



NATIONAL

Varroa Mite Management

PROGRAM



A Pollination Guide for Pollination Dependent Industries

Adapted from the Honeybee Best Management Practices for Australia Almonds

A guide for all parties involved in the pollination process.



Forward

This guide has been designed as a baseline template to be adapted by each pollination industry to be more specific to their needs. The information is generalised and will be applicable across most of the pollination industries. It is designed to be a base guide and is to be used in conjunction with industry specific information. This guide is correct at the time of printing and changes may need to be made as amendments are made to the codes of practices or any other legislation or as research information becomes available.

This guide aims to cover off on:

- Pollination Agreements
- Bee health
- Care for bees while completing pollination
- Pesticide use

Author

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1. Why Healthy Honey Bees Matter?

Healthy honey bees play a vital role in the food chain, pollinating fruits, vegetables and nuts that we rely on for our daily nutritional intake. The effective pollination of wild and cultivated plants not only benefits our nutritional intake but reduces the cost of fruit and vegetable production. Proper pollination speeds up the growth of plants to maturity and enhances yield sizes, leading to production efficiencies (CSIRO, Greta Vella 14 January 2016). It can also increase the shelf-life and improve the quality of food. Keeping honey bees healthy is essential to maintaining pollination services.

Your responsibility to care for the health of bees

Healthy bees are more active and will complete more foraging trips to pollinate crop flowers, leading to better fruit, nut or seed set.

As a grower utilising a pollination service, it is your responsibility to ensure your farm is the safest it can possibly be. This will not only benefit your own pollination but will aid in making sure that the grower who receives the same bees next will also enjoy the same positive yield outcomes. It is not just the targeted crop area that needs to be maintained but also the immediate environment around your targeted crop.

Providing a bee friendly environment will foster a mutually beneficial relationship between yourself and your beekeeper, supporting the beekeeper to provide strong healthy bees for your crop year on year. The aim is to make sure that you are known as being a good bee steward while the bees are working on your property.



Figure 1: Photo courtesy istock



2. Communication

“The kinds of errors that cause plane crashes are invariably errors of teamwork and communication.”

— *Malcolm Gladwell, best-selling author and journalist.*

The same can be said for a successful pollination, if you want to achieve the best possible outcomes from the bees then there needs to be clear and open communication between the grower and the beekeeper. Make sure that both parties are fully aware of expectations, this may not be limited to the grower and the beekeeper but includes farm staff, auditors, bee brokers, agronomists, spray contractors and any other on-farm contractors that may be employed during pollination.

Preparing hives and entire apiaries for pollination is an activity that must be planned well in advance. It takes time and investment to prepare and grow bee colonies in preparation for a pollination contact. Both beekeeper and grower need the confidence that both will enter this business arrangement in good faith.

For this matter it is important that growers develop strong relationships with a beekeeper/broker and are able to communicate their pollination needs well before the bees are needed. Beekeepers will be preparing their bees weeks to months before they are due on your property to complete your pollination. Therefore, it is vital that early discussions are had to ensure that the beekeeper can provide the desired number of hives in condition suitable for pollination. Continual revision of pollination agreements and pollination and harvest records are helpful to identify any amendments needed to maintain desired yields and meet business needs.

Two key times to review these documents are at the end of your pollination season, and after the harvest of your crop. Amendments should be communicated back to your beekeeper/broker as early as possible to ensure they can be accommodated in time for the next pollination season.

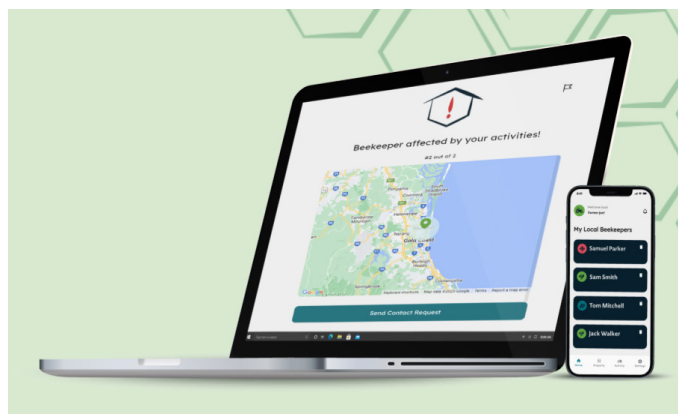
See Appendix 1 for pollination agreement template and Appendix 2 for pollination record template.

BeeConnected: Fostering collaboration between growers and beekeepers

Growers and beekeepers/brokers should share information about hive locations and crop protection activities. With [BeeConnected](#), growers and beekeepers can seamlessly communicate and collaborate, ensuring the safety of bees and encouraging sustainable farming practices.

For beekeepers, it is easy to register the location of their hives and notify growers about where hives will be located well in advance of them being deployed. In turn, they will be aware of crop protection activities near hive locations and can easily contact growers to share information about their bee hives.

Growers can easily register their farm location, share information about their intended crop protection activities, receive notifications about bee hives located nearby and communicate easily with nearby beekeepers.



The Communication Chain

The links between grower, beekeeper/broker, agronomist, auditors, contractors and state requirements are all essential to achieve good pollination outcomes. The below are some recommendations on how this can be achieved.

Grower

- Communicate pollination needs, how many hives, timing of hive arrival, hive standards and where hives are to be placed
- Have a pollination agreement, signed by all parties
- Request a declaration of compliance by the beekeeper with the [Australian Honey Bee Industry Code of Practice \(the Code\)](#)
- Engage a third-party hive health auditor to aid in the completion of hive inspections
- Communicate specific needs of the pollination agreement to other parties within the chain
- Ensure site and safety inductions are discussed and completed where needed
- Notify neighbours of the timing of the pollination event
- Ensure compliance with the agreed pesticide plan
- Communicate potential impacts on pollination, for example seasonal changes requiring additional pest management.

Beekeeper/Broker

- Have a pollination agreement, signed by all parties
- Ensure all bee hives are registered with the relevant state or territory government
- Meet all required bee biosecurity measures i.e. hives boxes branded with registration code, no colonies with American foulbrood present, treatment threshold for Varroa, hive boxes in good repair, any required hive movement permits, required biosecurity training
- Hive health incidents have been recorded and reported if needed to the respective state government and grower.
- Declaration of compliance with the Code
- Pest detections are reported as required
- Keeping of movement records, health certificates and chemical treatment records as per relevant state requirements

Agronomist (or grower where no agronomist in use)

- Investigate chemical treatment options including formulations that are bee friendly, and options that maintain overall health of the farm
- Develop a pesticide plan in conjunction with the grower, beekeeper and spray operator
- Early and or timely Communication with beekeepers if an emergency chemical application needs to take place during pollination
- Use the BeeConnected app to ensure all neighbouring properties are clear of hives if pesticides are needed



Spray contractors or staff entrusted with completing spray activities

- Communicate any changes to the agreed pesticide plan
- Double check labels to ensure that all chemicals are safe to use within the pollination system
- Ensure all spray equipment is decontaminated, cleaned and maintained properly to ensure there is no chemical residue or contamination
- Fungicide spray of blooms should be completed at night or at the very least when there is minimal bee activity
- Ensure on farm chemical records are compliant, accurate and accessible
- Hive locations are clearly marked on all spray maps
- Regular updates with beekeepers, especially if non-scheduled fungicide applications need to be completed. Keeping in mind that there may be a minimum time required to have hives removed from the farm before the pesticides are applied
- Any hive health incidents that may include the use of chemicals need to be recorded, discussed and resolved

Hive auditor

- Complete hive health assessments as per the requirements of the pollination agreement
- Make sure the beekeeper is given sufficient notice of the date and time of the assessment to ensure minimal disruption to the hives
- Give the grower the option to be present for the hive health assessment to ensure that the hives meet the requirements of the pollination agreement.

State/Territory Government

Be mindful of any state requirements that may need to be followed by either the grower or the beekeeper/broker. These may include things such as:

- Compliance by beekeepers with [Australian Honey Bee Industry Code of Practice](#)
- Movement restrictions or permits
- Chemical use permits
- Trade restrictions or permits



Figure 2: Photo courtesy istock



3. Hive Standards

Hives used for pollination must be provided to a specific standard agreed upon between the beekeeper/broker and the grower. This standard needs to be included in the pollination agreement so there are clear expectations and no misunderstandings. The hives will be audited to ensure the standard is being met.

Hive requirements will vary from crop to crop but a minimum hive standard is:

- An average of 8 full depth frames of bees, with a minimum of 6
- Either 2 full frames, or 4 half frames, of brood in all stages
- A minimum of 3 full depth frames full of honey for the pollination period
- An actively laying queen
- Sufficient room for the colony to expand
- Appropriate management of diseases, pest or viruses

More information can be found from your local State or Territory government agency and or the Bee Aware website.

The auditor should methodically assess a percentage of the apiaries in line with the specifications set out in the pollination agreement. Following on from this, the grower can continue to assess the health of the hives by walking through the crop to monitor bee activity. Anything that seems unusual, for example hives with no activity at the entrance, should be reported to the beekeeper/broker as soon as reasonably possible to ensure it is rectified and pollination can be completed. Assessments should take place at temperatures above 14°C, in no to low wind and sunny conditions.

Pollination Agreements

Pollination agreements are an important document for growers and beekeepers/brokers to ensure that there is a clear understanding of what is required by both parties during the pollination period. Pollination agreements should be completed in consultation with all parties to ensure they are fair and accurate (see template in Appendix 1).

Suggested items to be included in the pollination agreement, may include but are not limited to:

- Hive numbers at the agreed colony strength
- Arrival and departure timing
- Compliance with Bee Biosecurity Code of Practice (see details of things to include in Section 4 below)
- Full details of the grower, location of where bees are to be kept, crop type and area
- Full details of the beekeeper/broker's current registrations and certifications
- Special circumstances, i.e., pesticide plan where advance notice is required for hive removal to avoid spray risk
- Rates of payment, i.e., per hive or per frame and any incentives that may be offered such as stronger colonies than expected or weaker colonies but more hives
- Insurances including public liabilities for coverage of any damages, i.e., if a ute hits a hive
- Varroa status / treatment regime if coming from a Varroa infested area.

Grower responsibilities

The bees always remain the property of the beekeeper, and the grower should have minimal interactions with the hive, any and all interactions to be predetermined by the pollination agreement. Unnecessary hive interactions may interfere with natural bee behaviour and effective pollination or may have more serious consequences such as hive death. While bee hives are on a pollination site, the grower must ensure the following:

- The area designated for the hives is kept and managed appropriately
- Adequate provisions for clean water that is not part of an irrigation system
- Protection of hive from damage, i.e., a clearly marked hive location that is away from all machinery
- Adherence to the agreed pesticide plan
- Immediate notification to the beekeeper/broker of any bee deaths, measured as a cup of bees at the entrance to the hive, or hive damage.

Fee for Pollination

The fee for pollination is determined by many factors, such as current going rate, number of hives required, size of the crop, access to the hive drop off sites, availability of hives, and attracting hives away from existing business activities like honey collection. The fee and how that is to be charged, i.e., per hive or per frame, should be agreed upon well prior to the pollination season and locked in to ensure all parties are happy, being aware that there may be external factors that will affect this timing such as weather, seasonal events. There may also be the option to offer incentives to ensure that you receive the best hives at the exact time that pollination needs to occur. As differing crops require pollination at overlapping times it may sometimes be necessary to provide a financial incentive to make sure that you are able to secure the hives required to complete pollination.

It is essential to remember that not all crops require the same number of hives or hive standard to complete their pollination needs, and differences in hive set-up required may increase labour and/or inputs by the beekeeper. This can lead to differing prices for hives across different crop types. Other factors that may influence the price of pollination include, but are not limited to:

- Ease of access to hive site, i.e., is it easily accessed by truck or do the hives have to be carried in by hand or ute/side-by-side
- Distance travelled
- Duration the hives are at your property
- Seasonal conditions during the time of pollination, i.e., drought can affect the volume of alternate floral resources available to keep the bees healthy while on site so the beekeeper may have to supplementary feed to prevent starvation
- Provision of alternative forage
- Treatment for pest and diseases such as Varroa mite
- If your crop is a honey producing or consuming crop. Crops like almonds are honey consumers. That is, the bees will consume any honey reserves in the hive to maintain hive health, whereas crops like macadamias are honey producers so the beekeeper may have the ability to harvest the honey from the hives for sale
- Value of honey production during pollination event
- The expected condition of hives at the end of the pollination event, i.e., is it an environmentally and/or nutritionally stressful crop for the bees to pollinate
- If hives are to be placed under protected cropping conditions such as netting.



4. Pest and Disease Management

Like all animals, bees need to be kept healthy and free from pests and diseases. This falls predominantly onto the beekeeper to maintain hive health, but the grower has a role to play in providing the best environment possible. Australia has several established bee pests and diseases which include American foulbrood (AFB), European foulbrood (EFB), Chalkbrood, Varroa, small hive beetle, wax moth and European wasps. Ants and Cane toads can also affect bee hives. For this reason, it is highly important to make sure that growers do everything within their power to make sure they are not a source of hive health risk.

Growers should already have some form of on farm biosecurity plan in place. Managed hives should form part of that plan.

Bees, by their nature, will rob hives. That is, they will enter another hive, be that wild or managed, that is sick or weak and take the honey back to their own hive. This may cause the spread of pests and diseases. For example, if there is AFB present in one of the hives brought on farm for pollination, there is the potential for all hives within a 3-4 km radius to contract AFB if the infected hive is robbed. AFB is a fatal bee disease requiring hive euthanasia, equipment quarantine and processing or incineration. This is a very costly exercise for the beekeeper.

Robbing is also one of the pathways through which Varroa spreads.

Both the [the Code](#) and the Biosecurity Manual for Beekeepers ([here](#)) have been developed to aid beekeepers in managing the health of their hives. All beekeepers that you contract on your property for pollination should be compliant with the Code.

The main objectives of the Code are to:

- Increase the productivity of the Australian honey bee industry by improving the general level of pest and disease control by Australian beekeepers
- Assist beekeepers to recognise exotic pests and diseases of bees and then prepare them for a response
- Ensure beekeepers conduct regular surveillance for the presence of notifiable exotic and established pests and diseases
- Assist in the management of significant established pests such as Varroa
- Ensure the future viability and sustainability of the Australian honey bee industry.

More information on honey bee health can be found at [BeeAware, biosecurity](#).

Beekeepers and the Code

Some of the biosecurity fundamentals that beekeepers should be practicing for good hive health include:

- Register hives with their relevant state or territory authority
- Undertake approved biosecurity training
- Regularly inspect hives for pests and diseases
- Report notifiable pests and diseases found in their hives, such as Varroa
- Control pests and diseases and manage weak hives
- Maintain records of biosecurity-related actions and observations
- Brand hives
- Do not allow hives to become exposed or neglected
- Allow their operation to be assessed
- Provide name and contact details at each apiary

- Removal of waste including honey, wax, and dead bees to prevent exposure to pests and diseases.

Some sections of the Code are mandated and enforced under each state or territory's legislation. All beekeepers should complete an annual certificate of compliance with the Code and therefore growers should request a copy of the certificate as part of the pollination agreement.

As part of the pollination agreement, growers should check that the following has been done to assure that the beekeeper is compliant with the Code. These checks may also be completed by a broker or independent auditor on behalf of the grower:

- Sighting of a current registration certificate, and branding (hive registration number) is clearly marked on all hives
- All hives are structurally sound, have intact external surfaces and the only openings to the hive are specifically designed for bee access
- Declaration that the hives have been inspected for pests and disease. In the case of Varroa, the methods of monitoring include sugar shake, soapy water wash or alcohol wash, while drone uncapping can also be used for surveillance in areas where Varroa has not yet been detected
- Appropriate reporting of any notifiable pests or diseases
- Hive numbers and quality must meet those required by the grower
- Records are available detailing inspections, tests, observations and actions e.g. hive movements, Varroa treatments, brood inspections
- Maintaining records relating to movement and chemical treatments
- A honey culture test is conducted annually; this is mandatory for beekeepers with 50 or more hives
- A completed and signed Certification of Compliance document accompanies the pollination agreement. Appendix 3 is a sample of a compliance certificate.

Growers

Pollination can be one of the biggest risk factors influencing hive health as many hives managed by multiple beekeepers can be brought in close proximity. For this reason, on-farm biosecurity is important. Growers should do whatever they can within their power to provide an environment that reduces the threat to the hives from pests and disease. This may include but is not limited to:

- Engaging only with pollination contractors that are compliant with The Code
- Inspecting all vehicles and equipment for signs of contamination from soil or plant material, honey or wax
- Establishing a specific cleaning station equipped with high pressure wash down facilities and wastewater collection area that is away from growing and production areas
- Limiting vehicle movements to designated road/lane ways, with capacity for heavy vehicles
- Working with the beekeepers to assure that all tools and equipment are regularly cleaned
- Producing biosecurity signage with instructions for visitors and a sign in/out logbook
- Providing conditions that enable bees to thrive such as alternate floral resources and being protected from wind
- Maintaining hive sites year-round as per the On Farm Reference Guide for Honeybee Management.



5. Honey bees and your Farm

There are multiple things a grower can do to make sure that the crop environment is the most suitable for healthy bees to ensure a successful pollination season. Factors such as the environmental conditions at the time of pollination are out of the growers' control, however growers can reduce the effects of the environment on hives and pollination.

Making sure that all hives brought onto the property meet the agreed standards. This will help maintain the core temperature of the hive during the cooler nights of early spring pollination.

Consider sufficient alternate floral resources for hives that are brought on farm early or remain after the peak pollination time. This will ensure that the hives are still healthy enough to perform pollination once the targeted species begin flowering or once pollination is complete, allowing for the bees to leave the farm in the same condition that they arrived on farm. Ideally you would plan for the hives to arrive just prior to the crop reaching peak flowering for optimal pollination. By doing this it will maximise your pollination while minimising stress on bees that must search for alternate floral sources until the crop is flowering sufficiently. Leading up to pollination, at least a week before and again 48hrs prior, it is vital to have open communication with the beekeeper/s around the flowering stage to ensure that the hives arrive at the optimal time, keeping in mind that flowering times can change depending on weather conditions. Sometimes hives will all arrive at the same time due to unforeseen circumstances such as rain and breakdowns. The allowance of extra floral resources will ensure that all bees will be kept at optimal condition for pollinating once the target species begins to flower fully.

Making sure that there is sufficient clean water within 100 m of the hives that is not from an irrigation or source that has potentially been exposed to pesticides of any type. The source and type of water should be agreed upon as part of the pollination agreement. This is extremely important for many reasons such as reducing the time taken by the bees to reach the water which means more time foraging and thus pollinating, keeping the hive cool during extreme hot weather events, and enabling hives to rehydrate after transport. Sufficient water source on farm will also prevent the bees from leaving the property in search of water, which may be contaminated by pesticides. If there must be a spray completed, which should already have been discussed, then the water source should be removed or covered to prevent contamination.

All care should be taken to avoid the application of pesticides and fungicides during pollination. A pesticide plan should have already been agreed upon along with the pollination agreement. Specifically, pesticides should not be applied when bees are foraging. This can affect bees in several ways. Depending on the pesticide, direct application can kill the bees and the contaminated pollen, nectar and water can be taken back to the hive where it can have major implications. Even direct application of a bee friendly pesticide on actively pollinating bees can chill them in cool weather and may prevent them from returning to their hive.



Hive location on your property

Most growers will have their properties organised to maximise their growing area; this means that there are not always the best sites left on the property for the locations of hives. This can be especially so if there needs to be more than one hive location site when you are contracting the use of more than one beekeeper, or a large area needs to be pollinated at the same time. Practical considerations, other than proximately to the target crop, to make when allocating areas of your property for hive locations include:

- Access to the hives should be adequate for heavy vehicles in all weather conditions, with adequate room to turn around, unload/reload trucks with hives without interfering with the hives
- Access must be 24 hrs a day. Most collections and retrievals of hives will be completed at night once the bees have returned to the hives from their foraging activities and when it is cooler
- Hive sites should allow for the protection of the openings to the hives from weather events. These sites should allow for late afternoon shade (especially for crops being pollinated late spring through late summer), sheltered enough from frosts when pollinating in late winter or early spring and be elevated enough to protect the site from flooding during major rain events or irrigation. Sites where cold air settles at night should be avoided to ensure there is not delayed bee activity in the morning
- Hive sites should be positioned away from high traffic areas. Not only will this help prevent staff from being stung but it will also allow the bees to go about their daily activity without interference
- Sites should have an adequate buffer zone, not only from the general farming area where pesticides are used, but also from hives sites that are being used by other beekeepers to complete the pollination. This will help to minimise the spread of pest and disease
- All hive sites need to be actively managed for weed seed. This will help to prevent the spread of seed from one farm to another.



Photo Courtesy Elizabeth Frost



Alternate Floral Resources

When bees are able to forage on more than one floral type, they are able to forage for longer periods of time and are generally healthier. Alternate floral types that are planted within and around the periphery of target crops have been shown to provide hives with a wider nutritional base, allowing bees to forage more naturally, generating stronger hives which are better able to sufficiently pollinate the target crop. The provision of floral resources also ensures that there is enough pollen and nectar for the bees, especially at the start and end of the blooming period. The suggested types of floral resources that can be used are brassicas, mustards, radish, turnip and clover. More area specific options can be found via the When Bee Foundation's [Powerful Pollinators](#) Project. The type of resources chosen will depend on climate and type of target crop. Some plants crosspollinate, so make sure that the alternate floral resource chosen does not interfere with target crop production. To some degree, weeds can also provide an alternate floral resource, however, care must be taken with the management of the weeds, particularly chemical control.

There are also other benefits to planting alternate floral resources such as weed control, increased organic matter when crops are mown or mulched, improved soil moisture and stability from erosion. Depending on the crop type, there can be the added benefit of nitrogen fixation and increased soil fertility.

The provision of alternate floral resources may aid in the prevention of insecticide poisoning of the bees from neighbouring properties at the end of the target crop flowering period. Bees can fly up to 10 km from their hive while foraging. This can increase their risk of exposure to pesticides if bees must leave your property to forage to sustain the colony. Ensuring there are enough floral resource to sustain the hives until they are collected will also ensure that the hives will leave in the same condition that they arrived in. If you, as the grower, are unable to provide alternate floral resources, then there is the option of providing supplementary feed for the bees. This is to be done by the beekeeper only. This may occur when a beekeeper is unable to collect bees at the agreed time and so access to the bees to be able to feed them to maintain the hive health may be required. All of this must be discussed during the process of creating a pollination agreement.



Photo Courtesy istockphotos



6. Pesticides and how they affect Honey bees

Not all pesticides are harmful to bees; however, some pesticides can be extremely toxic to them. For this reason, it is extremely important to have a discussion with your chemical representative and beekeeper to ensure that the most appropriate pesticides are being used at the appropriate time. Developing a pesticide plan is essential to ensuring good hive health and successful pollination.

Insecticides

Insecticides are generally the most toxic agrichemical to honey bees and should be avoided entirely during the pollination event. Insecticides work in one of two ways:

- Direct contact with the target (and unfortunately non target insects), or
- Systemic which is where it is taken up by the plant, and then the component of the plant is eaten by the insects.

Systemic insecticides have the potential to contaminate pollen, nectar or water depending on when it is applied. This can then be carried back to a hive, which can then be stored and fed to the brood. This brood can then emerge with deformities or not emerge at all. As the brood takes 21 days to emerge, these issues can potentially arise long after a hive has left a pollination event.

Both forms of insecticide can have devastating effects on bees. There are some thoughts that the contact insecticides are less harmful to bees as they do not have the flow-on effect to the entire hive. It is worth noting that some of the contact insecticides can remain active for extended periods of time, i.e., up to a month post-application in the case of Fipronil, so timing is critical to ensure the safety of the managed hives.

Fungicides

Some fungicides have been found to have negative impacts on the bee's foraging activity during pollination. Fungicide application directly onto the bloom during the pollination event to control fungal diseases, especially during humid conditions, can affect the scents that are produced by the blooms weakening their attracting ability. This in turn reduces the bee's ability to detect the blooms that have not been pollinated. The mixing of fungicides with other fungicides, insect growth regulators, herbicides or insecticides can have extremely toxic effects on bees. More information on this can be found at [Fungicides and bees in almonds](#).

Surfactants

Surfactants or carriers are used to increase the ability for the chosen pesticide to penetrate or stick to the target plant or insect, which can unfortunately also mean bees. Surfactants increase the ability of pesticides and fungicides to penetrate the exoskeleton of bees, increasing the chance of bee mortality through poisoning. It also has the ability to encompass bees causing them to suffocate.

Pesticide labels

All agricultural pesticides that are known to be toxic to bees will contain a statement on the label. There is evidence that pesticides that do not contain a warning statement may also have adverse effects on honey bees. All pesticide programs should be discussed and decided upon well before the honey bees arrive for the pollination season. This plan should then be strictly adhered to, and any changes must be communicated well in advance and appropriate actions agreed on by all parties. A list of Australian broad acre and horticultural pesticides that are known to be toxic to honey bees can be found in Appendix 1 and 2 of [Honeybee pesticide](#)

[poisoning: A risk management tool for Australian growers and beekeepers](#). Please keep in mind that this list does not include all current chemistry available, so always read the label carefully.

All pesticides that are currently registered for use with the APVMA can be found at [Public Chemical Registration Information System Search - portal.apvma.gov.au](#).

Integrated Disease and Pest Management

Integrated disease and pest management (IDM and IPM) are integral in reducing the volume of chemical pesticides used on your property. Integrated disease and pest management have other benefits such as reduction in resistance to chemicals, protection of air and water quality, and reduction of exposure of honey bees, pollen and nectar to pesticides. Information on IDM and IPM practices including strategies for specific pest species and crops can be found here:

- [broadacre cropping](#)
- [horticulture](#)

Best chemical practices to ensure the protection of honey bees

- Read the chemical label and follow the directions of use for all pesticides
- Develop an extensive chemical plan with all parties involved committed to following all aspects of the plan. This will ensure that the beekeeper will be fully aware of the timing and types of pesticides to be used during the pollination period
- Ensure there are no residual insecticides remaining on arrival of the honey bees
- Ensure there are no pesticides or inputs used with the following label cautions: dangerous to bees, highly toxic to bees, toxic to bees, or extended residual toxicity Residual toxicity can have varying effects and can last from hours to days
- Keep in mind that not all inputs appear harmful to bees but can have detrimental effects on bees, i.e., copper applied as a fungicide can have detrimental effects on bees and potentially death
- Notify beekeepers within the agreed notice period before any pesticides must be used so that they can provide alternate arrangements for the hives. Remember bees can only be transported at night
- Ensure fungicides are applied late afternoon/evening once foraging activity has declined. This will allow time for the fungicide to dry before foraging begins for the next day
- Never mix a fungicide with an insecticide for application during pollination. Avoid using the same tank for fungicides after the use of insecticides unless there is thorough decontamination
- Understand that when your crop flowers, exposed pollen is present
- Ensure that bees have access to clean drinking water. If pesticides must be applied, cover or remove the water to remove the chance of contamination
- Do not spray pesticides directly onto the hives or hive sites
- Ensure bees are not foraging if pesticides must be used
- Notify neighbours and use BeeConnected when hives will be present on your property to reduce the risk of bee mortality from spray drift

Incorrect bloom spray application which may have impacts on bee health

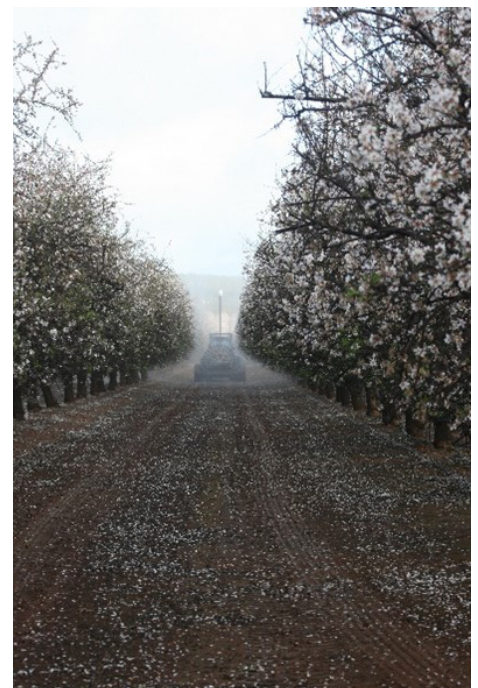


Photo Elizabeth Frost



- After your own pollination period has passed, check with neighbours to ensure that they have finished before commencing post pollination pesticide applications
- More information on pesticide toxicity on bees can be found on the [BeeAware Website](#).

If you believe a spray drift incident or misuse of pesticides has occurred in your local area that may have a direct impact on bee health, it should be reported to your state government as soon as possible. Information that may be required when reporting such incidents include date and time of incident, location of incident, number of hives affected, number of beekeepers involved, chemicals used (if known), proximity to flowering crops and photos or detailed visual observations of the incident.

New South Wales

Environment Protection Agency (EPA)

www.epa.nsw.gov.au

Environment Line -131 555

South Australia

Department of Primary Industries and Resources, Senior Apiary Inspector

www.pir.sa.gov.au

Phone: 08 8207 7975

Victoria

Agriculture Victoria,

<http://agriculture.vic.gov.au/agriculture/farm-management/chemicals/report-an-issue>

Customer Service Centre –136 186

Western Australia

Department of Agriculture and Food, Plant Biosecurity

www.agric.wa.gov.au

Phone: 08 9368 3535

Queensland

Department of Primary Industries, Queensland

<https://www.daf.qld.gov.au>

Phone: 13 25 23

Tasmania

Department of Natural Resources and Environment Tasmania

<https://nre.tas.gov.au/biosecurity-tasmania>

Phone: 1300 368 550

Any unexpected or unintended outcomes experienced while using a registered chemical product according to the label instructions, can be reported to the APVMA through an [Adverse experience report](#). These reports should be submitted as soon after the pesticide event as possible, including as much detail as possible. Timely detailed reports ensure that the information is presented as accurate as possible and will assist a representative who may survey the outcome physically.



7. Safety During Pollination

There are many safety factors to consider when managed hives are used for your pollination season.

Bee Stings

Honey bees sting as part of their natural defence strategy when they feel threatened. This can be when staff are near the hives or as part of the movement of hives in or out of the hive site. To help reduce the risk of bee stings growers can:

- Place signage on the property indicating honey bees are currently in use
- Develop hive location maps to issue to contractors and staff that are moving around the property that may go near the hive locations
- Ensure that you as the owner of the property are aware of any staff members that may be highly sensitive to bee stings and develop an action plan in case the need arrives
- Run training sessions on how to manage bee stings including the use of an EpiPen
- Allow only authorised people to access the hive sites, i.e., auditors and beekeepers.

Manual Handling

In general, beekeepers have a full understanding of what is required to move their bee hives. This may include mechanical lifters and trollies through to forklifts. As the grower you must provide the space at the hive site to be able to move these machines safely around to reduce manually handling and the associated risk of injury.

Use of heavy vehicles and the role of the grower in the chain of responsibility

A heavy vehicle is any vehicle with a mass of more than 4.5 tonnes, and in most cases, these are the type of vehicles that will be delivering hives to your property. Under the Heavy Vehicle National Law, the grower has a primary duty to ensure the safety of heavy vehicle activities over which they might have influence or control. This includes both risk management of your own activities, as well as encouraging safe behaviours in other parties. For more information on the heavy vehicle chain of responsibility please visit:

www.nhvr.gov.au/sms

[Chain of Responsibility - primary producers | NHVR](#)

As a grower that may be using their own vehicle to transport bees on behalf of the beekeeper, things to be mindful of are:

- Weight distribution on the vehicle
- The vehicle is fit for transport and is legally able to be driven on the road
- The load is fully secured on the vehicle
- There is no pressure or demands on the timeline to avoid speeding or fatigue.

A grower's responsibility when the heavy vehicle is owned/operated by the beekeeper:

- Avoid time restrictions/demands that can impact speed or fatigue
- Ensure that access to the hive site is unrestricted to enable timely delivery or removal
- Ensure access road/lane ways on the property are maintained in appropriate condition to handle the heavy vehicle.

In the interests of public safety, the Australian Honey Bee Industry Council (AHBIC) recommends that the following guidelines are followed, except in the case of emergency, e.g. fire or flood:

- Where possible, only transport open entrance bee hives between sunset and sunrise

- When securing beehives, equipment or machinery onto the transport vehicle, ensure that load restraint guides are met as set out by the National Transport Commission of Australia
- After completion of loading of bee hives, wait until most bees have stopped flying before departing site
- Even in cooler weather, travel through built up areas and road works should be avoided during daylight hours
- Ensure adequate fuel is carried on the vehicle to complete the journey without the need to enter a refuelling depot when transporting open entrance bee hives
- If a break in the journey must occur, then ensure the vehicle is located far enough away from lights so as not to attract bees and create a nuisance.

If the above guidelines cannot be met, AHBIC advises bee hives should be screened, netted or have closed entrance to prevent.

8. References and Resources

- Almond Board of California (2018). Honeybee best management practices for California almonds. A guide for pollination stakeholders. Published by the Almond Board of California. Pp19.
- BeeAware website:
<https://beeaware.org.au/pollination/>
<https://beeaware.org.au/industry/education-and-resources/>
- Connelly, D (2012). Honeybee pesticide poisoning – a risk management tool for Australian growers and beekeepers, Rural Industries Research and Development Corporation Publication 12/043.
- Goodwin, M (2012). Pollination of crops in Australia and New Zealand, Agrifutures Australia. Pp136.
- NSW DPI (2014) Healthy Bees Managing Pests, Diseases and Other Disorders of the Honey Bee AgGuide A Practical Handbook by Jennifer Laffan
<https://books.apple.com/au/book/healthy-bees/id904874707>
- NSW DPI (2016) Healthy bees AgGuide, A Practical Handbook
<https://www.tocal.nsw.edu.au/publications/bees/agguide-healthy-bees>
- NSW DPI (2018) Pollination using honeybees AgGuide A Practical Handbook, by Doug Sommerville and Elizabeth Frost Pp. 309
<https://www.tocal.nsw.edu.au/publications/bees/pollination-using-honey-bees>
- NSW DPI (2019) Honey and pollen flora of Southeastern Australia – by Doug Sommerville
<https://www.tocal.nsw.edu.au/publications/bees/Honey-and-pollen-flora-of-south-eastern-Australia>
- Plant Health Australia (2016). Biosecurity manual for Beekeepers: Reducing the risk of exotic and established pest affecting honeybees. Version 1.1



9. Appendices

Appendix 1 Pollination agreement template

This agreement is made on the _____ (date)

BETWEEN _____
(grower's name) hereinafter called the "grower"

AND _____
(beekeeper's name) hereinafter called the "beekeeper"

TERM OF AGREEMENT

The term of this agreement shall be for the 20____ growing season, covering flowering until 48 hours after the grower requests hive removal, but not beyond _____ of that year. (Other agreed provisions should be added or deleted if required at the time of signing, and initialled by both parties.)

RESPONSIBILITIES OF THE BEEKEEPER

Beekeeper Agrees:

1. To supply the grower with hives of honey bees as stipulated in the following table:

HIVE DELIVERY TABLE

Hive Number	Description of Hive Site	Timing of Delivery
		At % flowering
		At % flowering
		At % flowering

(Grower to advise beekeeper of delivery dates as per clause 3)

2. To supply hives, each containing a minimum of (higher standards may be negotiated, especially on isolated or problem crops):

- four full standard frames of brood in all stages (7000 cm² of brood, 7 frames 60% full)
- twelve standard frames well-covered with bees (approximately 30,000 bees)
- at least three full-depth frames of honey
- a high-quality laying queen
- sufficient room for colony expansion
- be free of American foulbrood and European foulbrood and
- has been appropriately treated for Varroa if treatment thresholds have been met

3. To deliver each instalment of hives to the property within 24 hours of final notice from the grower under clause 10.

4. To place hives in positions decided in previous consultation with the grower in group sizes of no more than ___ hives.
5. To feed each colony ___ litres of ___% sugar syrup solution every second morning starting on the second day colonies are in the orchard.
6. To not place/spill sugar syrup outside the hives where it can be collected by foraging bees.
7. Within 24 hours of notice from the grower, to open and demonstrate bee colony strength of any hives specified by the grower.
 - a. To lend the grower and/or auditor effective protective clothing if requested where they wish to accompany the beekeeper under clause 7 above
 - b. To allow an auditor nominated by the grower to audit the strength of the colonies if requested by the grower (such request not to be made unreasonably).
8. To supply within 24 hours an additional hive(s) to compensate for any hive found to be below the minimum standard, at no extra cost to the grower.
9. To remove the hives within 48 hours of being notified by the grower that they are no longer required.
10. To take all reasonable measures to reduce the number of field bees left behind in the grower's property when hives are removed.
11. To collect any bee swarms in the property during the flowering period within 48 hours of request by the grower.
12. Replace any hives that swarm within 24 hours.
13. To carry public liability insurance.
14. To inspect the property and any hazards identified by the grower under clause 8, such inspection to be in daylight before delivery of hives.
15. Carry out any sanitation of vehicles as required by the growers.

GROWER RESPONSIBILITIES

Grower Agrees:

1. To pay a rental sum of \$ ___ per hive for a total of _____ hives. GST is to be added to all payments.
2. The total rental is \$ _____. This is payable as to \$ _____ on or by _____ (date) and a final payment of \$ _____ by the 20th of the month following removal of hives from the property.
3. To pay 1.5% per month (or part thereof) interest on amounts unpaid after due dates.
4. To liaise with the beekeeper well in advance of hive delivery and allow beekeeper prior inspection of the property in daylight.
5. To provide a suitable place to locate hives. This site must be readily accessible to a truck and other vehicles used in handling and servicing the colonies and be in a sheltered, sunny position.
6. To provide the beekeeper with a map of the property well before delivery of hives showing the positions in which hives are to be placed, and the number of hives to be placed at each location. The positions will be as agreed under clause 4.

7. To be present, or nominate an appropriate person to be present, when the beekeeper inspects under clause 14 under responsibilities of the beekeeper, and when hives are delivered and removed (to assist with locating sites).
8. To advise the beekeeper in writing of any property hazards including drains, orchard wires, fences, ditches, irrigation pipes, and any other hazard, and to clearly identify the location and nature of such hazards.
9. To allow the beekeeper entry onto the property at a reasonable time whenever necessary to service the bees.
10. To give the beekeeper at least 48 hours first notice and 24 hours final notice that hives are required to be placed in the property.
11. Not to shift, examine, or disrupt bee access to or from hives without the beekeeper's approval.
12. To give the beekeeper at least 48 hours' notice to remove hives from the property.
13. To abide by the appropriate country and/or state pesticide legislation.
14. To comply with bee toxicity warnings on agrichemical labels.
15. Not to spray any bee-toxic chemical while the hives are on the property, and in so far as is reasonably practicable, to avoid spraying any insecticide in the ten days prior to hives being shifted into the property.
16. To avoid spraying any agrichemicals between 08:00 and 17:00 hours when large numbers of bees are foraging, in so far as is reasonably practicable.
17. To provide the beekeeper with at least 24 hours' notice if anything is to be sprayed on the property while hives are present and to flush any insecticide or other bee-toxic chemical from tanks and spraying equipment before spraying while hives are on the property.
18. To dispose of any insecticide-contaminated liquid or other bee-toxic material so that bees cannot contact or drink it.
19. To give adjoining landowners notice of intent to bring in hives at least ten days before the hives are moved into the property and notice of the full period that the hives may be present.
20. To advise the beekeeper within 12 hours if a significant number (one cup or more) of dead bees are seen near the entrance of any hive.
21. To avoid irrigating flowering crops while bees are foraging and to ensure irrigators will not overrun and drench hives.

PERFORMANCE

Neither party shall be responsible for failure to comply with the terms of this agreement where such failure to comply results from causes beyond the reasonable control of that party, provided however that this shall not relieve the grower from liability to make payment for services performed.

ARBITRATION

If the grower is dissatisfied with the quality of hives supplied, his/her first recourse shall be to the beekeeper. Such complaints shall be lodged as soon as possible and in no case after the hives are removed from the property.

In the event of any unsettled dispute between the beekeeper and grower, both parties agree to abide by the decision of a mutually agreed upon independent arbitrator.

ASSIGNMENT OR TRANSFER

This agreement is not assignable or transferable by either party, except that the terms hereof shall be binding upon a successor by operation of law to the interest of either party.

IN WITNESS THEREOF, the parties hereto have executed this agreement the day and year above.

Grower:

Address:

Contact details: (Home) (Mobile)

Beekeeper:

Address:

Contact details: (Home) (Mobile)

(One signed copy each to be retained by the grower and by the beekeeper)



Appendix 2 Pollination record

Date of check	
Crop Type/Variety	
Area/block/paddock	
Hives per hectare	
Hive condition at arrival	
Date flowering started	
% flowers when first hives arrived	
Weather during pollination	
Bee activity seen during pollination	
Crop Yield	
Pesticide applications	
Other	

Appendix 3 Declaration of Compliance with the Code of Practice

Your last successful completion of an approved Honeybee Pest and Disease Training Course or the Beekeeper Biosecurity Training and Assessment Program to comply with Section 9 of the Code?

Date ___/___/___

Provider reference No.

Result:

Dates over which all hives were inspected to comply with Sec. 3. 1 of the Code

___/___/___ to ___/___/___

___/___/___ to ___/___/___

Dates over which all hives were inspected to comply with Sec. 3. 2 of the Code.

___/___/___ to ___/___/___

___/___/___ to ___/___/___

Tick the method(s) used for mite examination:

- Sugar shake
- Alcohol wash
- Drone uncapping
- Soapy water wash

Date of your last independent honey test for American foulbrood to comply with Sec. 10 of the Code.

___/___/___

Testing laboratory:

Laboratory reference number:

Result

Positive/Negative

During the past 12 months I have maintained management standards that are fully compliant with the Australian Honeybee Industry Biosecurity Code of Practice, including maintained accurate, legible, records of all biosecurity-related activities in accordance with Part B Section 5 of the Code.

YES / NO

I certify that the above information is true to the best of my knowledge

Name: _____

Signature: _____

Date: _____