awi Australian Wool Innovation Limited

flyboss

A FLY IN THE OINTMENT

Some woolgrowers are reporting shorter duration of protection from some chemical flystrike treatments, and resistance has now been confirmed in some strains of blowflies in a number of states.

Therefore, with the high-risk flystrike time upon us, and with school holidays and cropping reducing the ability to monitor stock, it's time to review whether your treatments are working, how you use them and what other strategies can reduce reliance on chemical treatments so that they remain effective for more years.

Particular tips are provided for those already with resistant flies.

STRATEGIES TO LIMIT FURTHER DEVELOPMENT OF INSECTICIDE RESISTANCE

RESISTANCE IS ALREADY PRESENT

For some producers, there is already a 'fly in the ointment', that is, blowflies on their property are resistant to some flystrike preventative products.

- Resistance is first seen as a reduction in the protection period achieved by the products in a specific chemical group.
- When an insecticide or any form of parasiticide is used there is potential to increase both the proportion of the parasite population that is resistant to that chemical and the concentration of insecticide they can survive.
- Because there are limited chemical alternatives for flystrike, look to manage flystrike in other ways:
  - Breed for flystrike resistant sheep.
  - Crutch or shear sheep before peak fly times.
  - Control breech strike with good worm control, correct tail length and, where still necessary, breech modifications.

Low-level resistance to cyromazine and dicyclanil was initially reported in NSW in 2010, and further cases of low-level resistance to these products were reported in 2012–2014. In 2019, an AWI/NSW Department of Primary Industries jointly-funded blowfly resistance project demonstrated a further increase in resistance. The grim reality is that no chemical can be used without resistance developing, some more rapidly than others. The Australian sheep blowfly has been resistant to organophosphates for well over 50 years. Cyromazine products have been on the market for 40 years and dicyclanil for 20 years – it is inevitable that some resistance has emerged, but you can take steps to slow development on your property.

DO YOU HAVE RESISTANT FLIES?

These signs indicate you might have resistance:

- a shortening of the protection period (specified on product labels)
- flystrike in multiple treated sheep rather than just a few.

Before you conclude your flies are resistant, check that:

- the sheep affected were actually treated
- the chemical was applied following the manufacturer's instructions
- the appropriate amount of chemical was applied
- the wool length was adequate to retain the treatment
- wool or dags did not make penetration of the product difficult
- there was not unusually heavy rain following treatment, resulting in chemical wash out.

Once you have eliminated the above common causes for treatment failure and you are sure there has been some shortening of the protection period, it is advised that you contact the product manufacturer who can assist in further investigations.

STRATEGIES TO LIMIT FURTHER DEVELOPMENT OF INSECTICIDE RESISTANCE

1. USE AN INTEGRATED APPROACH TO REDUCE RELIANCE ON INSECTICIDES

- Breed sheep that are resistant to flystrike. Shear or crutch at times that maximise protection against flystrike.
- Dock tails to the correct length.
- Manage scouring.
- Use breech modification if required, until sheep are genetically resistant to flystrike.

2. KNOW YOUR ENEMY

- Understand the time and length of protection you need: when is the flystrike risk highest on your property and how long does it last? If you are unsure, the FlyBoss Tools can quickly show an annual flystrike risk graph for your area, based on historic data.
- The favourable weather conditions for flystrike are warm (17°C–38°C), humid days with wind speeds less than 30 km per hour.
- Flies can travel up to 10 km, but most go no further than 2–3km; you may have bred many of these flies yourself.
- Flystrike often occurs in waves and when it does it hits hard and fast; check susceptible mobs at least every second day during high risk conditions.
- Provide the best protection and the most regular checks to the most susceptible sheep, eg those with longer wool, more urine or lambing stain, more dag, and young sheep.
- Where feasible, put susceptible mobs in the least-sheltered paddocks, which tend to have fewer flies.

3. KNOW YOUR CHEMICAL GROUPS

It is critical you know which chemical group you are using and not just the brand name if you are to rotate chemical groups and avoid overuse of particular groups (especially if you've noticed a reduced period of protection for the chemical you are using). There are five chemical groups for flystrike prevention, see Table next page; some of these groups have more than one chemical active.

For example, if you used Vetrazin® Liquid on one occasion and Venus® the next, you would be using the same chemical active, cyromazine, both occasions. Also, the chemical actives cyromazine and dicyclanil both belong to the insect growth regulators (IGR) chemical group and have a similar mode of action. This means there is cross-resistance between two different, but related, chemical actives that are within the same chemical group – if resistance to one of these actives develops, it is likely that some resistance to the other could be present or may soon emerge.

Insecticide choice should be tailored to your particular location and management:

- Consider rotating insecticide products from different chemical groups to slow the development of resistance.
  - Use a different chemical group for treating struck sheep to that used for flystrike prevention.
  - Successive treatments within the fly season should generally be different chemical groups (reminder: using dicyclanil and cyromazine one after another does not rotate chemical groups).
- Choose a product with the appropriate protection period and time of application.
  - A product that provides a shorter period of protection may be sufficient in some instances, for example, when sale of sheep or lambs for slaughter is imminent; when sheep are soon to be crutched or shorn; when close monitoring of sheep is not possible for a short period because of other farm tasks or holidays.
- Products with long protection periods can be used to provide protection over the fly season from a single treatment when timed strategically. However, the use of products with long protection periods does not replace the need for regular monitoring for struck sheep, particularly in cases where resistance may be suspected and the expected period of protection may be shortened.

Use the FlyBoss Products Tool to search for flystrike products, determine their chemical group and make your selection. (www.flyboss.com.au/tools/products.php). Also, be aware that some products kill both flies and lice, so treatment for lice potentially affects flies and may lead to development of resistance, and vice versa. Ideally, use a different group for treating flies to lice to limit potential for resistance development – better still, eradicate lice so that their ongoing treatment is unnecessary.

Continued use of chemical groups where resistance is evident

If resistance is suspected or confirmed on your property, seek professional flystrike management advice.

Continued use of chemical groups that some flies are resistant to may result in a shorter protection period, but this still may be useful in an integrated flystrike management program. Be aware that the number of resistant flies will likely increase and they may also spread to neighbouring properties, limiting the options of those producers.

If a second treatment in the season is warranted, rotation to a different (effective) chemical group will help to reduce the level of surviving resistant flies.

Applying this knowledge

- If both a spring and autumn treatment are required, use different chemical groups.
- By using crutching or shearing to lengthen protection in the fly season by six weeks, shorter acting products can be incorporated allowing a rotation across different groups.

CHEMICAL GROUP	CHEMICAL ACTIVE	EXAMPLE PRODUCT	METHOD OF APPLICATION[1]	PROTECTION PERIOD (WEEKS)[2]
Insect growth regulator (IGR)	Cyromazine	Vetrazin®	Spray-on	11
		Vetrazin® Liquid	Jetting/Dipping	Up to 14
	Dicyclanil[3]			
	• 12.5 mg/ml	CLiKZiN®	Spray-on	Up to 11
	• 50 mg/ml	CLiK®	Spray-on	18–24
	• 65 mg/ml	CLiK® Extra	Spray-on	Up to 29
Neonicotinoid	Imidacloprid	Avenge & Fly®	Spray-on	Up to 14
Macrocyclic lactone (ML)	Ivermectin	Coopers® Blowfly & Lice	Jetting	Up to 12
Synthetic pyrethroid (SP)	Alphacypermethrin[4]	Vanquish®	Spray-on	Up to 10
Spinosyn	Spinosad	Extinosad® Eliminator	Jetting	4–6

Chemical groups and actives used for flystrike prevention.

[1] Always follow label directions.

[2] Check the label before use as some products may differ.

[3] Dicyclanil product protection periods vary due to their different concentrations of the active chemical.

[4] Registered for the prevention of body strike only.

- If using whole mob treatments where you suspect there are strikes present, use a jetting product. Use ivermectin or spinosad, rather than cyromazine, because the latter takes some days to kill all maggots. Sheep seen to be struck at the time of jetting should be dressed.

- When dressing struck sheep:

  - Use a different chemical group to that used for flystrike prevention.

  - Always shear or clip the struck area, ideally with mechanical, rather than hand shears, to remove more maggots. This is generally as successful at cleaning up the strike as using a dressing, which are mainly used to prevent re-strike.

  - Kill maggots in wool shorn from struck sheep by placing them in a sealed plastic bag in the sun. This reduces the number of flies in the next generation and kills maggots that potentially survived a recent preventative treatment to the sheep.

- Continue to check your flock after treatment to monitor the protection period being achieved under your environmental conditions.

4. USE CRUTCHING OR SHEARING AND CHEMICAL TREATMENTS STRATEGICALLY TO PROVIDE PROTECTION OVER YOUR RISK PERIOD

If resistance on your property has shortened the protection periods or you wish to rotate chemical groups with some having short protection periods, there are still a variety of options.

When an insecticide is required (or two in succession), its protection period should ideally be longer than the expected risk period.

Shearing and crutching can be used strategically and will generally give up to six weeks protection from flies. If either can be done at the start of the fly season, a shorter acting chemical may be sufficient to get you through your high-risk fly period. Alternatively, shearing or crutching in the middle of the season could allow you to use two short-acting products from different chemical groups either side.

Crutching or shearing can also be used to minimise development of resistance, similar to giving an exit or 'tailcutter' worm drench after a long-acting drench. When a fly preventative treatment has been applied early in the season, the period of cover may come to an end while there is still fly activity. For a short time, as the product concentration drops, some maggots from resistant flies may survive the low concentration while the maggots from susceptible flies will die; this will increase the proportion of resistant flies in the population. By shearing or crutching prior to the 'tail' period, the remaining low concentration of chemical is removed and the short wool may prevent the need for the autumn treatment. For more information, search FlyBoss for early season flystrike prevention.

Always make sure to observe the wool harvesting interval and trade advice for the product/s used.

5. FOLLOW THE LABEL DIRECTIONS AND KEEP A TREATMENT RECORD

- Follow directions to ensure the right dose is applied using the proper application method and location, and dose rate.

- Record the product used (including batch number), dose rate, date of treatment and mob treated, then use a different chemical group next time. These records are a legal requirement but are also a useful reference when investigating emerging resistance.

USEFUL RESOURCES

Fact Sheet – Resistance Management Strategy for the Australian Sheep Blowfly (*Lucilia cuprina*) (April 2019).
http://www.flyboss.com.au/sheep-goats/files/pages/treatment/insecticide-resistance/resistance-management-strategies/190415-SHEEP-BLOWFLY-RESISTANCE-MANAGEMENT-STRATEGY-FINAL-GD3349.pdf
For flystrike control information visit the FlyBoss website www.flyboss.com.au
Insecticide resistance www.flyboss.com.au/treatment/insecticide-resistance.php
Breeding and selection pages www.flyboss.com.au/breeding-and-selection.php
Treatment pages www.flyboss.com.au/treatment.php
Management options www.flyboss.com.au/management.php
Lice and flystrike products tool www.flyboss.com.au/tools/products.php
Flystrike decision support tools, customised to your location www.flybosstools.org.au

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