

Pesticides — a guide to their effects on honey bees

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Introduction

Beekeeping management practices require beekeepers to maintain high populations of bees in their hives, have their bees on a honey-producing crop, or have their apiaries in particular areas for pollination purposes. As a result there will be periods of time when apiaries will be at risk of damage from pesticides.

This Primefact provides a basic knowledge of the chemical name, product name and toxic effect on honey bees of pesticides which beekeepers are likely to come into contact with when operating in areas where pesticides are applied.

Note: This data was prepared in December 2005. It includes pesticides registered in NSW recognised under international standards as being toxic to honey bees. Based on available information, all other pesticides registered in NSW at December 2005 are either not toxic to honey bees or do not pose a hazard to honey bees due to their method of application.

Data on residual toxicity to honey bees, that is, the amount of time a pesticide remains toxic to bees after the time of application, has been included if it is considered to have come from a reliable source. The residual time of the toxic effect of a pesticide applied in a field situation is influenced by temperature, relative humidity, dew and rain.

Beekeepers required to make decisions on the management of apiaries situated in areas where

pesticides are being applied are advised that the information is to be used as a guide only, due to differences in formulations and weather conditions which may occur when these pesticides are applied in different areas of NSW. NSW Department of Primary Industries (NSW DPI) does not accept responsibility for the accuracy of the data on residual toxic effects of the named pesticide applied under NSW conditions.

- This Primefact does not contain information on pesticides registered for use in NSW after December 2005.
- Where no data are provided for the residual toxic effect: All chemicals listed in this Primefact have been identified as toxic to honey bees and will have a residual toxic effect ranging from a few hours to a number of days. Not all pesticides listed as toxic have data on their residual toxic effect. Where no data are listed, this does not mean the pesticide has no residual toxic effect but that the residual toxic effect is not known. Beekeepers should take this into account when making management decisions.

This Primefact should be read in conjunction with [Primefact 148, Pesticides—reducing damage to honey bees](#).

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Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing (December 2005). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of New South Wales Department of Primary Industries or the user's independent adviser.



Toxicity to bees				
Active ingredient	Product name#	Contact*	Residual** (days)	Label statement*** Comment
abamectin	Vertimec	t	1	
acephate	Orthene	t	Up to 4	1 Long residual, increasing with rate up to 4 days (US EPA IRED)
alpha-cypermethrin	Fastac	t	1	1 Not considered toxic to bees under field conditions
azinphos	Gusathion	t	4	1 (US EPA IRED)
bendiocarb	Ficam	t	1	1 Residual effect not known
betacyfluthrin	Bulldock	t	>1	1 Longer residual in Australian conditions
binfenazate	Acramite	t	1	1 Only hazardous if bees oversprayed when foraging, residues non-toxic (APVMA PRS)
bifenthrin	Talstar	t	2	2 Spray in the early morning while bees are not actively foraging
carbaryl	Bugmaster	t	Up to 7	1 Up to 7 days residual for WP formulation; SC formulation will be less depending on rate of application
chlorfenapyr	Secure	t	2	1 Foraging behaviour could be affected for >2 days (NRA PRS)
chlorpyrifos	Lorsban	t	Up to 1	1 Not persistent and populations recover quickly (US EPA IRED; NRA review)
chlorpyrifos-methyl	Rescue	t	3	3 Do not spray any plants in flower while bees are foraging
cyanamide	Dormex	t	1	1 Residual effect not known
cypermethrin	Sonic, Scud	t	1	1 Residual, but not considered toxic to bees under field conditions
deltamethrin	Decis	t	4	4 Some repellent effect for 2 days, unlikely to be hazardous to bees unless bees oversprayed
diafenthiuron	Pegasus	t	1	1 Residual effect not known
diazinon	Diazinon	t	1	1 Only hazardous if bees oversprayed when foraging (NRA review)
dimethoate	Rogor	t	Up to 3	1
emamectin	Affirm, Proclaim	t	1	1 Residual effect not known
endosulfan	Endosan, Thiodan	t	1	1 Generally without significant field impact (NRA review)
ethion	Mustang	t	2	2 Spray in the early morning while bees are not actively foraging
esfenvalerate	Sumi-alpha Flex	t	1	1
fenthion	Lebaycid	t	Up to 1.5	1
fenitrothion	Fenitrothion	t	1	1 Field effects may increase with higher rates used for locusts (NRA review)
fipronil	Regent	t	7 to 28 days (label)	5 Long residual. Dangerous to bees. IMPORTANT – Read Label Statement No. 5
gamma-cyhalothrin	Trojan	t	7	7 Long residual. Risk is reduced by spraying in the early morning or late evening
imidacloprid	Confidor	t	1	1 Hazardous if bees oversprayed when foraging; suspected of affecting bee behaviour (especially following seed treatments) but no conclusive evidence (EA assessment)
indoxacarb	Steward	t	6	6 Not hazardous once spray has dried. Avoid direct application or drift of the spray mix onto beehives
lambda-cyhalothrin	Karate	t	>7 days for encapsulated formulation	7 Long residual. Risk is reduced by spraying in the early morning or late evening

Active ingredient	Toxicity to bees			Label statement***	Comment
	Product name#	Contact*	Residual** (days)		
malidison/malathion	Hymal	t	2 to 6 hours	1	
methamidophos	Nitofol	t	1	1	May be longer in Australian conditions
methidathion	Suprathion	t	3	1	(US EPA IRED)
methomyl	Marlin, Lannate	t		10	Ensure beehives are removed from the area to be treated and from adjacent paddocks. Not hazardous once spray has dried
mevinphos	Phosdriin	t	4 hours	1	(NRA review)
omethoate	LeMate	t		1	Residual effect not known
parathion	Folidol, Pennacp	t	1 to 8 days	1	The EC formulation has at least a 1 day residual, which may be longer (4 to 6 days) depending on weather (US EPA RED). The micro-encapsulated formulation (Pennacp) has a residual of 8 days (NRA review)
permethrin	Ambush	t	Up to 2	1	May be longer in Australian conditions
phosmet	Imidan	t		1	Residual effect not known
profenofos	Curacon	t		-	Hazardous to foraging bees
pyridaben	Sanmite	t		1	Only hazardous if bees oversprayed when foraging. Has transient repellent effect that protects bees. Foraging may be reduced in the short term (NRA PRS)
spinosad	Success, Tracer	t	1	8	Not hazardous once spray has dried – allow at least 24 hours (EA assessment). Avoid direct application or drift of the spray mix onto beehives
taufluvalinate	Mavrik	t		9	Only hazardous if sprayed when bees are foraging. Low hazard to bees. Under good pesticide application practices, application is preferred when bees are not actively foraging
tebufenpyrad	Pyranica	t		1	Low toxicity (BCPC)
trichlorfon	Dipterex	t		1	Not considered a bee hazard as LD ₅₀ does not fall within toxic category (US EPA RED; BCPC)
thiamethoxam	Actara	t		1	Affects behaviour and foraging activity (NRA PRS)
thiodicarb	Larvin	t		1	Not hazardous once spray has dried

* Contact toxicity (t) Toxic on contact. (US EPA classification) established by laboratory studies. LD₅₀, t = < 11 µg Tomlin CDS 2000 *The Pesticide Manual*, 12th edn, Farnham, British Crop Protection Council

** Residual toxicity (WSU) The amount of time the pesticide remains toxic after application. Figures are derived from US field trials conducted by the University of California (UC), and Washington State University (WSU)
 Atkins EL et al. 1981, *Reducing pesticide hazards to honey bees* (UC)
 Mayer DF et al. 1999, *How to reduce bee poisoning from pesticides* (WSU)
 unless otherwise indicated

Product name The most common product name is shown. Other product names for some active ingredients are used in NSW. Pesticides should be identified by their active ingredient.

*** Label statement. All instructions on Label Statement must be followed in NSW.

Label statement code	Instruction
1	Dangerous to bees. DO NOT spray any plants in flower while bees are foraging.
2	Dangerous to bees. DO NOT spray any plants in flower while bees are foraging. Spray in the early morning while bees are not actively foraging.
3	Dangerous to bees. Avoid direct application or drift of the spray mix onto beehives. DO NOT spray any plants in flower while bees are foraging.
4	Dangerous to bees. DO NOT spray any plants in flower while bees are foraging. Some repellent effect may be apparent for approximately 2 days.
5	Dangerous to bees. DO NOT apply to any areas where the crop, 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) of spraying. Before spraying, ensure bees are not foraging in the area to be sprayed or in any areas that may be contacted by spray or spray drift. Remove beehives from areas to be sprayed and surrounding areas. Ensure an alternative (untreated) source of nectar is available for bees. If an area has been sprayed accidentally, in which the crop, weeds or cover crop were in flower or subsequently came into flower, it is recommended that bees not be allowed into that area for at least 28 days (7 days for pastures and sorghum) from the time of spraying.
6	Dangerous to bees. DO NOT spray any plants in flower while bees are foraging. Avoid direct application or drift of the spray mix onto beehives. After the spray has dried, bees can safely forage flowering crops.
7	Dangerous to bees. DO NOT spray any plants in flower while bees are foraging. Risk is reduced by spraying in the early morning or late evening.
8	Dangerous to bees. Avoid direct application or drift of the spray mix onto beehives. Once the spray deposit has dried, foraging bees will not be affected.
9	Bee safety: The product presents a low hazard to bees, however, under good pesticide application practices application is preferred when bees are not actively foraging.
10	Dangerous to bees. DO NOT spray any plants in flower while bees are foraging. Ensure beehives are removed from the area to be treated and from adjacent paddocks.

Abbreviations	
RED	Registration Eligibility Decision
IREDD	Interim Registration Eligibility Decision
WP	Wettable powder
SC	Suspension concentrate
EC	Emulsifiable concentrate
BCPC	British Crop Protection Council (Pesticide Manual)
PRS	Public Review Summary
EA	Environment Australia
NRA	National Registration Authority (now APVMA)
APVMA	Australian Pesticides and Veterinary Medicines Authority
US EPA	United States Environmental Protection Authority
>	More than
<	Less than