Australian Wool Innovation Limited

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.

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.

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.

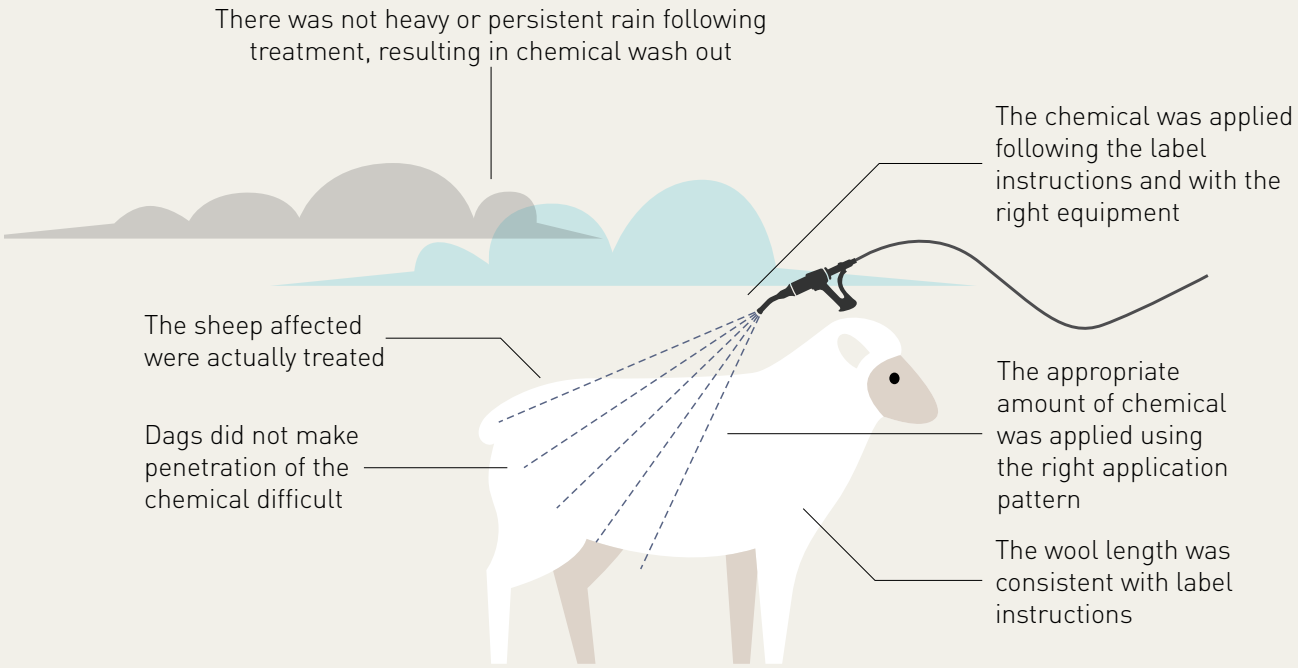
How will I know if I have chemical resistance on my property?

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

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:

- A shortening of the protection period that is specified on product labels; or
- Flystrike in multiple sheep that have been treated with the same chemicals, rather than just a few of your sheep.

These signs typically indicate that your flies might be resistant to chemical treatments. However, before you conclude that your flies are resistance, check the following:



If these factors have been eliminated you should arrange for a blowfly chemical resistance test.

How can I get a blowfly chemical resistance test?

NSW DPI is now conducting laboratory tests, which are open to producers from all states, to determine the presence of blowfly resistance to various chemicals.

You will need to supply at least 60 live, healthy Lucilia cuprina maggots to the laboratory.

For more information, including costs, and to get a collection kit, with detailed instructions sent out to you contact:

Narelle Sales
Elizabeth Macarthur Agricultural Institute
Email: emai.insectresistance@dpi.nsw.gov.au
Direct Ph: 02 4640 6446
Switch Ph: 02 4640 6333

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#
	Dicyclanil#

#There is some cross resistance between these.

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.

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/demystifly or the FlyBoss website www.flyboss.com.au.

Should I combine chemicals?

The idea behind combining chemicals is that if a fly is resistant to one component, the other should kill it. However, the risk is that sublethal concentrations of a chemical could lead to selection for resistance to one or both chemicals. Furthermore, combinations of chemicals may not have been tested for safety and efficacy.

In addition, if you combine two chemical actives from the same chemical group, as in the case of using the IGRs Cyromazine and Dicyclanil, there is cross resistance between chemical actives in the same chemical group, so you are essentially adding fuel to the resistance fire.

You also need to consider that using two chemicals from different chemical groups at the same time takes out these chemicals as options if they're needed later in the season. Given the scarcity of chemicals available for flystrike control, this can leave you short of options later in the season while adding cost without improving effectiveness.

Each chemical is carefully formulated to give best effect. Sometimes other constituents in the formulations of the two chemicals can interact and reduce effectiveness or give other undesirable outcomes. Different products should not be mixed if it is not indicated on the label.

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.

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.

Why is it important to destroy maggots on struck sheep?

When treating a flystruck animal, it's vital to clean the infected area by clipping around the wound and around any maggot trails and ensuring all maggots have been removed from the sheep. This allows the wound to dry out and heal and prevents maggots from continuing their cycle and inflicting pain on the animal.

Applying a chemical after cleaning the area is recommended as this prevents restrike and kills any maggots that may have been missed. Restrike can occur from Lucillia cuprina maggots that were missed or from secondary blowfly species that begin their lifecycle on wounds.

Some chemicals take longer to kill maggots or only work at a certain stage in the lifecycle (e.g. when they moult between stages) so if they are not removed from the sheep, they can continue to inflict pain until the maggots die or develop resistance.

It is recommended that maggots removed from struck sheep are killed, particularly if a preventative or treatment chemical has already been applied as the maggots could be resistant to chemicals. These can be collected and sealed in a bag for a few days in the sun to die.

Is it worth treating the ground where maggots have been removed?

No. All fly chemicals were designed to be used on sheep and the dosage is based on application on a live animal. Treating maggots directly can lead to underdosing. If maggots survive underdosing they have now been exposed to one of the chemicals in your toolkit and they could develop resistance.

Should I also give my sheep an antibiotic and/or analgesics after cleaning up and treating the strike?

Veterinary advice is to reduce the pain and suffering of the animal and use an antibiotic and analgesic. Woolgrowers should consult their vets when developing a pain relief plan for their sheep.

MORE INFORMATION ON FLYSTRIKE

For more information on understanding and managing chemical resistance in blowflies go to www.wool.com/demystifly

For information on AWI's Flystrike Extension Program visit www.wool.com/flystrikeresources

For more detailed information on flystrike management, including access to interactive decision support tools, visit www.flyboss.com.au

For information on AWI's flystrike research, development and extension program, visit www.wool.com/flystrike

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