

# Bee aware of honey bees

## Minimising risks through working together

The cotton growing environment can be a high risk environment for bees. Periods of extended dry weather can make cotton one of the most attractive sources of pollen and nectar for honey bees, as pollen sources in native vegetation become increasingly scarce.

Cotton is recognised by the honey bee industry as a potentially useful feed source for bee breeding and honey production. The reduced reliance on insecticides in the cotton industry has increased the willingness of some hive owners to place bees in close proximity to cotton – meaning growers should be vigilant to the presence of honey bee hives in their area, particularly as honey bees can travel for up to seven kilometres in search of pollen and nectar.

Bees collect nectar from cotton's extra-floral nectaries (eg. under leaves) as well as from its flowers, so they may forage in cotton crops before, during and after flowering.

### Honey bees and insecticides

Bees are particularly susceptible to many of the insecticides still used in cotton production, such as fipronil, clothianidin, abamectin, indoxacarb and pyrethroids. There are no products for mirid control in cotton that are safe to bees. Even when products such as fipronil are used at well below label rates, toxicity to bees remains very high.

Toxicity to Bees	Cotton Insecticides
VERY LOW	Bt, NP Virus, Primicarb, PSO (Canopy), Methoxyfenozide, Etoxazole, Dicofof, Pymetrozine
LOW	Pyriproxyfen, Propargite, Amitraz
MODERATE	Diafenthiuron, Acetamiprid*, Imidacloprid, Thiodicarb*
HIGH	Indoxacarb*, Abamectin, Emamectin, Dimethoate (incl below label rates), Thiamethoxam, Methomyl*, OPs, SPs.
VERY HIGH	Fipronil (incl below label rates)
UNKNOWN**	Indoxacarb (below label rates), Chlorantraniliprole, Amorphous silica, Siprotetramat, Clothianidin

Data Source: British Crop Protection Council. 2003. The Pesticide Manual: A World Compendium (Thirteenth Edition). Where LD50 data is not available impacts are based on comments and descriptions. Where LD50 data is available impacts are based on the following scale: VERY LOW = LD50 (48h) > 100 ug/bee, LOW = LD50 (48h) < 100 ug/bee, MODERATE = LD50 (48h) < 10 ug/bee, HIGH = LD50 (48h) < 1 ug/bee, VERY HIGH= LD50 (48h) < 0.1 ug/bee.

\* Wet residue of these products is toxic to bees, however, applying the products in the early evening when bees are not foraging will allow spray to dry, reducing risk to bees the following day.

\*\* Indicates no data available for specific local species.

Table 1: The relative toxicities of cotton insecticides to honeybees (source: adapted from Cotton Pest Management Guide 2013/14, Table 3, pages 8 & 9)

Insecticides that are particularly toxic to bees are identified as such on the label through statements such as:

**Dangerous to bees. DO NOT spray any plants in flower while bees are foraging.**

These statements make clear the shared responsibility between hive owners and users of insecticide in the protection of bees.

The productivity of hives can be damaged if bees or the hives are contaminated. Bees can be killed or

contaminated while foraging in sprayed cotton crops, but damage may also occur if insecticides drift over hives or over neighbouring vegetation being foraged by bees.

### How toxic is the product I'm using?

The relative toxicities of cotton insecticides to honeybees are listed in **Table 1** (see page 1). This table ranks the acute toxicities of products to bees based on LD50 information. The residual toxicity of insecticides, that is, the amount of time the product remains toxic to bees after the time of application, should also be considered when information is available.

Active Ingredient	Trade Names	Residual toxicity to bees <sup>1</sup>	Comment
clothianidin	Shield		Residues may remain toxic to bees several days after application <sup>3</sup> .
fipronil	Regent, Albatross, Andcestor, Flak, Kaiser, Legion, Onslaught, Rhyme, Surefire Vista, Regal	7 to 28 days	Long residual. See label extract above.
betacyfluthrin	Bulldock Duo	>1 day	Longer residual expected in Australian conditions.
esfenvalerate	Sumi-Alpha Flex	1 day	
lambda-cyhalothrin	Limit, Karate Zeon, Kung Fu, Matador Zeon, Agro lambda, Cyhella, Flipper, Lambda	>7 days	Micro-encapsulated formulation has longer residual.
chlorpyrifos	Chop, Chemicide, Chlorban, Chlorpos	up to 1 day	
dimethoate	Rover, Rogor, Danadim, Dimetholinx, Saboteur, Stalk, Unidime	up to 3 days	
methidathion	Ridacide, Suprathion	3 days	

Source: Primefact 149, Pesticides – a guide to their effect on honey bees.  
 Residual toxicity is the amount of time the pesticide remains toxic after application. Data is derived from United States field trials conducted by the University of California (Atkins et al. 1981, Reducing pesticide hazards to honey bees) and Washington State University (Mayer et al. 1999, How to reduce bee poisoning from pesticides) unless otherwise indicated.  
 United States Environment Protection Agency.  
<sup>3</sup>Source Label

Table 2: Cotton Insecticides with known residual toxicities to honey bees

For the majority of insecticides used in cotton the residual toxicities are unknown. **Table 2** (see below) summarises the currently available information. Fipronil is highly toxic to bees even when used at below label rates. It can be particularly dangerous for hives due to its long residual life. Insecticides with fipronil as the active ingredient, include Regent, Albatross, Ancestor, Flak, Kaiser, Legion, Onslaught, Rhyme, Surefire Vista and Regal have the following label restriction:

**Dangerous to bees.**

**DO NOT** apply where bees from managed hives are known to be foraging, and crops, weeds or cover crops are in flower at the time of spraying, or are expected to flower within **28 days (7 days for pastures and sorghum)**. Before spraying, notify beekeepers to move hives to a safe location with an untreated source of nectar, if there is potential for managed bees to be affected by the spray or spray drift. If an area has been sprayed inadvertently, in which the crop, weeds or cover crop were in flower or subsequently came into flower, notify beekeepers in order to keep managed bees out of the area for at least **28 days (7 days for pastures and sorghum)** from the time of spraying. Where the owner of managed hives in the vicinity of a crop to be sprayed is not known, contact your State Department of Primary Industries/Agriculture, citing the registration number, for assistance in contacting the owner.

**What can I do on-farm to reduce risks?**

During the cotton season, the risk to bees can be reduced by following these simple steps prior to spraying:

**1. Check the proximity of hives by:**

- Visiting the Bee Alert webpage (see over page);
- Keeping an eye out for bee hives that may have been placed in vegetation neighbouring your farm. They may be positioned under trees

to afford them protection from direct sun.

Commercial apiarists may also seclude hives from view to avoid theft;

- Checking with the NSW State Department of Primary Industries (NSW DPI) or QLD Department of Agriculture, Fisheries and Forestry (QLD DAFF) as relevant in your area as all beehives must be registered;
- Checking with the Local Land Services (in NSW) to see if there are any dedicated 'bee sites' on travelling stock reserves in your area.

**2. Notify the beekeeper** when hives are near crops to be sprayed to allow hives to be removed before spraying. Beekeepers require as much notice as possible to move hives, preferably 48 hours. Commercial apiarists may operate over large areas and may not be able to initiate protective action over their bees at short notice.

- Where the owner of the hives is not known, contact NSW DPI or QLD DAFF, citing the registration number on the hives, for assistance in contacting the owner:
  - NSW DPI – Doug Somerville (02 4828 6619/0427 311 410)
  - QLD DAFF – Patricia Swift (02 5644 2216) or Di Warner (07 4660 3604)

**3. Inform any contract pesticide applicators**

operating on your property of the locations of hives. The applicator may wish to discuss with you the establishment of a buffer zone to further protect the area.

**4. Always apply insecticides according to the label requirements**, and pay particular attention to:

- wind speed and direction, air temperature and time of day before applying insecticides. Wherever possible, restrict spray activities within flight range of hives until after 4pm,

by which time the number of bees present in crops will be low (it is important for growers to be aware however, that in the late afternoon inversion layers may be present or forming and these can increase the likelihood of spray drift);

- avoiding drift and contamination of surface waters where bees may drink.

### **Bee Alert: free service for growers**

Under the cotton industry's joint program, CottonInfo, an online register of beehives in cotton growing areas has been created to improve communication between growers and hive owners. The online CottonInfo Cotton Calendar contains a Bee Alert tab – a free service that allows beekeepers to regularly update information about their hives. Cotton growers and spray operators can also use Bee Alert to help neighbours 'bee aware' when hives have been observed near cotton crops.

To add a Bee Alert to the Cotton Calendar, go to [www.mybmp.com.au](http://www.mybmp.com.au) and log in using the username: [beealert@mybmp.com.au](mailto:beealert@mybmp.com.au) and password hymenoptera. Once logged in, then follow the events calendar links to add your Bee Alert. Once live, Bee Alerts can also be viewed via the Cotton Calendar app (available to download from the Apple app and Google Play stores).

For more information on how to access the Cotton Calendar, add a Bee Alert or view it in the app, contact Dave Larsen, CottonInfo, on 02 6799 1534.

### **myBMP Pesticide Management module**

The cotton industry's Chemical Handlers Application Management Plan for 2013-14 can be found as a grower resource in the myBMP Pesticide Management module at [www.mybmp.com.au](http://www.mybmp.com.au)

### **Products under review**

The Australian Pesticides and Veterinary Medicines Authority (APVMA) has a Chemical Review Program



which can reconsider the registration of agricultural and veterinary chemicals in the marketplace if potential risks to safety and performance have been identified. Both fipronil and the neonicotinoid chemical group (clothianidin, imidacloprid and thiamethoxam) are currently under review. Honey bee health is a focal point in both reviews and was a significant consideration in the European Commission's decision last year to implement a two year suspension of all uses of three neonicotinoids (clothianidin, imidacloprid and thiamethoxam) in flowering crops.

With good communication and good will, it is possible for apiarists and cotton growers to work together to minimise risks to bees, without the loss of access to these products.

### **For more information**

- **On products that are harmful to bees:** Cotton Pest Management Guide 2013-14, available to download from [www.crdc.com.au](http://www.crdc.com.au)
- **On chemical application and best practice:** Chemical Handlers Application Management Plan 2013-14, available to download from [www.mybmp.com.au](http://www.mybmp.com.au)
- **On whether there are any beehives located near you:** Contact NSW DPI (Doug Somerville – 02 4828 6619 / 0427 311 410); QLD DAFF (Patricia Swift – 02 5644 2216, or Di Warner – 07 4660 3604); NSW Local Land Services in your area (1300 795 299)