



# **BEST PRACTICE GUIDELINES FOR THE APPLICATION OF CHEMICALS IN MACADAMIA ORCHARDS**

July 2011

Prepared by  
Australian Macadamia Society  
Suite1, 113 Dawson Street, Lismore 2480, NSW  
Phone: 02 6622 4933. Fax: 02 6622 4932  
e-mail: [admin@macadamias.org](mailto:admin@macadamias.org) website: [www.macadamias.org](http://www.macadamias.org)

## Foreword

The macadamia nut industry makes a substantial contribution to the local economies of the Northern Rivers Region and Nambucca region of NSW, Gympie, Glasshouse and Bundaberg regions in Queensland and to Australia generally.

The use of agricultural chemicals is governed by the Office of Environment and Heritage (OEH) in NSW and Biosecurity Queensland for QLD. The responsibility for administering the legislation resides with OEH for NSW and that Biosecurity administers the direct controls on the use of agricultural chemicals in Queensland.

For guidelines on off-target spray drift and chemical use, reference should also be made to the *Australian Macadamia Industry Code of Sound Orchard Practices*.

The approach considered to best achieve a sustainable outcome is the development of a Best Practice Guideline containing the latest information to hand on the operational deployment of chemicals in agriculture, supported by and endorsed by stakeholders in the macadamia nut industry and residents.

This is a voluntary Best Practice Guide which is supported by the Australian Macadamia Society Limited, Office of Environment and Heritage (NSW) and Biosecurity Queensland.

The Guide has been prepared by Australian Macadamia Society in consultation with growers, consultants and researches involved in the Australian macadamia.

We also acknowledge the initial work by Australian Strategic Planning Pty Ltd in the preparation of material for this guide.

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**LIST OF ABBREVIATIONS**

AMS – Australian Macadamia Society Limited
APVMA – Australian Pesticide and Veterinary Medicines Authority
OEH – Office of Environment and Heritage
FAISD – First Aid Instructions, Safety Directions and Warning Statements Handbook
LCC – Lismore City Council
MRL – Maximum Residue Level
MSDS – Material Safety Data Sheet
NIS – Nut-in-shell
NOHSC –National Occupational Health and Safety Commission
OH&S – Occupational Health and Safety
PPE – Personal Protection Equipment
REI – Re-entry Intervals
TAFE – Technical and Further Education
WP – Withholding Period

## BEST PRACTICE GUIDELINES FOR THE APPLICATION OF CHEMICALS IN MACADAMIA ORCHARDS

The guidelines have been published to assist macadamia growers, their families, employees and contractors, rural residents, equipment and machinery manufacturers and other stakeholders to develop and implement practices to reduce the risk of “off target movement” of spray as part of orchard management.

### Purpose

The guidelines provides practical guidance on complying with the *NSW & QLD* regulations in relation to licensing requirements for users of certain agricultural chemicals, user record keeping, user training, and the establishment of standards for application and use of agricultural chemicals. Users of this guide should also refer to applicable legislation & regulations for that State.

It is a statement of best practice for crop spraying and chemical use in macadamia nut production and actions for landholders, their employees or other persons to undertake when using spraying equipment and chemicals given the current state of knowledge.

### Is the Guideline Compulsory?

The guide which is **voluntary** is aimed at ensuring that macadamia farming promotes a good neighbour approach between growers, their neighbours and the community.

It recognises the right of macadamia nut growers to make their own business decisions, provided these decisions comply with legal requirements, regulations and industry standards. These decisions should comply with principles of preserving natural resources and minimizing ‘adverse *on-site and off-site impacts on the environment and any other sector of the community*’.

**It is recommended that every rural landholder take this guide into account because it is likely that following these best practice guidelines will result in good neighbourly relations, more profitable farming activities and less risk of prosecution.**

Most agricultural chemical application is applied using liquid sprayers. Spraying equipment includes horizontal boom sprayers for under-tree herbicide application, motor driven pressure pumps attached to hoses and hand guns for high volume spraying of weeds or trees and motorised self-driving or trailered high pressure air-blast assisted orchard sprayers.

Preventing off target movement is an essential aspect of using agricultural chemicals responsibly.

This guide should be followed by orchard managers to ensure conformation with relevant laws and guidelines and thereby ensure the safety and well-being of growers, farm workers, customers, consumers, neighbours and others who may visit or be otherwise impacted by the chemical spraying practices used for pest and disease management in macadamia orchards.

Not all horticultural chemicals are classified as hazardous substances. However, care should be taken when handling all chemicals.

**For guidelines on off-target movement and chemical use, also refer to Australian Macadamia Industry Code of Sound Orchard Practices (see Pest and Disease Management)<sup>1</sup>.**

The guide has been designed for farmers and community alike, for the sole purpose of promoting open and transparent farming operations.

Appendix A summarises the responsibilities of stakeholders for use of chemicals and control of off target movement of chemicals (i.e. grower; chemicals supplier, Government Agency; and residents/neighbours).

Appendix B contains information about the NSW & QLD Government Agencies responsible for the use of agricultural chemicals and the range of enforcement actions.

Appendix C provides a summary of the APVMA definition of a sensitive area.

Appendix D provides a definition of what a UN number is.

<sup>1</sup> Australian Macadamia Industry Code of Sound Orchard Practices, Australian Macadamia Society Ltd, Section 2.5, pp15-18.

## BEST PRACTICE GUIDE FOR CONTROL OF SPRAY DRIFT AND USE OF CHEMICALS IN MACADAMIA ORCHARDS

Topic	RECOMMENDED BEST PRACTICE ACTION	Beneficial Outcomes
1. Operational		
1.1 Weather & Conditions & Equipment	<p>Do not spray in strong wind conditions or if wind is blowing towards sensitive areas (<i>for definition of sensitive areas refer to appendix C</i>) where even light spray drift may be of concern</p> <p>Equipment to be calibrated prior to spray season. Depending on canopy, equipment will need to be adjusted to growth</p> <p>Calibration will also depend on tractor speed, engine speed, air volume, type of nozzle, pressure gauge</p> <p>Latest weather forecast for day of spraying</p> <p>Recording of chemicals, wind conditions (please see separate section)</p> <p>Ideal wind speeds are 3-20 km/h</p> <p>During spraying, wind should be blowing steadily - light and variable or gusty winds make it difficult to predict where spray will go;</p> <p>Spraying should not be carried out under calm or still conditions - under calm conditions, droplets are more likely to remain suspended in the air.;</p> <p>Ideally, wind should be blowing away from sensitive areas (<i>for definition of sensitive areas refer to appendix C</i>);</p> <p>Spray with a cross wind, i.e., at right-angles to the direction the sprayer is travelling;</p> <p>Avoid spraying in temperatures near or above 28°C - the cooler the temperature the better; spraying during high temperature conditions can result in agricultural chemicals evaporating or turning into vapour; higher ground temperatures establish air currents, which lift spray mist and carry them so that they spread over a wide area;</p> <p>Spray when humidity is high, i.e., greater than 45% - this is particularly important when the agricultural chemicals is dissolved in water, as low humidity is often associated with high temperatures and thus high evaporation;</p> <p>Turn spray off if no row to spray on one side;</p> <p>Turn spray off when turning;</p> <p>Do not spray in strong winds or gusty conditions;</p> <p>Identify sensitive areas (<i>for definition of sensitive areas refer to appendix C</i>);</p> <p>Maintain a buffer between application areas and sensitive areas (<i>for definition of sensitive areas refer to appendix C</i>);</p> <p>Avoid spraying under conditions of high temperature</p> <p>Do not spray when inversion conditions exist</p>	<p>Responsible community involvement</p> <p>More efficient use of chemical application, equates to more efficient use of time and money</p> <p>Better application coverage improves pest/fungal control</p> <p>Less chemical usage thus reducing chemical footprint</p>

Topic	RECOMMENDED BEST PRACTICE ACTION	Beneficial Outcomes
	Keep a nozzle chart handy and calibrate according to conditions and crop	
1.2 Accreditation for spray operators	Spray operators are required to have a certificate of accreditation (NSW) indicating that they have met the requirements of the Agricultural Chemical Users Training [Chemsafe] Course. The AMS strongly supports the certified accreditation of all growers in the industry	Accreditation ensures up-to-date understanding of the best practice guidelines for chemical usage
1.3 Neighbourhood planning and sensitivity to surrounding areas	Notifications to neighbours, use an appropriate method that makes sense for all Maintain control of all spray operations. Immediately stop spraying, or stop the contractor spraying if the conditions are not right; Read the product label and follow the instructions accurately; If possible, choose a product that is non-volatile; Identify sensitive crops and other critical areas around where you intend to spray, and let the spray operator know about them; Discuss your spray plans with your neighbors and contractors. Maintain a map of the orchard and identify: buffer zones sensitive areas Maintain a buffer zone between areas of application and areas where there is a risk; some labels will prescribe a mandatory no-spray zone for downwind sensitive areas. Minimise the height at which the spray is released - if spray is being applied aerially, make sure that it is released only when the aircraft has leveled out above the crop; Turn off fans when spraying near silos containing nuts.	Responsible community involvement Picking the right time to spray means less chance of adverse weather outcomes Orchard map of sensitive areas and no spray zones makes it easier for growers to notify neighbours and make operational adjustments according to changes
1.4 Responsible Chemical Usage	Following label or permit instructions Avoid spraying near non target areas; Using only registered chemicals Storing agricultural chemicals in labelled containers	Meet the legal requirements and standards of government bodies
1.5 Incident reporting	If an incident occurs record the following: the date, time and duration of the incident the exact location description of spray equipment how the equipment was being used weather conditions especially wind names and contact addresses of any other witnesses any exposure to non-target areas document with the APVMA (Adverse Experience Reporting)	Recording of information is an essential part of the legal requirements as well as good community engagement
<b>2. USE OF CHEMICALS</b>		
<b>Topic</b>	<b>RECOMMENDED BEST PRACTICE ACTION</b>	<b>Beneficial Outcome</b>

Topic	RECOMMENDED BEST PRACTICE ACTION	Beneficial Outcomes
<b>2.1 Record use of chemicals and sprays</b>	<ul style="list-style-type: none"> <li>➤ Record within 24 hours the application of every chemical and spray. Information to be recorded should include:               <ul style="list-style-type: none"> <li>○ Date with start and finish times</li> <li>○ Full name of the product</li> <li>○ Location address and paddock/s sprayed</li> <li>○ Amount of product used per hectare and number of hectares applied to</li> <li>○ Crop and target weed/pest for crop protection application</li> <li>○ Wind speed and direction application</li> <li>○ Air temperature and relative humidity during application</li> <li>○ Nozzle brand, type, spray angle, nozzle capacity and spray system pressure measured during application</li> <li>○ Name and address of person applying this product (Additional record details may be required by the state or territory where this product is used)</li> </ul> </li> <li>➤ Recorded details need to be reasonably specific; e.g., not just 'Fred' but '<i>Fred Smith</i>', not just 'orchard, but SE orchard boundary with'. The full product name should be recorded, not just metasystox or glyphosate. The time must include the start and finish times.</li> <li>➤ Where contractors are involved, make sure they have understood the principles of the Best Practice Guide and will operate according to the guide and have signed off accordingly</li> </ul>	<ul style="list-style-type: none"> <li>➤ Maintaining the legal requirement of record keeping of all agricultural chemicals applications has been compulsory in NSW and QLD.</li> <li>➤ Conforming to State regulatory requirements and avoiding fines. Regulatory officers may check these records at any reasonable time and penalties may apply if the records have not been kept properly.</li> </ul>
<b>2.2 Use Registered Agricultural chemicals Only</b>	<ul style="list-style-type: none"> <li>➤ Before using any agricultural chemicals first check that its use is Registered or covered by a Permit. If not, do not use it. There are no exceptions – all agricultural chemicals need to be registered, including so called 'natural' agricultural chemicals.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Maintaining a positive light on your farming practices and showing the communities that we are responsible</li> </ul>
<b>2.3 Use Agricultural chemicals Only at the Label Rates and for Label Uses</b>	<ul style="list-style-type: none"> <li>➤ Agricultural chemicals must be used only at the label rates and for label uses and stored and transported as per the label instructions.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Following label rates ensures correct application, which equates to better coverage and crop protection</li> </ul>
<b>2.4 Read the Label and Follow All Directions for</b>	<ul style="list-style-type: none"> <li>➤ Do not remove labels from their containers.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Maintaining labels and product documentation ensures correct usage instruction for workers</li> </ul>

Topic	RECOMMENDED BEST PRACTICE ACTION	Beneficial Outcomes
<b>Use</b>		
<b>2.5 Follow all Safety Directions</b>	<ul style="list-style-type: none"> <li>➤ Read the label and follow all directions listed in the Safety Directions and First Aid sections.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Fellow workers or emergency services attending an accident scene are better informed</li> </ul>
<b>2.6 Chemical Storage</b>	<ul style="list-style-type: none"> <li>➤ Follow the label instructions regarding the best place to store chemicals on the farm. <ul style="list-style-type: none"> <li>○ If a product is a Dangerous Good, this is identified on the product label. Remember that some non-agricultural chemicals products on the farm are also Dangerous Goods. Ammonium nitrate fertiliser is one example.</li> </ul> </li> <li>➤ Store chemicals onsite in a lockable bundled cage storage area with the correct signage</li> <li>➤ Keep records of chemical purchases including Date of Manufacture and UN number</li> <li>➤ Keep records of the disposal of empty chemical drums, including the date and the location of the disposal site</li> <li>➤ <b>Exemption Limits for Dangerous Goods.</b> In NSW licensing may be required if you store amounts in excess of the following: <ul style="list-style-type: none"> <li>○ Class 3 – Flammable Liquids – More than 100 litres of Packing Groups I or II, or 1000 litres of Packing Group III in an aboveground tank.</li> <li>○ Class 6 – Toxic Substances [Poisons] – 10 kg of Packing Group I, 100 kg of Packing Group II or 1000 kg of Packing Group III.</li> <li>○ Class 6.1 – Oxidising Agents [e.g. Ammonium nitrate fertiliser] – 25 tonnes if kept in separate depot at least 50 metres from other buildings – 500 kg otherwise.</li> </ul> </li> <li>➤ <i>Class and Packing Groups are listed on product labels and/or Material Safety Data Sheet {MSDSs}.</i></li> <li>➤ Some products are classified as Dangerous Goods by WorkSafe and if you store above the threshold amounts of Dangerous Goods you may have to be licensed. Check with WorkSafe if you are in doubt. There are regulations covering the storage of Dangerous Goods. Refer to the Australian Dangerous Goods Code [ADG Code]. When Agricultural chemicals are Dangerous Goods it is usually because they are Flammable Liquids or Poisons including Dangerous Poisons.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Promotes a safe working environment for farm workers and community alike</li> </ul>
<b>2.7 Wear and Use Appropriate Protective</b>	<ul style="list-style-type: none"> <li>➤ Always use the safety equipment recommended in the Safety Direction section of the product label when handling, mixing and applying agricultural chemicals and other chemicals.</li> </ul>	

Topic	RECOMMENDED BEST PRACTICE ACTION	Beneficial Outcomes
<b>Equipment</b>	<ul style="list-style-type: none"> <li>➤ If your sprayer or tractor has a safety cab fitted, check that the cab including the filter system is fitted and maintained according to the manufacturer's instructions.</li> <li>➤ Keep people not wearing the appropriate safety equipment away during the spraying operation.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Promotes a safe working environment for farm workers and community alike</li> </ul>
<b>2.9 Withholding Periods</b>	<ul style="list-style-type: none"> <li>➤ All farm workers involved with picking operations must be aware of agricultural chemicals applications Withholding Periods (WP) to ensure that picking does not occur before the expiry of the WP. Periods in storage cannot comprise part of the WP as agricultural chemical breakdown may not be the same in nuts in storage as in nuts on the tree.</li> <li>➤ Nuts exceeding the MRL for any agricultural chemicals active ingredient may not be legally sold.</li> <li>➤ The use of by-products from nut processing must take into account the possibility of agricultural chemical residues in the by-product. For example this may limit the use of these products in potting mix.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Ensures the safety of food produce in line with Government guidelines for MRL</li> </ul>
<b>2.10 Worker Protection</b>	<ul style="list-style-type: none"> <li>➤ Growers should ensure that farm workers and contractors involved in agricultural chemical application are appropriately trained, instructed and protected. Workers not directly involved in agricultural chemical application should also be trained and or advised of aspects of agricultural chemical use on the farm that may impact on them.</li> </ul> <p>The following information and facilities must be made available to workers:</p> <ul style="list-style-type: none"> <li>○ appropriate personal protective equipment [PPE];</li> <li>○ Material Safety Data Sheets for each agricultural chemical product;</li> <li>○ product labels especially for access to Safety Directions and First Aid directions;</li> <li>○ washing facilities;</li> <li>○ emergency numbers in the case of poisoning;</li> <li>○ appropriate training or instruction; and</li> <li>○ information on Re-Entry Intervals.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Responsible agricultural chemical usage on farms includes ensuring the protection of farm workers, community and the environment.</li> </ul>

## Appendix A – Summary of Responsibilities for Control of Off Target Movement and Use of Chemicals

Responsibility	Grower	Chemical Supplier	State Regulator	Residents/ Neighbours
<b>1. Control of Off Target Movement</b>	✓	✓	✓	✓
1.1 Elimination or Reduction in Off Target Impacts	✓	✗	✗	✗
1.2 Management of Equipment	✓	✗	✗	✗
1.3 Accreditation of Spray Operators	✓	✗	✗	✗
1.4 Off Movement Prevention	✓	✗	✗	✗
1.5 Spraying near Silos	✓	✗	✗	✗
1.6 Agricultural chemical Misuse	✓	✗	✓	✓
1.7 Allegation of Off Target Movement	✓	✗	✓	✓
<b>2. Use of Chemicals</b>	✓	✓	✗	✗
2.1 Record use of Chemicals and Spray	✓	✗	✗	✗
2.2 Use of Registered Agricultural chemicals	✓	✓	✗	✗
2.3 Use of Agricultural chemicals only at Label rates and For Label Uses	✓	✓	✗	✗
2.4 Use of Restricted Agricultural chemicals	✓	✓	✗	✗
2.5 Reading the Label and Following All Directions for Use	✓	✗	✗	✗
2.6 Following all Safety Directions	✓	✗	✗	✗
2.7 Agricultural chemical Storage	✓	✗	✗	✗
2.8 Wearing and Using Appropriate Protective Equipment	✓	✗	✗	✗
2.9 Re-Entry Periods	✓	✗	✗	✗
2.10 Observing Withholding Periods	✓	✗	✗	✗
2.11 Worker Protection	✓	✗	✗	✗

## Appendix B – APVMA, Office of Environment and Heritage (OEH) and Biosecurity Queensland

### APVMA

The APVMA is an Australian government statutory authority established in 1993 to centralise the registration of all agricultural and veterinary chemical products into the Australian marketplace. Previously each State and Territory government had its own system of registration.

[www.apvma.gov.au](http://www.apvma.gov.au)

### NSW

OEH regulates the use of agricultural chemicals in New South Wales to reduce exposure and minimise impacts on the environment including plants, animals and people. This involves developing and enforcing chemical control

and agricultural chemical use laws, including regulating remediation technologies for treating agricultural chemical wastes and controlling major industrial spills and other hazardous incidents. OEH also provides information and advice on management of agricultural chemicals.

[www.environment.nsw.gov.au](http://www.environment.nsw.gov.au)

### QLD

Biosecurity Queensland:

- Coordinates the Government's efforts to prevent, respond to, and recover from pests and diseases that threaten the economy and environment
- Works to ensure continued market access for our products
- Maintains our reputation for high standards of animal care and keeping
- Reduces the risk of chemical contamination and promotes a safe food supply
- Helps to ensure Queensland land and the environment is healthy and resilient

[www.dpi.qld.gov.au](http://www.dpi.qld.gov.au)

## Appendix C – The Definition of a Sensitive Area

The APVMA identify four (4) categories of No Spray Zones (*sensitive areas*) in regards to chemical spray application, please refer to table below –

<b><u>Sensitive area application category</u></b>	<b><u>Highlighted examples of specific areas</u></b>
1. No-Spray zone for Protection of Human Health	<i>Structures that people occupy, parks and recreation areas</i>
2. No-Spray zone for Protection of the Aquatic Environment	<i>Aquatic and wetland areas, aquacultural ponds, surface streams and rivers.</i>
3. No-Spray zone for Protection of Terrestrial Environment	<i>Sensitive crops, gardens, landscaping vegetation, protected native vegetation and protected animal habitats.</i>
4. No-Spray zone for Protection of International Trade	<i>Livestock, pastures and any land that is producing feed for livestock.</i>

## Appendix D – The Definition of a UN Number

The UN number is assigned to a chemical substance by the United Nations Sub-Committee of Experts on the Transport of Dangerous Goods (UNSCETDG). It is a numerical field with a length of 4 digits. UN numbers range from UN0001 to about UN3500 and are assigned by the United Nations Committee of Experts on the Transport of Dangerous Goods. They are published as part of their *Recommendations on the Transport of Dangerous Goods*, also known as the *Orange Book*. These recommendations are adopted by the regulatory organization responsible for the different modes of transport. There is no UN number allocated to non-hazardous substances. These will simply not have a UN number.