

Recently there has been some discussion of the efficacy of a range of snail and slug pellets when used under excessively wet conditions. Conclusions reached from these studies, without due caution by some commentators, need further consideration in light of facts well known and documented by scientists and regulatory authorities.

The purpose of this article is to clarify the situation and to point out the problems of using any molluscicide product under excessively wet conditions. The study in question did not involve methiocarb based products such as Mesurol or Baysol. According to my copy of the study, only iron chelate and metaldehyde products were tested. (It is conceivable that the study involved other products but it does not appear that the information is in the public domain).

It is important to note that because of the toxicity of methiocarb to non-target species, particularly birds, molluscicides based on methiocarb have been withdrawn from sale in Europe and the USA<sup>1</sup>. In the author's opinion all molluscicides, particularly metaldehyde based products, should not be used under excessively wet conditions. In such conditions you either have a product which is not an environmental threat but has poor efficacy (such as iron based products), OR the product is moderately effective but has potential to cause significant environmental damage (such as metaldehyde based products).

Metaldehyde products for slug and snail control have been available in Australia for over 60 years. Their use is severely restricted in most developed countries because of their toxicity, but in Australia they are still the most commonly used molluscicide in agriculture. There is a wide range of products available in Australia with between 1.5% and 5% metaldehyde as the active ingredient.

Europe is gradually phasing out metaldehyde pellets and the maximum concentration of active ingredient is being reduced, due to the pollution of waterways, and iron based pellets are taking their place. (To use a 5% metaldehyde pellet in the UK would attract a large fine<sup>2</sup> or perhaps imprisonment whereas such is widely used in Australia).

In the UK the manufacturers and suppliers of metaldehyde based pellets have formed a voluntary organisation, the Metaldehyde Stewardship Group "MSG", to address the problem of waterway pollution caused by metaldehyde.

Included in the guidelines<sup>3</sup> are the following:

- Maximum application rate of 210g of metaldehyde active ingredient per hectare
- Maximum total dose from 1st August to 31st December (late summer to early winter) 210g metaldehyde per hectare
- No pellets within ten metres of a watercourse
- Do not apply when heavy rain is forecast.

The reason for these guidelines is to avoid contamination of the water supply by metaldehyde and the far more toxic breakdown product, acetaldehyde. A point almost completely ignored in Australia is that metaldehyde breaks down to give acetaldehyde. This occurs in the dry pellet as well as the wet pellet. In normal use acetaldehyde, which is volatile, is lost to the atmosphere and then eventually decomposes to carbon dioxide. Acetaldehyde is highly toxic by inhalation<sup>4</sup> but in well ventilated spaces or open paddocks the concentration of acetaldehyde from metaldehyde breakdown is low.

(In storage areas the concentration can easily rise to dangerous levels and care should be taken when dealing with metaldehyde pellets in confined storage).

In very moist conditions, such as after heavy rain, the metaldehyde based product active ingredient is flushed out and is dissolved up in the rain water. The metaldehyde in the water continues to decompose forming acetaldehyde, which itself is soluble and relatively stable in the water. If this contaminated water is consumed by non-target species such as farm animals, fish or humans it poses a potential threat which is the reasoning behind the European regulations for metaldehyde in the water supply. Acetaldehyde occurs widely in the environment at extremely low levels. It is an irritant to skin, eyes, mucous membranes, throat, and respiratory tracts and is a class one carcinogen<sup>5</sup>.

On the other hand the active ingredient in iron based pellets is more easily flushed out by excessively wet conditions meaning they pose no environmental threat, but at the same time lose their efficacy. In these conditions the active ingredient is rapidly degraded, particularly in high calcium soils, to compounds of very low toxicity and eventually to carbon dioxide and iron oxide, which results in no environmental toxicity problem of the active ingredient getting into waterways. Based on extensive studies undertaken in universities and independent research organisations, the table below summarises our known information #:

| Effectiveness  | Iron Chelate   | Metalhyde## |
|--|----------------|-------------|
| Slightly moist & warm conditions                         | Very Good      | Good        |
| Slightly moist & hot conditions<br>(Max 25-35 degrees C) | Extremely Good | Good        |
| Slightly moist & cool conditions<br>(Max 15 degrees C)   | Good           | Poor        |
| Moderately damp & warm conditions<br>(Max 30 degrees C)  | Good           | Good        |
| Very wet & warm conditions                               | Poor           | Moderate    |

| Environmental Sustainability      |           |                       |
|-----------------------------------|-----------|-----------------------|
| Slightly moist to moderately damp | Excellent | Moderate              |
| Very wet conditions               | Excellent | Potentially very poor |

# The effectiveness varies slightly with the species and will of course vary with the particular formulation

## For the more effective metaldehyde products. In general, metaldehyde products available in Australia, containing 1.5% of metaldehyde are environmentally of less concern but considerably less effective than those of higher metaldehyde concentration.

References

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