

# Best practices for aerial and ground spray applications to cotton

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A lot of time, effort and money are spent on spray application. To achieve the best value from that effort requires that the application technique is matched to the target, the product and the weather conditions. Movement of spray away from the target area wastes product and increases the risk of damage or residues onto non-target crops or sensitive areas.

This chapter provides guidance on factors to be considered in optimizing spray application. New technologies and information are continually becoming available, so this is meant as a summary guide only. Readers should consult additional information where available. Recommended additional resources are highlighted and can be found in the *myBMP* Resources Section [www.myBMP.com.au](http://www.myBMP.com.au)

## Planning

The development of a comprehensive Chemical Handling and Application Management Plan (CHAMP) is an important part of the Best Management Practice (BMP) program in cotton.

The CHAMP for farming enterprises should be completed prior to the season and should cover:

- Farm layout;
- Identification of sensitive areas, potential hazards and awareness zones;
- Communications procedures;
- Pesticide Management Guidelines; and,
- Accident and emergency procedures.

Having a CHAMP in place helps to ensure that everyone involved in pesticide application has a clear understanding of their responsibilities.

## Legal requirements

Always read and follow the label when handling and applying chemicals and be aware of federal and state regulations for chemical application. Staff responsible for handling and applying pesticides must be qualified according to relevant state and federal requirements.

There may also be workplace health and safety requirements related to storage and use of hazardous chemicals, which require risk assessments to be completed, in addition to maintaining a manifest and Safety Data Sheets for those chemicals deemed to be hazardous.

Users are not absolved from compliance with the directions on the label or the conditions of the permit by reason of any statement made or not made in this publication.

## Label Instructions

Many product labels now include a range of Mandatory Statements, some examples include:

### Mandatory spray qualities

Labels typically require the use of a coarse spray quality or larger, or a Medium spray quality or larger according to the ASABE or BCPC classification systems. Ensure nozzles are selected from charts that refer to either of these standards and equipment is setup and used appropriately to achieve the required spray quality.

### Mandatory wind speed range

Labels state that the wind speed must be above 3 km/h and less than either 15 km/h or 20 km/h (depending on the product) as measured at the site of application. Minimum wind speeds at night should be above 11 km/h to ensure turbulence (mixing of the air) and to minimize the likelihood of a surface temperature inversion being present.

### Surface temperature inversions

Labels state that spraying must not occur during a surface temperature inversion. There is a high risk of surface temperature inversions being present at night. For more information refer to the GRDC factsheets on Surface Temperature Inversions and Tips to reduce spray drift.

**myBMP resources: GRDC Surface temperature inversions and Tips to reduce spray drift**

## Spraying?

Be aware – take care



Cotton crops are sensitive to Herbicide spray drift. To help prevent this problem happening this summer, there is a website to identify cotton fields in your area.

Any farmer planning to use herbicides can log on to view susceptible cotton fields which could be at risk.

CottonMap is seasonally available between 1 September and 30 April and can be found at [www.cottonmap.com.au](http://www.cottonmap.com.au)

#### Also remember:

Follow label directions – it's illegal not to

Use a "Coarse" spray quality or greater when applying Group I herbicides

Don't spray during inappropriate weather conditions

Be particularly vigilant of variable conditions at night

Notify cotton neighbours of your intention to spray



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### No spray zones

A NO SPRAY ZONE is the downwind distance between the sprayed area and a sensitive area. The NO SPRAY ZONE cannot be sprayed when the wind is towards the sensitive area (which may be a residence, public area, water body, pasture, terrestrial vegetation or another susceptible crop), i.e. a label may include several NO SPRAY ZONE tables. The distance required for the NO SPRAY ZONE may differ for the various types of sensitive areas.

Always check the label to see if a no spray zone is required, and how wide the no spray zone has to be for the product you wish to apply. NO SPRAY ZONES for aerial applications are much larger than those required for ground application.

### Record keeping

Record Keeping requirements are now included on the label or permit of many products. It is a legal requirement to maintain those records, in addition to any state based requirement for record keeping.

### Communication and neighbour notification

Prior to spray application and product selection check the proximity of susceptible crops and sensitive areas such as houses, schools, waterways and riverbanks.

It is good practice to notify neighbours and staff of your spray intentions, regardless of label requirements. By doing this, sensitive crops or areas that you may not have been aware of can be accounted for.

Open communications with neighbours is critical when using Roundup Ready or Liberty Link cotton. Herbicide drift onto fields of cotton without the appropriate tolerance traits can result in serious yield losses.





Cotton is extremely sensitive to phenoxy via off target application. To assist with reducing drift it is essential that you identify your cotton fields on the cottonmap website. This map will be used by spray contractors, resellers, agronomist and neighbours to identify crops.

### Monitoring weather conditions

Weather conditions need to be checked regularly during spray applications (this means continual visual observations and actual measurement at least every 20-30 minutes) and recorded as per label requirements.

Labels contain a legal requirement to measure weather parameters at the site of application. This can be done with handheld equipment (e.g. Kestrel 3000, 3500, 4000 or equivalent) or portable weather stations. Alternatively on-board weather stations that provide live weather information while the sprayer operating (such as the Watchdog systems) are available.

**FIGURE 11: effect of atmospheric stability**

Smoke	Condition	Notes	Spray?
	NEUTRAL (e.g. morning)	Cool breeze (4–15 km/h) Optimum spray conditions.	✓
	UNSTABLE (e.g. afternoon)	Hot. Low windspeed, thermal activity. Risk of upward movement of fine droplets.	✗
	INVERSION (e.g. night)	Low windspeed. Hot during day. Risk of significant off-target deposition of fine droplets.	✗
	STABLE (e.g. dusk)	Low windspeed. Risk of off-target spray deposition.	✗

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**Because we are in this together**  
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Best Practice

## Best practices for aerial and ground spray

**myBMP resources:** Fact sheet on weather monitoring equipment.

Growers can also subscribe to websites that provide forecasts of conditions for spraying up to 10 days in advance. These sites evaluate a range of factors to produce tables indicating times that would be suitable for spraying. You can access the websites at either [Spraywisecisions.com.au](http://Spraywisecisions.com.au) or [Syngenta.com.au](http://Syngenta.com.au) for more information.

### Temperature and humidity

Higher ambient air temperatures and lower relative humidity conditions increase evaporation rates. Since droplet size of water-based sprays decreases rapidly with higher evaporation rates, drift tends to increase.

Water-based sprays should not be applied under conditions of high temperature and low relative humidity (RH). Spraying is best conducted when the delta T (the difference between the wet bulb and dry bulb) is more than 2 and less than 10°C. Refer to Fact sheet on Tips to reduce spray drift for a Delta T chart.

When using coarse sprays at high water volume rates, evaporation may be less significant, which may allow some applications to continue into marginal delta T conditions (where soil moisture exists, and the targets are not in a stressed condition). Never start a spraying operation when the delta T is below 2 or above 10–12.

**myBMP resources:** Tips for reducing drift fact sheet

### Vegetative buffers

Effective vegetative buffers can reduce drift by as much as 60 to 90 per cent. A good buffer will be comprised of a mixture of tree and shrub species with foliage all the way to the ground. The planting arrangement and density should allow for air to partly flow through the barrier. Barriers without airflow act like impermeable walls, directing wind containing the spray drift up and over the top of the barrier, increasing how far drift may travel. Do not locate vegetative buffers where airflow will be obstructed by adjacent objects such as turkey's nests, water storages or large banks.

RELATIVE HERBICIDE VOLATILITY	
Active Ingredient	Product Example
<b>HIGH VOLATILITY*</b>	
2,4-D ethyl ester	Estercide 800
2,4-D isobutyl ester	2,4-D Ester 800
2,4-D n-butyl ester	AF Rubber Vine Spray
<b>SOME VOLATILITY</b>	
MCPA ethylhexyl ester	LVE MCPA
MCPA isooctyl ester	LVE MCPA
2,4-D isooctyl ester	Low Volatile Ester 400
triclopyr butoxyethyl ester	Garlon 600
picloram isooctyl ester	Access
<b>LOW VOLATILITY</b>	
MCPA dimethyl amine salt	MCPA 500
2,4-D dimethyl amine salt	2,4-D Amine 500
2,4-D diethanolamine salt	2,4-D Low Odour 500
2,4-D isopropylamine salt	Surpass 300
2,4-D triisopropylamine	Tordon 75-D
2,4-DB dimethyl amine salt	Buttress
dicamba dimethyl amine salt	Banvel 200
triclopyr triethylamine salt	Tordon Timber Control
picloram triisopropylamine	Tordon 75-D
picloram triethylamine salt	Tordon Granules

From Mark Scott, Agricultural Chemicals Officer, NSW DPI.  
 \* The APVMA has taken the decision to continue to suspend the registration of products containing high volatile ester forms of 2,4-D, namely the ethyl, butyl and isobutyl esters. Refer to page 155 for more information.

The optimum height for a vegetative buffer is 1.5 times the release height of the spray. Trees and shrubs are able to act as an effective barrier for ground applied sprays from early in their development. Most guidelines suggest that the optimum width of the barrier is 20 m with a 10 m maintenance strip on either side.

**myBMP resources:** DNR planning guidelines.doc



For more information on best practice for aerial and ground spray application go to [www.myBMP.com.au](http://www.myBMP.com.au).

(Photo: Cotton Australia – Jack Hawkins)