly reduced in the areas of the tunnels treated with FASTAC Duo or pirimicarb but it continued at almost normal levels in the parts of the tunnels which had not been treated, thus demonstrating the repellent effect of fresh deposits of these compounds. Foraging stopped in both the treated and the untreated parts of the tunnels sprayed with dimethoate, but returned to normal after 24 hours.

Beneficial Invertebrates

The value of bees to man is well known, but there are many other useful invertebrates. Earthworms, for example, improve soil fertility, while predatory and parasitic insects can help keep pests in check.

Predator/prey systems range from simple relationships such as the use of the parasitic chalcid wasp, Encarsia formosa, to control whitely in glasshouses to relatively complex interactions between whole groups of predatory and plant-eating species of invertebrates found in large-scale arable crops. Whatever the case, it is clearly to man's benefit to exploit the activities of useful species.

Earthworms

The toxicity of FASTAC Duo to earthworms was assessed under laboratory conditions using a simple test method. The test involves keeping batches of worms for 14 days in a standard artificial soil into which known concentrations of the test chemicals have been mixed. The worms are thus in direct bodily contact with the chemicals and they also ingest contaminated soil. By testing a chemical at a range of concentrations, mortality data can be used to calculate LC50 values.

FASTAC Duo was tested at various concentrations. Even at the highest rate, in the top millimetre of soil, no worms died. As this is higher than the highest Australian commercial dose rate, it seems safe to conclude that the normal use of FASTAC Duo will not be a hazard to earthworm populations.

The Chalcid Wasp

The chalcid wasp, Trichogramma cacoeciae, parasitises the eggs of a range of Lepidoptera including armyworms, bollworms and stalk borers such as Spodoptera, Heliothis and Ostrinia spp. Trichogramma is one of the most successful of all arthropod biological control agents. Laboratory reared specimens are used in mass release programmes to control pest populations.

Laboratory tests show that nearly all synthetic insecticides so far tested are highly toxic to adult chalcid wasps under laboratory conditions. In practice, crops are sprayed when many of the wasps are in the preadult stages is critical as far as the future population of the parasite is concerned.

A laboratory test was developed to compare the effects of FASTAC Duo on preadult Trichogramma with those of other widely used insecticides.

1 - Reference: FASTAC and the Environment, published 1983
By monitoring the emergence of wasps from the eggs and then their ability to parasitise fresh supplies of eggs, the test investigates the effect of the chemicals on the ‘beneficial capacity’ of Trichogramma rather than simply on its survival.

The effect of FASTAC Duo was compared with that of endosulfan. FASTAC Duo had only a minor effect on the emergence of the parasites and on their beneficial capacity, where endosulfan was highly toxic to the wasps. FASTAC Duo can therefore be classified as harmless to preadult Trichogramma.

A five-year study along with other field trials data reveal no evidence that FASTAC Duo treatments had any long term adverse effects on any of the beneficial taxa studied. The major beneficial groups included parasitic wasps, and the important predatory groups included ground beetles (Carabidae), rove beetles (Staphylinidae) and money spiders (Linyphiidae). Generally, the other insecticides used in the trials had more effect than FASTAC on beneficial foliage dwelling arthropods.

Aquatic Organisms
Tests with the invertebrate zooplankter, Daphnia magna, and the rainbow trout, Onchorhynchus mykiss, in pristine water showed that, as expected, FASTAC Duo has a high level of acute toxicity under laboratory conditions. This high toxicity under laboratory conditions is common to all pyrethroid insecticides and indicates potential hazards.

Further studies were set up to find out how serious these potential hazards might be in practice and to investigate the likelihood of long term problems or of any sub-lethal effects.

Both the fish and Daphnia test showed there were no significant chronic or sub-lethal toxic effects from prolonged exposure to FASTAC Duo.

The limited and transient nature of FASTAC Duo’s effects on invertebrate populations when used under commercial conditions contrast with its high level of acute toxicity in the laboratory.

Analysis of the pond and ditch water during the small plot experiments and commercial scale aerial spraying trials showed that concentrations of FASTAC Duo in the water were always lower than early predictions had suggested. The hydrophobic nature of alpha-cypermethrin and its very low water solubility, coupled with the very low application rates, results in low concentrations of FASTAC Duo in the body of the water. In addition, alpha-cypermethrin molecules are adsorbed strongly onto the surface of organic matter in ponds and waterways. This, and natural degradation, tends to lower the concentration in the water even further.

Summary
Environmentally FASTAC Duo has shown that despite its high level of activity against pests, when used as recommended, it generally has little effect on non target species.
Insecticide Resistance

For insecticide resistance management FASTAC Duo is a Group 3A Insecticide. Some naturally occurring insect biotypes resistant to FASTAC Duo and other Group 3A insecticides may exist through normal genetic variability in any insect population. The resistant individuals can eventually dominate the insect population if FASTAC Duo or other Group 3A insecticides are used repeatedly. The effectiveness of FASTAC Duo on resistant individuals could be significantly reduced. Since occurrence of resistant individuals is difficult to detect prior to use, BASF Australia Ltd accepts no liability for any losses that may result from the failure of FASTAC Duo to control resistant insects. FASTAC Duo may be subject to specific resistance management strategies. For further information, contact your local supplier, BASF Australia Ltd representative or local agricultural department agronomist.

In NSW and Qld, application of this product to Helicoverpa armigera larvae longer than 5 mm may not only be ineffective but it may increase the level of synthetic pyrethroid resistance. This product should NOT be used to treat infestations that were not controlled by an earlier application of it or another synthetic pyrethroid.

Infestations not controlled by this product should be treated with an insecticide from another chemical group. Application of this product with an insecticide from another chemical group such as NUDRIN will assist with the management of synthetic pyrethroid resistant Helicoverpa armigera.
### Recommended Spray Timing Schedule - Eastern States

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Please refer to your label for a complete list of crops, pests & application schedules.
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Please refer to your label for a complete list of crops, pests & application schedules.
A survey commissioned by the Australian Wool Corporation during the late 1980’s revealed that redlegged earth mite (RLEM) and blue oat mite (BOM) were the most damaging pests of pasture in Australia, resulting in over 200 million dollars in lost production to the sheep and wool industry alone. Another survey by the Kondinin Group from Western Australia, in 1995 showed that Australian graziers still rate RLEM as their major pasture pest. These surveys indicate that adequate control measures may not have been undertaken, either as a result of incorrect chemical choice or incorrect application timing. The following information deals with these topics.

RLEM are believed to have been introduced from South Africa and were first recorded in Western Australia in 1917.

Redlegged earth mite (RLEM) and blue oat mite (BOM) are sap sucking mites which can devastate both germinating and established pastures. They can kill seedlings by attacking the emerging coleoptile, and established pastures and can reduce production by up to 80% and seed set by up to 60%. Those plants which do survive have lower vigour and palatability.

Damage to plants generally occurs at a time when there is the greatest requirement for feed from grazing livestock, i.e. late autumn and early winter.

RLEM are generally pests of leguminous plants such as clovers and medicos, however they will also attack brassica crops such as canola and in seasons of favourable conditions, may attack cereals.

The objective of any insecticide is to manage the pest population in order to provide the greatest sustainable economic return. FASTAC Duo insecticide will provide excellent control of RLEM and BOM. However a basic understanding of the insect lifestyle and biology will confirm the correct timing of FASTAC Duo application for the greatest productivity increase.

Redlegged earth mite has a velvety black body and grows to about 1mm long with eight red legs as an adult. During the immature, or nymph, stage of its lifecycle, RLEM goes through several moults and only has six legs.

Blue oat mite are similar to RLEM with bluish-black and pink legs. BOM can be distinguished from RLEM by a small red blotch on the back.

RLEM hatch from the over-summering bodies of dead females which provide protection from high summer soil temperatures.

The eggs hatch approximately 19 to 20 days following 10 to 15mm of rainfall or irrigation and when day time temperatures of below 19°C have been recorded for 4 to 6 days. Being aware of these conditions, which are normally associated with the “opening break”, allows a relatively accurate determination of when damage and production loss in pastures is likely to commence.

Each over-summering dead female may contain 40 eggs, which will hatch over a three to four week period. Damage may initially be more severe on light soils which favour egg survival.

Once eggs have hatched, the nymphs go through several moults, which take three to five weeks. They then live as adults for another two to four weeks. Adults may commence egg laying approximately 28 days after hatching, thus establishing a new generation. A typical winter generation may cause significant damage for between 7 to 10 weeks.

Average population density of RLEM on legume pasture can be greater than 15,000 per square metre, or 150 million per hectare. Populations of over 10,000 per square metre have been recorded. When populations build up, earth mites become very mobile and may travel several metres in search of a desirable feed source. Paddock fence lines are no barrier to attack from RLEM. The population
diminishes during mid-winter when cooler conditions trigger the female to lay eggs. These eggs hatch in August/September as daytime temperatures increase, resulting in the spring generation.

The spring life cycle lasts about 4 to 5 weeks, half as long as the autumn/winter life cycle. Despite this shorter time frame, damage to pastures in the form of lost dry matter production and reduced seed set can have a devastating long term effect. If effective control of the winter life cycle is achieved, few females will survive to lay eggs for the next generation and therefore a problem is unlikely to occur in the spring. If control is to be attempted in the spring, spraying should commence early, before increasing temperatures encourage females to commence laying. Spraying in conjunction with spray-topping is often too late.

FASTAC Duo is a residual, synthetic pyrethroid insecticide which will provide control over the initial egg hatching period in the late autumn, thus providing long term control when used in accordance with label directions.

In the past, applications of an insecticide were often delayed until RLEM damage had been identified. This was probably necessary as the insecticide used may have only had a short residual or control period, or even required application to foliage to be effective. FASTAC Duo overcomes these shortfalls.

RLEM & BOM Damage

Damage is typically seen as whitening of leaves as the mites lacerate the leaf surface and suck out the sap, which is then replaced by air at the feeding site. If spraying is delayed until this damage is evident, pasture productivity is significantly reduced. In seasons of poor follow-up rains, after the opening break, many farmers notice that capeweed survives whilst clover content of the resulting pasture is poor. In many situations this is not only as a result of lower rainfall, but RLEM and BOM attack on stressed germinating and emerging seedlings.

<table>
<thead>
<tr>
<th>Weather Conditions and Spraying Times</th>
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<tr>
<td><strong>Weeks</strong></td>
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<tr>
<td><strong>Redlegged earth mite population</strong></td>
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<tr>
<td><strong>10-15mm rainfall</strong></td>
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<td><strong>followed by</strong></td>
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<td><strong>temperatures below</strong></td>
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<td><strong>&lt;11°C for 4-6 days</strong></td>
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**Optimum Spray Window**

The Solution

Apply Fastac Duo at the label rate within 1 to 3 weeks of initial egg hatch for best long term control. Spray when mites are actively feeding. Spray seedling crops if silvering or whitening (bleaching) is causing a reduction in crop growth.

Water Rates: Good coverage is essential to ensure adequate control.
REDLEGGED EARTH MITE
(Halotydeus destructor)
& BLUE OAT MITE
(Penthaeleus major)

- Bare earth control

Redlegged earth mite (RLEM) is one of the most economically significant insect pests encountered during the establishment phase of broadacre cereals, legumes, canola and pasture crops. Their attack generally coincides with the time of gemination and emergence of susceptible crops and results in the poor establishment of healthy, vigorous seedlings, which are required to ensure maximum yield potential. With particularly sensitive crops, such as canola and clover, complete decimation can be caused.

RLEM are sap sucking pests which lacerate the coleoptile, cotyledons and leaves of emerging seedlings. Their attack is insidious, as the pests are often unseen until poor emergence of the crop is noticed.

The Solution

FASTAC Duo is registered in canola, winter cereals, field peas, lupins and pastures for bare earth control of RLEM. It will provide excellent knockdown and residual bare earth control of RLEM.

The application of FASTAC Duo should occur to moist soil following sowing and prior to emergence of susceptible crops when RLEM are present. This will normally coincide with the hatching period.

Application to moist soil will provide residual control, as moisture is the mechanism for absorption of FASTAC Duo by RLEM. During periods of dry soil conditions, FASTAC Duo is absorbed to soil particles and not available to control pests. Continued periods of the soil surface becoming moist and then dry will result in more rapid degradation with several mornings of frost or dew, followed by fine sunny afternoons. At these times, frequent monitoring of the crop and if necessary the application of a knockdown treatment, will ensure desirable levels of control are maintained. (Refer to Table 1. on the previous page).

FASTAC Duo is compatible with pre-emergent herbicides such as simazine, Spinnaker, and metribuzin, to enable one pass herbicide and insect control. FASTAC Duo is also compatible with knockdown herbicides and insecticides such as dimethoate, which may be tank mixed for control of early infestations of lucerne flea.

NEW Registration:
100 mL/ha
- Pastures

The adult is a dark brown beetle approximately 1 cm long with a broad shovel-like head. It is sometimes mistaken for black beetle which attacks suburban household lawns.

The larvae are a grey to white, six-legged grub with a black to dark brown head capsule. Fully grown they are up to 2 cm long.

The adult beetles emerge from the soil in late December to early March following summer rainfall at which time they mate and commence egg laying. The female can produce between 30 to 80 eggs. Depending on soil moisture, beetles may lay eggs in greater densities on rising positions of paddocks which generally have the barest soil surface.

After 4 to 5 weeks the larvae hatch but do not move to the surface to feed on decaying organic matter until rain has fallen. If rainfall does not occur within 30 days of egg hatch, up to 50% of young larvae may die. Therefore wet summers are more likely to produce severe outbreaks than dry summers.

The first instar larvae only feed on organic matter. The second and third instar (late April to July) stages feed on green surface plant material and usually come to the soil surface after heavy rain or heavy dew. After larvae have come to the soil surface to feed, soil casts can be seen at the opening of their tunnels and fresh foliage may be found in their tunnels.

Larvae can store sufficient food in their tunnels for 6 to 8 days. If rain has not fallen for 9 to 10 days, the larvae will return to the soil surface to feed. Larvae store fat and reduce feeding from August on and then seal themselves in the bottom of their tunnels to pupate in November and December. The period of greatest larval activity and consequent pasture damage occurs from May to July, which coincides with the heaviest demand from the grazing animals for pasture feed.

An average infestation of 300-400 larvae per square metre can cause a 50%-70% reduction in winter pasture production and a 40%-50% loss of desirable pasture species production in spring.

Larval feeding preference is for legumes (clovers) then grasses and finally broadleaved weeds such as capeweed.

Cockchafer damage is multiplied when heavily infested pastures are dug up by birds such as crows and ibis in an attempt to feed.

Redheaded Pasture Cockchafer

Although less widespread than Blackheaded cockchafer, they cause significant damage, to annual pastures as the larvae are totally soil dwelling and feed on the roots of pasture plants.

The adult is a plump brown to black beetle approximately 13 mm long and 8 mm wide. The larvae are six legged grubs which grow to 25 mm long and have a red-brown head capsule.

Control: As the larvae are soil dwelling insects, efficient chemical control is not available.

If substantial numbers of larvae (in excess of 350 to 400 per square metre) are monitored at the time of opening rains, consideration should be given to the cultivation of the worst affected areas. The sowing of a cereal crop to compensate for the expected loss in pasture stock feed is advised.

The Solution

Apply FASTAC Duo at the label rate within 4 weeks of opening rains when larvae are less than 1 cm in length.

It is preferable to apply by boomspray in 60 to 80 litres of water per hectare as a fine spray producing a droplet size of 100-200 microns VMD. Spraying is most effective when larvae are detected and treated early.

Suspect paddocks should be dug after the first substantial rain in April/May and inspected to ensure grubs are present in sufficient numbers to warrant treatment.
Cereal crops

Aphids affect cereals by direct feeding on plants, and/or by transmitting barley yellow dwarf virus (BYDV). BYDV affects wheat, oats and barley and is spread by flying aphids. Direct damage occurs when colonies of 10-100 aphids develop on stems, leaves and heads, from seedling stage through to head filling. The degree of damage depends on the percentage of tillers infested, aphids per tiller, and the duration of the infestation.

Wheat/oat aphids vary from mottled yellow-green through to olive-green and dusky brown, to a blackish green. Colonies develop on the outside of tillers from the base upwards, on stems, nodes and backs of mature leaves, starting any time between late tillering and grain filling. Heavy infestations can blacken heads and flag leaves and are the aphids most commonly reported by farmers. Wheat/oat aphids are quite mobile and can drop to the soil and crawl to other plants. They cause yield losses by reducing grain weight and grains per head.

Winged aphids fly into crops from pasture grasses or other crops and start colonies of wingless aphids. Reproduction is rapid when weather conditions are favourable, leading to population outbreaks. Plants can become sticky with honey-dew excreted by the aphids. When plants become unsuitable or overcrowding occurs, winged aphids redevelop and migrate to other plants or crops. They can carry viruses in saliva or on their feeding tubes. BYDV damage is most serious after plant infection early in the season.2

The Solution
In southern areas, barley crops should be checked from late tillering onwards for wheat/oat aphids on stems, backs or leaves and in the crown. Crops expected to yield 3 tonnes/ha or more are most at risk.

Apply FASTAC Duo at the label rate. Sprays should be applied at 3 and 7 weeks after emergence to reduce aphid colonisation and the spread of BYDV. This will also reduce the effect of feeding aphid damage.

The use of FASTAC Duo to control the spread of BYDV has shown significant yield increases in trials conducted by the Western Australian Department of Agriculture.2 Strategic applications of Fastac Duo early post emergence at the first sign of aphid activity have proven to be a cost effective method of minimising the damage caused by BYDV.

2 Department of Agriculture, Western Australian Trials 1993 - M Grimm & D Pfeiffer
- Cereal crops

Cereal crops, especially oats and barley, are an attractive source of food for several insect pests.

Armyworm (barley grub) is the most destructive insect pest of these crops in Eastern and Western Australia.

The severity of outbreaks varies from year to year and district to district. Armyworm generally inflicts greatest damage to cereal crops during November or December when it “chases” moisture in the maturing crops and lops off heads. Substantial grain losses can result if the pest is not identified and controlled promptly.

The adult is a dark grey, night-flying moth with a wing span of 2 to 3 cm, and is normally seen during September and October. Armyworm can be distinguished from other moths by white streaks near the leading edge of the forewing and white lines near the far end of the forewing.

In pastures they may cause total loss of vegetation when moving as an army (normally early summer). In barley and oats, up to 70-80% grain loss may result from severe infestations over a five day period.

The moth lays eggs on grasses and cereal crops which hatch a week or two later, depending on weather conditions. Armyworms have three or four life cycles per year in cool wet areas. They survive over summer on self-sown cereals and grasses which germinate with summer rains.

In spring it takes about three weeks from when the eggs are laid for them to hatch and for the caterpillars to reach head-lopping size. The larvae when first hatched, are small pale caterpillars approximately 2mm long which change colour when feeding commences. They may feed for a week before causing economic damage. When mature, the grubs, may vary in colour from green to brown. Growing to 4 cm in length, they can be distinguished by three white stripes on the collar (behind head). The tail piece is always brown with three white longitudinal stripes.

The presence of grubs is indicated by pale yellow/green pellet-shaped droppings known as “frass” which can be found on the ground in the crop. Awns and other flowering parts are often found around or near frass. A sweep net or bucket can be used to sweep through the heads of the crop to assess grub numbers. In some situations, larvae lop heads at night, and may return to the soil during the day. In these situations, assess the level of damage already caused to the crop, and the days to harvest and base a spray decision on this.

The Solution

Apply FASTAC Duo at the label rate when sampling reveals 2 or more grubs per m².

One grub can cut off up to eight heads per night and therefore spraying should always occur when grubs are small and before head lopping commences.

Caterpillars are most active in cooler times of day. Spraying early morning or later afternoon will provide greatest knockdown.
- Field Peas

A pea weevil can be serious pest of field peas. If not controlled, it can cause significant yield losses and possible rejection of the load at the silo.

The adult weevil is a brownish chunky beetle, 4 to 5 mm long, which lays yellow cigar shaped eggs on young pea pods.

The adult weevil hibernates in overwintering sites such as under bark or trash around edges of paddocks. They emerge from these sites in early spring when temperatures rise above 18°C and fly to the nearest pea crop, where they feed on pollen for 5 to 15 days. The females then lay eggs on pea pods; these eggs hatch into larvae over a period of several days. The young larvae then bore straight into the pea pod.

Because insecticides can only control pea weevil larvae before they get inside the pods, it is critical to control the adult pea weevil prior to egg laying.

Pea weevil larvae feed and later pupate inside the pea seed. The adults emerge over several months from late December.

The Solution

As there is a nil tolerance to pea weevil in export peas, a high level of control is essential. This is why you should spray the whole paddock if populations exceed the economic threshold. A border spray may prove inadequate. Sweep netting is most effective at detecting pea weevil on calm, warm, sunny days.

Monitoring the outer edges of a pea crop with a sweep net should commence from very early flowering. Apply FASTAC Duo at the label rate when the population reaches one pea weevil in twenty five sweeps.
Native budworm are a pest of many crops. The young are voracious feeders as they attempt to rapidly gain body weight and store energy in preparation for metamorphosis to an adult moth. They may produce up to five generations per year.

The adult is a nocturnal, buff coloured moth with a wing span of 3 to 4.5 cm. The hind wings have a dark broad band on the outer margins.

Adult moths emerge from soil during Aug/Sept and usually live for two to four weeks. Female moths are capable of laying up to 1000 bronze coloured eggs.

The larvae grow to 5 cm long and vary in colour from green to almost black. They can be distinguished from other caterpillars by a broad yellow stripe which runs along the length of both sides of the body. Larvae hatch from eggs in 2 to 4 days and may feed for 4 to 6 weeks. The young larvae (less that 1 cm) prefer to eat foliage while the older larvae prefer pods. One larva may attack 4 to 5 pods before reaching maturity.

Field Peas and Canola*

* FASTAC Duo is registered to control native budworm in many crops. In this guide, field peas and canola only are referred to. Please consult the label for full directions for use.

The Solution

Apply FASTAC Duo at the label rate when grubs are small (less than 1cm) and before they commence boring into pods.

Crops should be monitored with a sweep net every 2 to 3 days from the start of flowering.

Spraying with FASTAC Duo should commence when sweeps collect 4 or more larvae in 10 sweeps. For larger larvae (10 mm long) use the higher rate.
Brown pasture looper  
\textit{(Ciampa arietaria)} - Pastures

Brown pasture loopers are major pests of legume pastures and minor pests of legumes, oil seeds and cereals. Loopers feed on foliage, capeweed being their favoured host. Young caterpillars feed on the leaf surface near the hatching site, whereas older caterpillars may migrate from adjoining paddocks. They will devour the entire leaf tissue leaving scalloped leaves, reducing plant density and vigour.

Loopers usually have only one life cycle per year. The adult lays small cream coloured eggs in autumn, these are usually laid in groups or rafts on dry grass stalks. The moth is a grey/coppery colour about 20mm long with delicate rounded wings and is strongly attracted to light.

The larvae is grey/brown to green in colour with black and cream longitudinal stripes. Young loopers move with a looping motion, however adults (40mm long) do not. The main period of activity is late autumn to early spring.

The Solution

Apply FASTAC Duo with a minimum of 50 litres of water per hectare when infestations reach an economically damaging level.

Cutworm  
\textit{(Agrotis ssp.)} - Cereals and Field Crops

Cutworm are a native insect pest of cereals and field crops.

The adult is a stout bodied moth with a wing span of approximately 3 cm.

The larvae live for about 1 month before pupating. They are characteristically smooth, plump and grey/green colour with a pink tinge. When fully grown, they can be up to 50mm long and curl up when disturbed. During the day they can be found just under the soil surface or in leaf litter, often close to a damaged plant and partly chewed leaves. They feed at night, chewing through emerged/emerging plants - often tucking the plant at ground level.

The Solution

Emerging and establishing crops should be checked for caterpillars crawling on the soil surface and feeding on seedlings in the late afternoon and evening.

Apply FASTAC Duo at the label rate with a minimum of 50 litres of water per hectare in the late afternoon or evening for best results.
OTHER PESTS

**Vegetable weevil (Listroderes difficilis)** - *Canola*

The adult has a typical weevil snout and is a dull, grey/brown colour approximately 10mm long with two small white blazes on its back. Larvae are yellow to green in colour with a flattened, slug-like body and a small brown head. Eggs are laid in autumn and develop into larvae in the winter. These larvae live up to two months before pupating. When the adults emerge, they feed until the summer when they hibernate until the following autumn.

**Webworm (Hednota spp.)** - *Cereals*

Webworm larvae are pale to deep brown, tinged by gut contents with a black or dark brown head. When fully grown, the larvae are approximately 15mm long. The larvae are often found in web lined tunnels from which plant parts may protrude. They can be seen above ground when conditions are cool and damp.

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The Solution

Pre-sowing:
Effective control can be achieved if webworm is identified in fallow. Apply FASTAC Duo at the label rate with a minimum of 100 litres of water per hectare. Do NOT apply to dense pasture. A minimum of 3 days should be left between spraying and sowing.

FASTAC Duo is compatible with Roundup™ and Spray Seed™.

Post Emergence:
Apply FASTAC Duo at the first sign of economic damage. If 25% of the plants show signs of damage, at or after emergence, spraying should not be delayed as the continued feeding will kill many plants, resulting in bare ground and thin areas. Most damage occurs within 3 weeks of emergence and during this period the crop should be inspected every 2-3 days.
CABBAGE MOTH
(Plutella xylostella)

- Brassica crops

Cabbage moth is potentially the most damaging of the caterpillar pests. With the expansion of areas sown to canola, the geographical spread of this pest, particularly during seasons with good finishing rains and temperatures exceeding 25°C, is expected to encourage rapid growth in the population of Plutella.

The adult is an active moth with a wing span of 12-13mm. The forewings are greyish-brown and definite diamond patterns are formed on the dorsal surface when the wings are folded; hence this pest is also known as Diamond back moth in many districts.

Eggs are greenish-yellow and disc shaped and just visible to the naked eye. They are laid singly or in clusters along the midrib on the underside of the leaf. Eggs hatch in 3-7 days. Larvae grow to about 12-13mm long, pale green, cigar-shaped and wriggle violently when disturbed. They sometimes lower themselves on silken threads.

The main attack occurs in maturing crops. The young larvae damage the leaves by feeding within them, whilst older larvae generally feed from the underside of the leaf. They remove all but the upper epidermis in patches on the leaf. The upper epidermis subsequently breaks into ragged holes. Larvae feeding on pods will cause significant damage in a short period of time.

The Solution

Apply FASTAC Duo at the label rate when adults are sighted in the crop in significant numbers or when the larvae present in the crop commence to cause appreciable damage to leaves and growth terminals.

When reinfestation is continuous, treatment every 7-10 days may be required. Add a non-ionic surfactant at the registered rate.
A locust outbreak, estimated to be four to six times larger than 1990, is forecast for 2000/2001.

The outbreak poses immense risks to growing crops and pastures in agricultural and pastoral regions of Australia. The permit extends the registered label for Fastac Duo to the onground control of locusts.

The key to successful control of the plague will be the application of effective insecticides (to control nymph locusts on the ground) in order to prevent the formation of flying swarms.

Adults of the Australian plague locust may be readily distinguished from other species by the large dark spot on the tip of the hindwings and distinctive scarlet hindleg shanks.

Adult body colour is variable and can be grey, brown or green. Adult males measure 25-30 mm long while females are 30-42 mm long.

The nymphs have five growth stages or instars. At each stage the developing wings become more noticeable. First instar nymphs are about 3mm long, pale brown to dark brown or black, and sometimes have a white stripe along the back of its first body segment just behind the head. Later instars are grey or brown and sometimes have a white stripe along the back.

Locusts pass through three main stages of development: egg, nymph (hopper) and adult. Locust eggs are laid in the soil. The female drills a hole into the ground using her ovipositor and lays a ‘pod’ of eggs which is sealed with froth. Locusts hatch from eggs as wingless nymphs.

Rainfall, which produces green vegetation, is necessary for nymphal and adult survival, adult migration and/or egg development. Egg laying usually follows either migration or rainfall. How long it takes for a locust to reach maturity depends on the species, conditions of the habitat and on temperature. In cool weather, nymphs and adults often attempt to increase their body temperature by basking in the sun.

NRA PERMIT FOR EMERGENCY USE OF A REGISTERED AGVET CHEMICAL PRODUCT - PERMIT NUMBER - PER3740.

The permit extends the registered label for FASTAC Duo to the onground control of locusts.

The Solution
The key to successful control of the plague will be the application of effective insecticides (to control nymph locusts on the ground) in order to prevent the formation of flying swarms.

Rate: 160 - 200 mL/ha.
**Safety Directions**

Poisonous if swallowed. Will irritate the eyes and skin. Facial skin contact may cause temporary facial numbness. Sensitive workers should wear protective clothing. Avoid contact with eyes and skin. Do NOT inhale spray mist. When preparing spray, wear cotton overalls buttoned to the neck and wrist, washable hat, elbow-length PVC gloves and face shield. If product on skin, immediately wash area with soap and water. If product in eyes, wash it immediately with water. After use and before eating, drinking or smoking, wash hands, arms and face thoroughly with soap and water. After each day’s use, wash gloves, face shield or goggles and contaminated clothing.

**First Aid**

If poisoning occurs, contact a doctor or Poisons Information Centre. Telephone 131126 Australia-wide. If skin contact occurs, remove contaminated clothing and wash skin thoroughly. Remove from contaminated area. Apply artificial respiration if not breathing. If in eyes, hold eyes open, flood with water for at least 15 minutes and see a doctor.

**MSDS**

Additional information is listed in the Material Safety Data Sheet.
Product Information Hotline: Free Call: 1 800 501 940

Customer Service: Phone: 1 800 635 550  Fax: 1 800 630 005

Website: www.agro.basf.com.au

Fax on demand service:
Phone: 0500 544 044 and have your fax number on hand
(Maximum call cost from within Australia, 60c per minute.
Higher charges apply for mobile and pay phones.)

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BASF
BASF Australia Ltd
ABN 62 008 437 867
Norwest business Park, 7 Maitland Place, Baulkham Hills NSW 2153.

Always consult the product label before use.