

## Pesticide Application on Edibles

Pesticides are an essential tool in the control of pests in nursery production. However special consideration should be given to the use of pesticides on edible crops especially those with potential to be readily eaten. In this month's Nursery Paper Grant Dalwood (NGISA) and Chris O'Connor (NGIA) remind industry of some of the key considerations when it comes to pesticide application in edible crops.

# Pesticide Application on Edibles

In light of the growing popularity of the 'grow your own' trend with home gardeners, recent years have seen an increasing demand for ready to eat consumable produce in the nursery retail sector. Examples include ready to eat herbs, advanced vegetables and advanced potted patio or dwarf fruit trees such as citrus or apples.

In conjunction with this trend, there have also been some realignments of Interstate Certifications Assurances (ICAs), so it is timely to remind growers of their need to be cognisant of the end users of their product, as well as the legal and moral obligations of providing a product which is safe for consumption and fit for purpose.

### Maximum Residue Limits

Chemicals applied to crops will undergo change; they will break down over time through metabolic processes or environmental influences. What remains within the crop, either as the original chemical form or product of that form is known as a chemical residue.

Maximum Residue Limits or MRL's are the maximum concentration of a chemical residue legally permitted in agricultural produce, resulting from the registered use of an agricultural or veterinary chemical. The MRLs are set by the Australian Pesticides and Veterinary Medicine Authority (APVMA) and specific attention is given to produce intended as food stuffs.

Before any agricultural or veterinary chemicals are released for sale and/or use in Australia they are rigorously evaluated for

registration by the APVMA. As part of this evaluation process MRLs are determined to ensure that the levels determined are not hazardous to human health either through chronic exposure or as an acute dose.

Once the MRL for the agricultural or veterinary chemical is set, these are then in the case of food products recommended to Food Standards Australia New Zealand (FSANZ) and incorporated into the Foods Standards Code. This code has been adopted by state and federal laws so the MRL becomes the maximum concentration of chemical legally permitted in or on a food or agricultural commodity as a result of the legal application of agricultural or veterinary chemicals.

It is important to note that these MRLs are not likely to be exceeded if the agricultural or veterinary chemicals are used as per the approved label instructions.

There are many facets which influence how agricultural chemicals perform in a crop situation and these are considered in the process of determining the MRLs and throughout the registration process.

From the APVMA some considerations include;

- how rapidly the chemical may be processed by either plant and/or animal tissues
- how rapidly the chemical may be degraded by soil and other environmental processes
- how frequently and at what intervals the chemical is used, taking into account the

potential for bio-accumulation

- how close to harvesting of plants the chemical is used (including withholding periods)
- the acceptable dietary exposure to low levels of chemicals in food
- how accurately the chemical and/or toxicologically significant metabolites can be measured in plant material
- any differences in MRLs and residue definitions between Australia and its major trading partners and those of the Codex Alimentarius Commission of the United Nations

The factors noted above constitute a wide array of possible influences upon the efficacy and likely impact of agricultural chemicals. The same chemical can behave very differently between plant species and between environmental conditions. It is for this reason that chemicals are registered for specific crops in specific situations along with specific application doses and withholding periods.

### Product Labels and Minor Use Permits

The product label is the most important source of information in regards to the legal use and application of an agricultural chemical and is in itself is a legal document. It includes essential information on;

- active constituents of the chemical
- directions for use
- modes of action
- any specific restraints or restrictions on use
- withholding periods
- safety information

In all situations and especially so with edible crops, the directions on the label must be followed including the rate of chemical used, the frequency of application and any specific instructions such as withholding periods or environmental parameters during application (e.g. do not apply if ambient air temperature exceeds 30°C).

Victoria differs from many jurisdictions in Australia in that it routinely allows off label use. Off label use applies to situations where a chemical is used in a way not specified by the label, for example using it to control a different pest or in a different crop situation. Some restrictions to off label use however do apply, these include;

- using a chemical at a higher rate than is listed on the label
- applying a chemical at a higher frequency than listed on the label
- not following specific label statements (i.e. DO NOT statements)

Outside of these situations a specific permit is required from the APVMA.



**Growers and retailers need to manage withholding periods of pesticides, especially in those products such as advanced fruit trees which may be readily consumed.**

The Victorian Department of Environment and Primary Industries (DEPI) advise that any person using chemicals in an off label manner accept responsibility for the efficacy of the chemical, any residues in the environment and produce and any health and safety issues. The Victorian DEPI also notes that with food crops, great care must be taken with off label use. Victorian DEPI advise that in cases where a chemical is not registered for use in a particular crop, that it is unlikely that a MRL is established and so any chemical residue in the end product would be unacceptable.

The assessment of agricultural chemicals is a costly venture, and so not all chemicals are registered in all possible crop situations. There is still however a need for growers to legally access and use chemicals to target specific pests in small crops, to access new chemistry and to manage pesticide resistance for pest control in emergency pest situations. In these circumstances Minor Use Permits or Emergency Permits are available.

Minor Use Permits are issued by the APVMA and are designed to allow growers legal access to use a chemical in a crop situation. In effect they become an extension of the information on the label. Like label directions, Minor Use Permits must be used in accordance with the described crop, pest and situation. For example many Minor Use Permits available for our industry are for ornamental crops and not food crops, so are not suitable for use on edibles. Minor Use Permits are also registered for a specific time frame so before using a chemical with a Minor Use Permit ensure that you have a valid permit within its expiration date.

### **Awareness of Withholding Periods**

According to the APVMA "A withholding period (WHP) is the time period that is set at registration for a chemical, to guide users of the chemical as to when residues will be below the MRL. It is based on the rate at which the chemical breaks down on the crop/animal. It is the minimum length of time between treatment of a crop or animal, and the suitability of the harvested crop or the animal product for human consumption."

As noted earlier, different chemicals are processed by plants at different rates, and this processing or breaking down of the chemicals is influenced by many factors such as environmental

conditions (temperature, rain, humidity) and the method of application (e.g. foliar application versus media drenching). So because of this variance it is important to pay particular attention to the directed withholding periods as stipulated by the label.

Awareness of withholding periods applies to both growers and retailers when dispatching product for sale. For retailers, any stock which falls within a withholding period must be removed from sale and not reintroduced until the completion of the withholding period. Retailers should also be aware of what chemical practices their suppliers (growers, brokers and trade marts) are using.

### **Compliance records**

Businesses involved in any level of pesticide application should keep records of pesticide application. A main driver to record keeping is to demonstrate compliance with various Quality Assurance programs associated with food safety and production such as Freshcare or those programs required by large supermarkets and to meet Work Health and Safety requirements. Appropriate record keeping is also a requirement of the Nursery Industry Accreditation Scheme Australia (NIASA) program.

Records for spray applications can also be used for other benefits beyond just compliance such as;

- resistance management e.g. cycling modes of action
- aiding future decision making through better purchasing plans, budgeting and forecasting along with product performance reviews
- assistance in emergency situations
- assistance in determining the causes of any associated issues if they arise

Examples of records which should be kept include;

- equipment Calibration records,
- spray application records,
- pesticide manifests

Detailed examples of these records are available on the NGIA website as part of the Nursery Industry Pesticide Management Diary and more information on your legal recording obligations are available from your state DPI's.



### Interstate Market Access Requirements

Biosecurity and domestic quarantine is of paramount importance to the Australian nursery industry. Supporting domestic quarantine are many Interstate Certification Assurances (ICAs) which require growers to treat stock prior to interstate shipment. Awareness of exactly what is required by these ICAs is essential to growers.

For example, in the case of movement of greenlife stock between SA and NT, there is an operational procedure in place (CA-10) that has recently highlighted a major concern for SA based nurseries that were sending potted edible herbs and vegetable plants to the NT. These issues were based on appropriateness of chemicals used for spraying consignments (before 9th May 2013) that had been prescribed under the Plant Movement NT (PMNT) arrangement.

Spinosad & Bifenthrin were originally prescribed for spraying edibles to combat Western Flower Thrips (WFT) and Scale insects entering the NT. However, Bifenthrin was identified as possessing properties that would impact the health of people who may have eaten the product within the withholding period once the product had arrived in the NT.

Through NGISA and the relevant government bodies the procedure was amended so that, vegetable and herb seedlings for transplanting must be treated with Bifenthrin as per Permit 9795 Version 7. This ensures that the residue of the chemical will be mitigated with the onset of time and the transplanting process.

The complimentary option for Vegetable and herb plants for growing on or pot culture is that they must be treated with white oil as per APVMA Permit 11815 Version 1. Plants that are deemed to be available for immediate consumption by humans are required to only be sprayed with a measured dose of white oil as per instruction in the APVMA Permit. This will ensure a reduction of risk to consumers but still manage the quarantine requirements of NT.

This demonstrates that growers must be aware of the intended use of their products once they have left dispatch and remain up to date with market access requirements for treatment of nursery stock.

### Key Points for Keeping Residues Below the MRL

The following points may assist you in keeping residues below the MRL in your products.

- Use the right product – is it registered for the pest, crop and situation?
  - Be aware of the product configuration and end user – Will it be potentially eaten straight away e.g. advanced vegetables or will it need to be planted out/grown on e.g. vegetable seedlings?
  - Comply with any withholding periods and schedule your production to factor this in
  - Be mindful of how you apply the chemical
- Look at the concentration e.g. different application methods may have different concentrations e.g. spray versus drenching.
  - Be mindful of spray drift e.g. from an ornamental crop to an edible crop
  - Be aware of the rate of application this includes making sure that application equipment is calibrated i.e. delivers the right dose. Too much causes waste, costs money, causes possible phytotoxicity and elevated residues. Conversely, too little is not effective for the target pest.

- Be aware of where you have used pesticides in your production system. For example if pesticides are routinely incorporated into potting media this may pose a risk.

- Keep good records on your pesticide use. This will help to identify issues and will also be required from a compliance perspective.
- Ensure that any accidents are responded to appropriately e.g. if stock is inadvertently sprayed it is removed from sale.
- Consider using an Integrated Pest Management (IPM) System if you are not doing so already.

In addition to the above points, NGIA has recently released an updated Nursery Pesticide Application Best Practice Manual to assist nursery operators in identifying and understanding the range of pesticide application equipment available and the key issues related to the use of pesticides in the nursery environment. The APVMA and state DPI's also have a great deal of information specific to your jurisdiction and situation.



**Advanced herbs are an example of one product which may be readily consumable by customer**



The **signal heading** at the top of the main panel specifies the product's poison schedule (which is based on criteria such as toxicity, use, potential for abuse and safety).

For agricultural, domestic and industrial poisons Schedules 5, 6 and 7 represent increasingly strict container and labelling requirements. Poisons listed in Schedule 7 are also subject to special regulatory controls on availability and use.

A signal heading also indicates any restriction on availability such as Prescription Animal Remedy, which is a Schedule 4 veterinary chemical.

If considering several chemicals, the signal heading can help users choose the less toxic option.

The signal heading includes **cautionary statements** regarding safety and storage such as 'KEEP OUT OF REACH OF CHILDREN'. All veterinary chemical products have the phrase 'FOR ANIMAL TREATMENT ONLY' to differentiate them from agricultural chemicals and human medicines.

**Mode of action symbol.** This letter or number indicates how the chemical works to help users manage chemical resistance by rotating chemical use through different modes of action.

**Limitations on use** warn against using the product contrary to label instructions unless authorised. In Victoria 'restricted use' chemicals must not be used off-label.

One limitation on use is the **withholding period (WHP)** – the minimum interval between the last use of the chemical and harvesting/grazing of plants or slaughter of animals. WHPs aim to prevent unacceptable chemical residues in our food, so contravening them is an offence. Note that some chemicals have multiple WHPs as the use pattern on each crop/animal can differ. The WHP is based on the rates of use shown on the label.

The label might also list **Export Slaughter Intervals (ESI)** which aim to protect our export trade. The ESI is the period that should elapse between treatment of an animal with a veterinary chemical or treated feed and slaughter for export.

Information on **storage** and cleanup, mixing and application, equipment maintenance and avoiding resistance are shown here.

The label will also refer to the **Material Safety Data Sheet** which provides more information on the chemical.

**CAUTION**

KEEP OUT OF REACH OF CHILDREN  
READ SAFETY DIRECTIONS BEFORE OPENING OR USING

**JO BLOGGS 500  
SELECTIVE HERBICIDE**

**ACTIVE CONSTITUENT**  
500 g/L 2,4-DB presents as dimethylamine salt.

**SOLVENT**  
260 g/L hydrocarbon liquid

**GROUP I HERBICIDE**

For selective control of certain broadleaf weeds in various crops as per the directions for use table

<p>Jo Bloggs Pty Ltd 80 Ryde St TINDALE NSW 2000</p>	<p>Contents 20 L</p>
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**Emergency Contact No. 1800 ETC**

**DIRECTIONS FOR USE**  
**RESTRAINTS**  
DO NOT apply when rain is expected within 4 hours.  
DO NOT apply to crops or weeds that are stressed by drought or cold, frosty conditions.

<b>CROP</b>	<b>WEEDS</b>	<b>RATE L/ha</b>	<b>CRITICAL COMMENTS</b>
Barley, Oats, Wheat understorey with...	Refer to weeds tables 1 and 2 following	2.1 - 3.2	Apply when crop is from tillering after the main shoot has 5 leaves until before the boot stage; and when lucerne

NOT TO BE USED FOR ANY PURPOSE, OR IN ANY MANNER, CONTRARY TO THIS LABEL UNLESS  
AUTHORISED UNDER APPROPRIATE LEGISLATION

**WITHHOLDING PERIOD**  
DO NOT GRAZE OR CUT FOR STOCK FOOD FOR 7 DAYS AFTER APPLICATION

**GENERAL INSTRUCTIONS**  
**RESISTANT WEEDS WARNING**  
Jo Bloggs 500 is a member of the phenoxy group of herbicides. Its mode of action is to etc.

**PRECAUTION**  
Don't mix chemical in steel tanks otherwise you might cause an explosive gas.

**PROTECTION OF WILDLIFE, FISH, CRUSTACEANS AND ENVIRONMENT**  
Do not allow chemical or used containers to contaminate streams or waterways.

**STORAGE & DISPOSAL**  
Store in the closed original container in a cool, well ventilated area.  
DO NOT store for prolonged periods in direct sunlight.  
This container can be recycled if it is clean, dry, free of visible residues and has the DrumMaster logo visible. Triple or pressure rinse container for disposal. Dispose of rinseate by adding it to the spray tank.

**SAFETY DIRECTIONS**  
Will irritate eyes. When opening the container and preparing the spray, wear face shield or goggles.  
Wash hands after use.

FIRST AID Contact Poisons Information Centre - 131 126  
Additional information is listed in the MSDS available from the supplier.

**APVMA Approval no: XXXX**

BATCH: A7W932    DOM: 060199

A **product name** should distinguish itself from another product and describe the intended use of that product, such as XYZ Dicamba Herbicide.

**Active constituent/s** and concentration appear below the product name. This is useful information in an emergency. It can also be used to compare products with the same active constituent, but perhaps a different level or formulation type.

If the **solvent** in the product is a scheduled chemical, it appears under the heading SOLVENT below the active constituent.

**Claims for use** statements show the purpose for which the chemical was registered unless already described by the product name. Restrictions on availability may also appear here with statements such as RESTRICTED CHEMICAL PRODUCT – ONLY TO BE SUPPLIED TO OR USED BY AN AUTHORISED PERSON.

**Directions for use** include instructions on how, when and where the product is to be used. This includes crops/animals and/or situations on which the product can be used, the pests/diseases to be controlled, results expected, application rates, restraints and critical comments. It is an offence in Victoria to contravene restraint statements (the DO NOT statements).

The DO NOT statements in directions for use can be **precautionary statements** addressing safety issues such as 'DO NOT enter treated areas for three days after spraying'.

**General instructions** include information for safe and effective use of the product.

When a product presents a hazard to people, animals or plants it will also carry **precautionary statements** such as 'DO NOT spray aviaries' and 'DO NOT allow spray to contact or drift onto plants you do not want killed'.

**Protection statements** provide a warning to avoid off-target damage to crops, the environment or livestock. Bees are 'livestock' and are especially sensitive to some agricultural chemicals.

**Safety directions** detail the hazard, how to minimise it and recommended protective equipment. **First aid statements** (below the safety directions) explain what to do (and not do) if someone is exposed and list the Poisons Information Centre phone number.

The **APVMA/NRA approval number** typically appears at the bottom of the rear panel on the main container, along with product number, pack size and date of initial registration. The NRA is the predecessor of the APVMA.

The label will also show the **manufacturer** and **batch number** while veterinary chemicals also have an **expiry date**.

**Abide by the directions of use and withholding periods of pesticides to ensure MRL's are not exceeded.**

## Further Information

Australian Pesticides and Veterinary Medicines Authority [www.apvma.gov.au](http://www.apvma.gov.au)

Victorian Department of Environment & Primary Industries - Off label chemical use in Victoria [www.depi.vic.gov.au/agriculture-and-food/farm-management/chemical-use/agricultural-chemical-use/off-label-use/off-label-chemical-use-in-victoria](http://www.depi.vic.gov.au/agriculture-and-food/farm-management/chemical-use/agricultural-chemical-use/off-label-use/off-label-chemical-use-in-victoria)

Biosecurity South Australia Movement of Nursery Stock & Plant Material to the Northern Territory (PMNT) Operational Procedure [www.pir.sa.gov.au/\\_\\_data/assets/pdf\\_file/0007/43189/CA10\\_PMNT\\_PROCEDURE\\_15\\_5\\_2013.pdf](http://www.pir.sa.gov.au/__data/assets/pdf_file/0007/43189/CA10_PMNT_PROCEDURE_15_5_2013.pdf)

NGIA Nursery Pesticide Application Best Practice Manual [www.ngia.com.au](http://www.ngia.com.au)

For additional information, consult the following nursery papers which are all available electronically from [www.ngia.com.au](http://www.ngia.com.au)

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