



# CHEMICAL RESISTANCE FREQUENTLY ASKED QUESTIONS

## Are shorter protection periods always because of resistance?

Shorter protection periods provided by chemicals than those described on the label are often interpreted to be chemical resistance, but there are many factors that influence the protection period achieved on farm. Before you conclude your flies are resistant, ask yourself the following questions:

1. Were the struck sheep more susceptible to flystrike because of heavy dags, urine stain, fleece rot, lumpy wool or other characteristics?
2. Did dags make penetration of the chemical difficult?
3. Was the wool length consistent with label instructions for application?
4. Was there persistent or heavy rainfall following treatment, resulting in chemical wash out or increased fly pressure?
5. Were the struck sheep actually treated?
6. Did you check the label instructions carefully before applying the chemical, paying particular attention to dosage, patterns of coverage, recommended applicator and whether the treatment should be applied off-shears or to longer wool?
7. Was the applicator calibrated and working properly, with no blockages or leaks?

If you answer 'yes' to any of the first four questions or 'no' to any of the last three questions, something other than chemical resistance may be reducing the protection period or the effectiveness of the chemical.

## How will I know if chemical resistance is occurring on my farm?

There are a number of ways insects can develop resistance to a chemical, with different resistance mechanisms resulting in different observable symptoms. If you have not had any lab tests done, have you noticed that:

- some or all of the maggots survive knock-down chemicals and appear like they haven't been treated, despite high confidence that the chemical treatment has been thoroughly applied; or
- the residual period of protection appears to be getting shorter than it was over past fly seasons, despite no change in application rate, correct application and no significant differences in season outlook or fly pressure?

Growers noting either of these symptoms should urgently arrange for a resistance test.

## How can I get a resistance test?

Contact Narelle Sales for information and to arrange a resistance test at:

**Elizabeth Macarthur Agricultural Institute**

**Email:** [emai.insectresistance@dpi.nsw.gov.au](mailto:emai.insectresistance@dpi.nsw.gov.au)

**Direct Ph:** 02 4640 6446

**Switch Ph:** 02 4640 6333

## Can I use more or less chemical for each application?

Overdosing and underdosing can contribute to resistance. It is important to apply the correct dose to animals with the proper equipment that has been calibrated using the appropriate application pattern. This information can be found on the chemical label.

## Should I just stop using chemicals?

Resistance doesn't mean that the chemicals have totally lost effectiveness, it just means that the period of protection may be less than what you previously expected or what is on the label, and protection periods may also vary between properties.

Chemicals still remain an effective option for flystrike prevention and treatment. If you have treated sheep, even if they are within the protection period, you should continue to actively monitor them for signs of flystrike and treat them accordingly if they do become struck.

## If flies are resistant to one chemical, will another chemical kill them?

This depends on whether the chemicals are within the same chemical group. There is cross resistance between chemicals within the same group; however, rotating between different chemical groups should be effective.

## What chemicals can I use in my rotation?

There are six chemical groups available for use to prevent or treat flystrike. Within these chemical groups there may be only one or two active chemicals but there may be multiple products marketed with different brands, names and formulations.

You need to read the label to determine the chemical active and rotate based on the chemical group that the active belongs to (Table 1).

**Table 1: Chemical groups and their active chemicals that can be used to prevent or treat flystrike**

Chemical group	Chemical active
Organo-phosphates (OPs)	Diazinon
Synthetic Pyrethroids (SPs)	Alpha-cypermethrin (body strike only)
Neonicotinoids	Imidacloprid
Spinosyns	Spinosad
Macrocyclic Lactones (MLs)	Ivermectin
Insect growth regulators (IGRs)	Cyromazine <sup>#</sup>
	Dicyclanil <sup>#</sup>

<sup>#</sup>There is some cross resistance between these.

AWI has developed a handy one-page guide that can help you consider which chemicals to use for flystrike prevention and treatment. It can be downloaded from [www.wool.com/flystrikeresources](http://www.wool.com/flystrikeresources) or the FlyBoss website [www.flyboss.com.au](http://www.flyboss.com.au).

## How do I rotate my chemicals?

Rotation of chemical groups will help prolong the usefulness of chemicals as one tool to combat flystrike. There are three things to consider when rotating chemicals:

1. Consider the chemical group that was last applied (either earlier this season or at the end of the previous fly season) and where practical, avoid using a chemical from the same group next.
2. Consider the chemical group that was last used to control lice and avoid using a chemical from the same group for the next preventative flystrike application in the same season.
3. Consider the chemical groups that were last applied to prevent flystrike and avoid using these as a dressing to treat struck sheep this season.

Rotating based on the group rather than the active or product name is important as some actives like cyromazine and dicyclanil are part of the same group and have cross resistance between them. Product names will be different, but the actives may be the same.

The protection periods provided by each chemical varies depending on its formulation within a product. In some cases, the strength or concentration of the chemical active may be different between products as well.

Not all chemicals can be used the same way, some can be used for dipping, some as a spray or pour-on, some for jetting and some are used to treat struck sheep. Some formulations can be used on different wool lengths or off-shears, and some have formulations that can also be used to control lice.

### Can I mix chemicals together?

Apply chemicals strictly according to label directions. Do not mix two or more chemical products as such combinations will not have been tested for efficacy or safety. Even if they are the same chemical active, they may be different strengths. It is unnecessarily expensive and does not improve the effectiveness of the chemicals.

### Why is it important to destroy maggots on struck sheep?

Maggots removed from the sheep are often not killed by the treatment, particularly when some resistance is already present. If maggots are not collected or destroyed the most resistant ones can burrow into the soil, complete development and contribute to the next generation of resistant flies.

### Does the onset of resistance result from activities on my farm, or is it a result from my neighbours, or both?

Individual flies with resistance may already be present on your property, they may fly in from neighbours or they may come onto the property via livestock movement from outside the district.

One resistant fly, in isolation, will not have any significant impact on the flock and will be almost impossible to detect. However, it is the individual on-farm management strategies that will influence the ability of resistant individuals to survive and breed and how fast the resistant population is allowed to build.

### What about other neighbouring industries?

Actions of neighbouring sheep producers are likely to have some influence in the overall size of the blowfly population within a district. Therefore, regional management strategies that reduce the overall fly population are likely to be beneficial in delaying insecticide resistance.

Other industries such as cotton or grains mostly use insecticides from different groups to those used for blowfly control; or apply their insecticides at a different time of year or by a different method of application. This results in a low level of selection pressure from these adjacent industries.