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## Volatile Vapour Drift Risk.

### Introduction

Most chemical users are aware that certain phenoxy herbicide groups (e.g. 2,4-D, MCPA, triclopyr and picloram) are available as amine, salt, or ester formulations. Knowing the characteristics of the phenoxy herbicide group and formulations is important when the intended use is in the vicinity of a susceptible broadleaf crop, as they can cause unintentional damage to susceptible crops, even when used at extremely low levels.

### Phenoxy herbicide formulations

The availability of phenoxy herbicides as amine, salt, or ester formulations is significant because they act in very different ways when applied and sometimes, even after they are applied.

The biggest difference in risk between amine, sodium salt, or ester formulations of the phenoxy herbicides relates to the production of volatile vapours.

Amine and sodium salt formulations of phenoxy herbicides do not produce volatile vapours at normal application temperatures, whereas ester formulations always produce volatile vapours at normal application temperatures.

Both High Volatile Esters (HVE) (ethyl, butyl and isobutyl esters) and Low Volatile Esters (LVE) (hexyl, octyl etc) are capable of producing volatile vapours – it's simply a matter of scale.

Amine formulations may produce volatile vapours if the temperature rises around 50°C, but if it's that hot, you should not be spraying anyway.

### Volatile vapour drift

The issue of volatile vapour production by ester herbicides is critical for phenoxy herbicides, and is one of the risks that must be taken into account when considering their use. The risk has to do with the potential for off-target spray drift damage.

A chemical that cannot produce vapours under normal operating temperatures (such as amine or salt formulations) can only cause droplet drift, which is generally limited to

relatively short distances of up to a few hundred metres. This distance can vary greatly, depending on the specific circumstances of the application.

However, herbicides that produce volatile vapours (such as esters) are a different story. Not only can they drift in droplet form like amine and salt formulations, they have an additional 'invisible' form of drift called 'volatile vapour drift'.

This is an important fact. While droplets might move a few hundred metres from the target and can be seen, vapours have the ability to drift many kilometres from the target and are invisible. Think of the consequences of spraying a volatile ester herbicide near a susceptible broadleaf crop, and then magnify the consequences for highly susceptible crops such as tomatoes, vines, and cucurbits (melons, zucchinis and pumpkins etc)!

There are even recorded instances of ester herbicides re-volatilising or moving by particle drift some time after they have been applied. Their movement away from the target area caused damage.

To reduce the possibility of drift occurring, restrictions are now in place, requiring all phenoxy herbicides to be applied with a COARSE to VERY COARSE droplet size as specified by the American Society of Agricultural Engineers Standard (ASAE S572), and with a wind speed between 3 and 15 km/hr.

### Weather conditions and drift

While wind plays a key role in the risk of droplet drift and is one important factor in volatile vapour drift, volatile vapour drift can occur under what may seem as 'ideal' conditions.

Some people think that a still or dead calm day is ideal for spraying. A still, dead calm day, particularly in autumn or spring might indicate the presence of an inversion in the atmosphere. Spraying volatile herbicides such as esters under inversion conditions is a recipe for disaster. Volatile vapours can travel many kilometres under an inversion, and there is no way of predicting where they may land and cause damage.

Care should also be taken to avoid spraying when extreme temperatures are predicted, especially when using ester

formulations. Remember, it is still possible for volatile vapours to form days after their application.

### Restrictions for using certain ester herbicides

Anyone who uses ester formulations of 2,4-D, 2,4-DB, MCPA and triclopyr (i.e. 'restricted use' chemicals) in Victoria must hold a valid Agricultural Chemical User Permit (ACUP) or be working under the direct supervision of an ACUP holder.

'Restricted use' chemicals are agricultural chemical products that:

- are Schedule 7 Poisons (Dangerous Poisons)
- contain atrazine, metham sodium, ester formulations of 2,4-D, 2,4-DB, MCPA and triclopyr.

In addition, the use of ester herbicides is restricted in Agricultural Chemical Control Areas (ACCA) when they are in operation. This is to provide protection for valuable crops during their growing seasons.

It is compulsory to make specified records within 48 hours of using an agricultural chemical product, and keep these records for a period of two years. This applies to all agricultural chemicals used, including poison baits used for pest animal control. This requirement came into effect on 24 July 2007 and excludes the use of household or home garden products.

### Further References

- DPI Chemical Standards website - [www.dpi.vic.gov.au/chemicalstandards](http://www.dpi.vic.gov.au/chemicalstandards)
- APVMA website - [www.apvma.gov.au](http://www.apvma.gov.au)
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