

An innovative solution to drift management

By Dr Lyndal Hugo, Daniel Hickey and Gil Chesterfield, AEMS

AEMS Drift Manager represents the most recent form of risk assessment to the industry for chemical application and spray-drift management. The program has been designed to evaluate buffer zone requirements for cattle contamination to prevent violation of export and domestic maximum residues limits (MRLs).

This has been a major concern for cotton growers and neighbouring graziers in the past. While chemical labels generally provide buffer zones for aquatic safety purposes, the buffer zones for international trade have not been defined, and the mechanisms of contamination generally not well understood.

This has left growers with warnings to beware of widespread usage of all products including synthetic pyrethroids (SP), organophosphates (OP), many new compounds and all compounds used as ultra-low volume (ULV) applications.

However, many of these compounds have vastly different characteristics to endosulfan — the grazing industry's greatest concern. For example, alternative products may be used at lower application rates, have less potential to bioaccumulate in the beast, and have lower persistence times in the environment. ULV applications of some compounds can be shown to be safe under appropriate conditions.

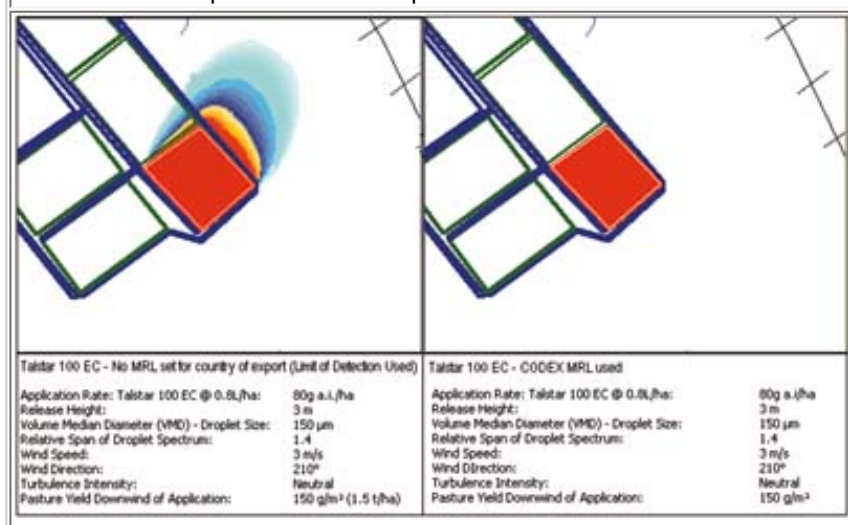
Drift Manager takes the complex nature of spray-drift modelling, cattle contamination potential (or biomagnification), export and domestic MRLs and presents this in a format suitable for grower/chemical applicator/agronomist risk management.

Inputs for the software program include droplet volume mean diameter (VMD), relative span of the droplet spectrum, meteorological conditions, the compound used and its formulation. The mathematics behind the software has been extensively tested and validated in Australia and overseas and is now contributing to both regulatory and international trade (residue) risk assessments in Australia.

The grower's GIS map, an aerial photograph, satellite imagery or aircraft guidance GPS data can be loaded into the system and used as the basis for spray drift modelling.

The output from the model includes the map and a three-colour coded system for beef

FIGURE 1: The potential consequences of drift



contamination. The red colour links with a spray-drift, deposition and cattle contamination concentration that would result in cattle having a concentration of greater than the relevant chemical export MRL.

The yellow zone means caution is required, with cattle grazing in this zone expected to contain 10–50 per cent of the relevant MRL concentration. But if cattle are on a declining plane of nutrition or pasture is dry and the chemical is likely to be more persistent then cattle should be withheld from this zone.

The blue area indicates that the probability of exceeding an MRL is less than 10 per cent. The software and accompanying manual provide information on these concepts.

Figure 1 (a) illustrates that even when there is zero tolerance (that is a MRL of zero is set by the importing country such as Korea or Japan), the use of Talstar still requires a relatively small buffer zone (400 metres) compared to endosulfan (750 metres for a 250 mm VMD), and the impact on cattle production would be minimal.

If the current Codex MRL (0.5 mg per kg of fat) is taken as the benchmark, Figure 1 (b) shows that application of Talstar can occur safely due to the relatively low application rate and low biomagnification factor in cattle of this product.

FMC, the manufacturers of Talstar, Mustang and Dominex, has been developing a stewardship program with AEMS and has supplied extensive data on the FMC products for use in Drift Manager.

With the knowledge of accurate buffer zones, the loss of productive land to buffer zones can be minimised and the potential risk can be minimised. This is the best form of due diligence in chemical application and management and would form an ideal component to any growers' relationship with neighbours.

This model has been recognised by the National Registration Authority (NRA) for risk assessment and development of buffer zones. The NRA is also interested in using this model for sensitivity analysis. AEMS recently used it for extensive analysis of chemical application, spray drift and international trade risk for the National Residue Survey (a department of Agriculture, Fisheries and Forestry Australia) and Safemeat.

Drift Manager can be used to assess the residue component of registration packages for new chemicals in many industries. Aerial operators and growers are also using the software to conduct their own risk assessments of spray drift.

Future development for Drift Manager appears endless. AEMS will continue to develop packages for risk assessments of herbicide damage,

aquatic toxicity impact and phytotoxicity of off-target crops. The current software is available in various forms to all aerial operators, growers, chemical companies and regulators.

For more information contact AEMS. ph: 07 46130 455 or e-mail on aems@bigpond.net.au.

Note: The buffer zones for various compounds have been presented here. These are specific for the application conditions presented, and are not advocated for use across the industry.