

IT'S FLY TIME!™

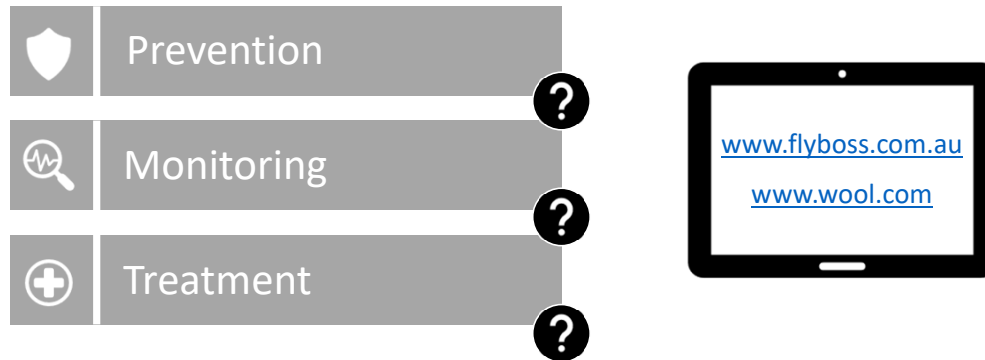
PREVENTING, MONITORING
AND TREATING FLYSTRIKE



- *This session has been developed for you to deliver as required. This may be at a group setting such as an event workshop, or one-to-one, for example with a client.*
- *In the presentation there are notes against each slide.*
- *Where text appears in italics, it indicates notes for you to consider or instructions. Normal text indicates the content which should be delivered with the slide.*
- *You should run this presentation as a PowerPoint show and have the Word document with you for prompts or, if you have two screens, run in Presenter mode so you can see these notes and your audience can see the presentation.*
- *Introduce yourself as the deliverer.*

MF1

Today's program



It's Fly Time!

- *At this point, welcome your participants and thank them for joining It's Fly Time! Preventing, monitoring and treating flystrike.*
- This has been brought to you by Australian Wool Innovation or AWI as part of the newly released It's Fly Time! information package designed to help woolgrowers prevent, monitor and treat flystrike.
- The focus of this package is on short term measures which can be considered during a fly season.
- Today's session will cover three topics which you will shortly hear more about: flystrike -
 - Prevention;
 - Monitoring; and
 - Treatment.
- *QUESTIONS: For small groups, you can take questions as you progress. For larger groups, its recommended that you break for questions at the end of each section. The presentation has been structured to break at each section for questions.*
- At the end of each section, we'll break for questions before moving onto the next section. *(Change this if you intend to answer questions as they are asked throughout the presentation), please feel free to ask questions throughout the presentation.*
- You will hear about a number of resources available to you today, these can be accessed through the FlyBoss website or

the AWI website.

- *Total time for full presentation is 1 hour allowing approximately 15 minutes of time in that for questions.*

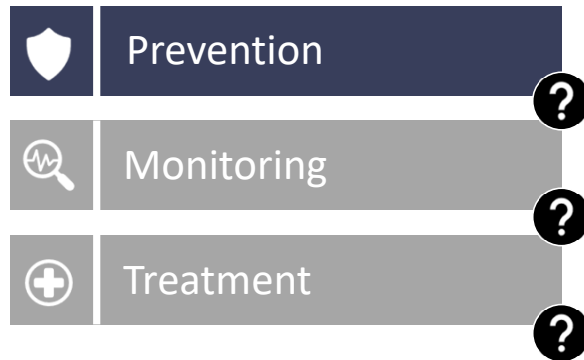
Today's deliverer



It's Fly Time!





- *You can use this space to add the name, company name and logo of the deliverer if required, otherwise delete this slide.*

Today's program



- Flystrike is one of the most important issues facing the wool industry.
- *Introduce cost to industry briefly, if available or known.*
- Effective short-term management is made up of three key pillars, which this webinar will cover:
 - Prevention of flystrike, including conditions required for flystrike to occur and some key prevention activities;
 - Monitoring to detect flystrike; and
 - Treatment options when flystrike occurs.
- Have a well-defined, well considered flystrike management plan which integrates these three aspects for your business, sheep and country. Don't leave it until a crisis.
- The place to start is prevention.

What we will cover - prevention

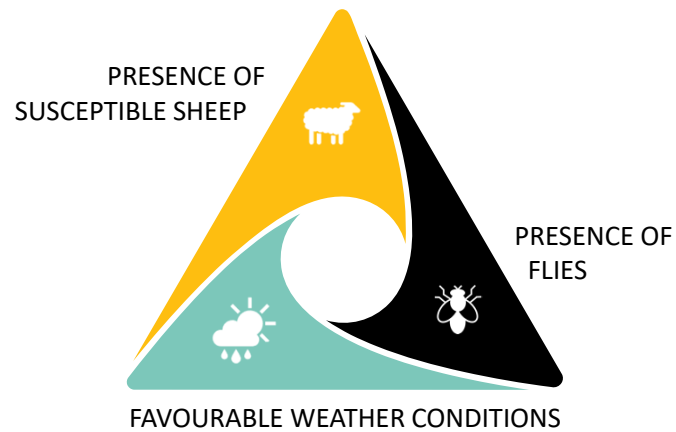
-  When flystrike risk is the highest
-  What makes sheep susceptible to flystrike
-  How to prevent flystrike
-  Questions

- During this section, I will cover a number of key items in relation to preventing flystrike, this includes identifying:
 - When flystrike risk is the highest;
 - What makes sheep susceptible to flystrike; and
 - How to prevent flystrike.
- We will also have time at the end of this section for questions after which we will move on to monitoring for flystrike.



When flystrike
risk is highest

Conditions required for flystrike



- There are three basic conditions required for flystrike to occur:
 - presence of susceptible sheep;
 - presence of flies; and
 - favourable weather conditions.

Weather conditions

Greater risk in:

- Warm and wet conditions
- Spring and autumn



Can occur throughout the year

- Let's start with weather first.
- Weather conditions play a big role in determining the risk of flystrike.
- The risk of flystrike is greatest during warm and wet conditions.
- This usually coincides with spring and autumn but it can occur throughout the year if climatic conditions make sheep more susceptible to flystrike and favour fly reproduction.

Weather conditions

Blowflies prefer:



Temperatures > 15°C
(most active 26-36°C)



Wind speeds < 9 km/h
(activity stops > 30 km/h)



Regular and consistent rainfall
(keeps skin moist for 2+ days)



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- Australian sheep blowfly activity increases when:
 - the temperature is above 15°C, but they are most active between 26°C to 36°C;
 - wind speeds are less than 9 km/h – fly activity stops when wind is greater than 30 km/h; and
 - rainfall is regular and consistent – the strike risk increases dramatically when there is enough rain to keep the sheep's skin moist for two or more days.
- Frequent, light falls of rain is more conducive to flystrike than occasional heavy falls because there is less opportunity for the skin to dry out.
- High risk regions are predominantly in southern Australia, particularly in southern Western Australia, South Australia, Victoria and New South Wales.

Presence of flies

The main culprit of flystrike:

- Australian sheep blowfly
(*Lucilia cuprina*)



- That covers weather conditions which is one of the requirements for strike.
- We will now talk about the next condition required for flystrike which is the presence of flies.
- You will hear more about the culprit as we work through today's presentation but let's introduce you to *Lucilia cuprina*.
- A pretty name but this fly, generally known as the Australian sheep blowfly, is responsible for initiating 90% of flystrike in sheep.
- As you can see, it's a very distinctive looking blowfly.
- After the Australian sheep blowfly has initiated a strike, other fly species may attack the animal and can cause additional damage which is sometimes more severe.

Presence of susceptible sheep

Some sheep are more inclined to be struck.



More sheep at risk...



The greater risk of fly wave and flystrike

- The final requirement for flystrike is susceptible sheep.
- Some sheep are more inclined to be struck than others and are more at risk than others.
- The number of susceptible sheep is a key factor influencing the extent of flystrike in a mob.
- The more sheep at risk in the mob, the greater the risk of a fly wave occurring.



What makes sheep susceptible to flystrike

- So what makes sheep susceptible to flystrike?

Sheep at risk

Those with:

- Breech wrinkles or long wool
- Dags, urine stain or yellow wool
- Fleece rot and dermatitis
- Wet or moist wool and skin
- Wounds



Young sheep and sheep that have been struck before are also more susceptible to flystrike

- Sheep that are more likely to be struck by flies are those that have:
 - breech wrinkles;
 - long wool in the breech area;
 - dags caused by scouring;
 - urine stain;
 - wool that is yellow;
 - fleece rot and dermatitis;
 - wet or moist wool and skin (greater risk of body strike);
 - horns; and
 - Wounds, for example, wounds caused by skin tears, abscess, dog bites or footrot, etc.
- Basically any wound or moist skin will attract blowflies.
- Sheep that have been struck in the past may also be more susceptible.
- Flies use scent to find sheep, so wet sheep or those with existing strike are more attractive to them.
- Young sheep like weaners are generally more likely to be struck especially those who are unclassified.



How to prevent flystrike

- Let's have a look at how you can prevent flystrike.
- Avoid the panic – prevention is better than the cure.
- Having an integrated flystrike management plan with broad ranging tools helps minimise strike without an over reliance on chemicals.



- Preventative activities which help reduce the risk of flystrike include:
 - classing and lamb marking which includes breeding and selecting sheep which are less susceptible to flystrike, as well as mulesing high risk sheep and docking lambs tails to the optimal length when marking;
 - shearing or crutching to reduce wool length so wool dries more quickly, particularly around the breech. This also reduces the prevalence of dags;
 - applying preventative chemicals to sheep to protect against strike;
 - reducing the risk of scouring which causes dags;
 - careful selection of paddocks; and
 - reducing fly populations.

- Let's have a closer look at each of these preventative activities.

Classing - Breeding and selection

Long term - breed and select sheep for:

- Low breech wrinkle and cover
- Dags and stain
- Productivity

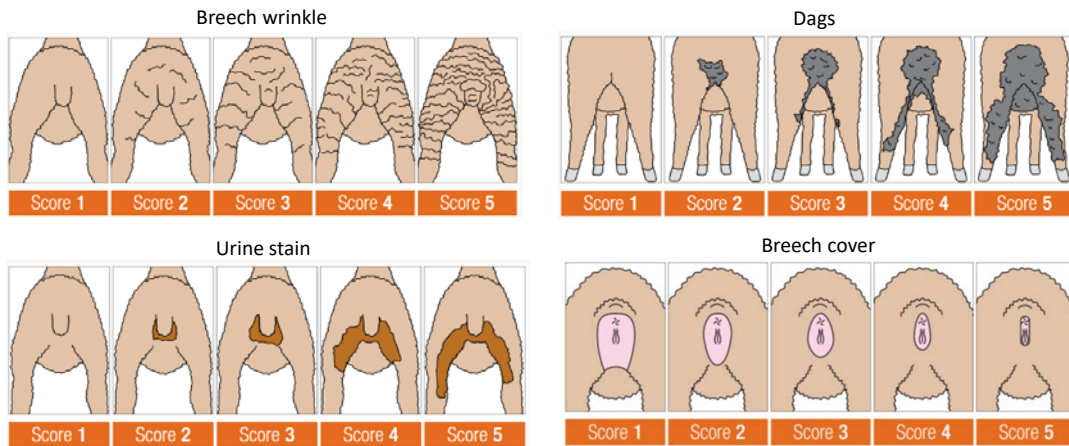


Cull sheep that have been struck previously



- Selecting and breeding sheep which are less susceptible to flystrike is a good long-term strategy to minimise flystrike.
- This includes selecting for low breech wrinkle and wool cover and low incidence of dags and stain.
- Culling sheep which have previously been struck is also advisable.

Class out high risk sheep - examples



Source: AWI/MLA Visual Score Guide



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- The AWI/MLA Visual Score Guide has some good examples of the type of sheep which would be at higher risk of flystrike.
- This Guide can be used to assist selecting and classing out sheep in order to prevent flystrike long-term.
- The top left image shows various degrees of breech wrinkle.
- The top right shows dags.
- Bottom left shows urine stain.
- And the bottom right shows breech cover which is how much naturally bare skin there is around the breech.
- You can see here that those sitting around score 3 or greater are going to be at increasing risk of flystrike so you would use these scores as guides for removing higher risk sheep from the flock.

Lamb marking - Mulesing

If you deem the risk of flystrike in your sheep is high and they require mulesing - ensure that best practice procedures are used.

Two guides are available from AWI



<http://bit.ly/BP-Lamb-Marking>



<http://bit.ly/Plan-Non-Mulesed>



It's Fly Time!

- If you deem the risk of flystrike in your sheep is high and they require mulesing - ensure that best practice procedures are used.
- Two guides are available from AWI which will help
- The first is a training guide to help you plan, prepare and conduct best welfare practice lamb marking procedures.
- The second is a guide to provide assistance when planning for a non-mulesed Merino enterprise.

Lamb marking - Tail docking

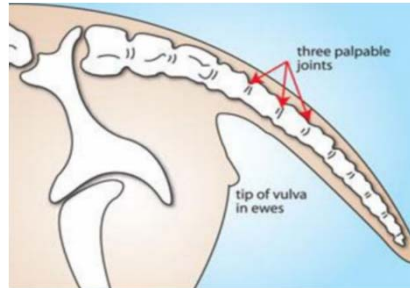
Optimal tail length helps:

- Channel urine and faeces away from breech area
- Minimise breech stain and reduce flystrike
- Protect from sun exposure and cancer

- Another long-term preventative activity relates to docking lambs' tails to an optimal length when marking.
- Wool that is stained or wet from urine and faeces can attract flies.
- There is an optimal tail length which helps channel urine and faeces away from the breech area.
- This also minimises stain around the breech and reduces flystrike risk throughout the sheep's life.
- It also helps to prevent prolapse (common in sheep with very short tails) and protects soft tissue from cancers caused by sun exposure.

Lamb marking - Tail docking

Immediately below 3rd palpable joint



Source: FlyBoss

- When marking lambs, the recommended tail length ensures the healed tail just covers the vulva.
- This means docking immediately below the third palpable joint or through the third joint space. Palpable means the joint that can be easily felt.
- Male lambs should have their tails docked to the same length as ewe lambs.
- The length is important because it means enough muscle remains so that the sheep can lift the tail high in the air which then puts vertical tension on the breech skin that makes the "channel" for urine.

Shearing and crutching

Shearing and crutching sheep:

- Protects up to 6 weeks (reduced to 3 weeks if scouring)
- Needs to be timed to extend protection over the fly season



Consider periods of high-risk in your area



- A short-term preventative activity is shearing and crutching.
- These activities can provide up to six weeks protection from body and breech flystrike. If sheep are scouring, this protection may be reduced to three weeks.
- Shearing or crutching should be planned to coincide with the start, or just before the usual start of the fly season.
- This is to reduce the number of susceptible sheep when the flies become active after winter. This is particularly important for lambing ewes that may have more stain around their breech.
- Carefully consider the timing of shearing and crutching.
- Aim to extend the period of protection over the fly season as much as possible by 'spacing' out these activities, bearing in mind the usual high-risk periods for flies in your area and other critical events such as lambing.
- Handling ewes with lambs at foot to crutch can be difficult so time your activities to avoid having to do this.

Applying preventative chemicals

Insecticides:

- Are used in combination with other activities
- Should not be relied upon alone
- Can be used preventatively or as a treatment



Make sure you use the right chemical for the task

- Insecticides can be used in combination with other preventative activities to deter flies but they shouldn't be relied upon alone.
- These chemicals are registered to be used as either a preventative treatment or to treat struck animals (called 'dressings'). Some chemicals only provide protection and will not kill maggots.
- We will cover treating flystrike further in this session.
- It is vital you use the right chemical for the task and follow the label instructions.

FlyBoss has tools to help chemical selection

www.flyboss.com.au

www.flyboss.com.au/sheep-goats/treatment/products

www.flyboss.com.au/sheep-goats/treatment/choosing-the-right-chemical

- As we heard earlier, you can access tools to help with chemical selection via FlyBoss.

Applying preventative chemicals

Points to consider when applying chemicals:

- At least one month's wool (approx. 10mm) for ideal chemical bond
- Time application to extend protection
- Check WHPs and other intervals - keep records



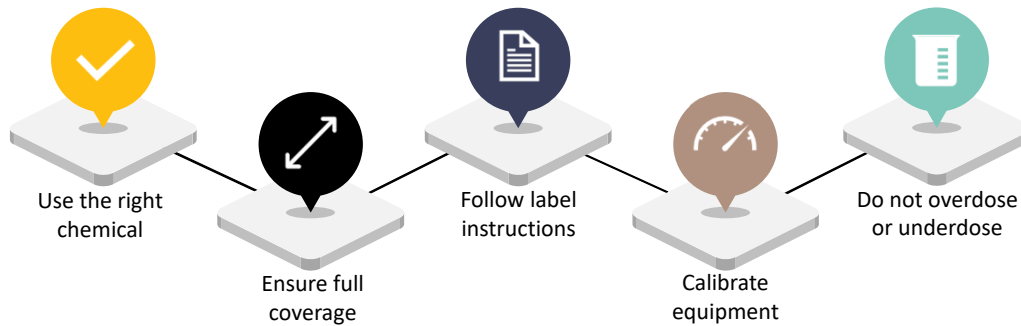
If protection period is reducing
consider a fly resistance test



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- Preventative chemicals may only work if there is at least one month's wool growth (approximately 10mm) for the chemical to bond to so applying immediately after shearing may not provide the protection expected of the product.
- As we said earlier, where possible, time applications to extend the protection period.
- For example, if you shear in early December, applying a preventative chemical six weeks later in mid-January will help to protect the sheep when the wool becomes long again.
- When considering a chemical treatment, check for withholding periods and intervals and make sure you keep accurate records of any chemical treatments used.
- If you feel the protection period is reducing, then you may want to consider conducting a fly resistance test.
- *Given shearer shortage (in news recently) growers may ask if any prevention chemical can be used to hold them over until they can get shearers – FlyBoss doesn't have any information. Options include checking stock daily, using spynosin wound dressing, choosing the lowest risk paddock and pulling in favours with the growers network to secure shearers or a crutching trailer.*
- *NSW DPI is offering sheep blowfly insecticide resistance testing to Australian woolgrowers.*
- *More information is available from the FlyBoss website: <http://www.flyboss.com.au/sheep-goats/news/articles/flyboss-featured-articles/free-tests-are-your-sheep-blowflies-resistant-to-chemicals.php>*

Chemical resistance is a growing concern



Regular monitoring is important even with preventative chemicals



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- The resistance of flies to chemicals is a growing concern, because resistance reduces the effectiveness of preventative chemicals and treatments or dressings over time.
- If woolgrowers already have resistance on their property, this could result in shorter periods of protection than what they could normally expect, rather than a complete loss of effectiveness.
- That is why it is important to use the right chemical for the task and rotate chemicals wherever possible.
- It's also important to:
 - ensure full coverage;
 - follow the label instructions for dosage rates and application methods;
 - calibrate application equipment regularly as this will help ensure the right dose is applied.
- It's vital that you don't overdose or underdose and the steps I've just mentioned will help ensure this doesn't occur.
- Poor efficacy is often attributed to resistance when in fact the real issue is the application, dose rate or timing of the application.
- Regular monitoring is important even with the application of preventative chemicals.

Do you think flystrike preventative chemicals still work
on your property for the protection period listed on the label?

- This is a question for your audience to consider.
- This question is about the audience's property and whether they think preventative chemicals work or if they may have a resistance problem. It's important that they're honest because - it's tempting to blame resistance when other management issues might be at play.
- Ask your audience the question: *"Do you think flystrike preventative chemicals still work on your property for the protection period listed on the label?"*
- Ask for a show of hands or nods to indicate yes, no, unsure.
- Allow time for people to answer.
- If you use this question in a group setting, it's good to get a sense of how many answered yes or no as this will be helpful in the next slide.
- So roughly X% said yes which means chemicals still work on their property and X% said no which means they may have a chemical resistance problem.

Chemical resistance

- Do you think chemicals still work on your property?
- Read *Resistance management strategy* available from www.flyboss.com.au
- Search “resistance management strategies”



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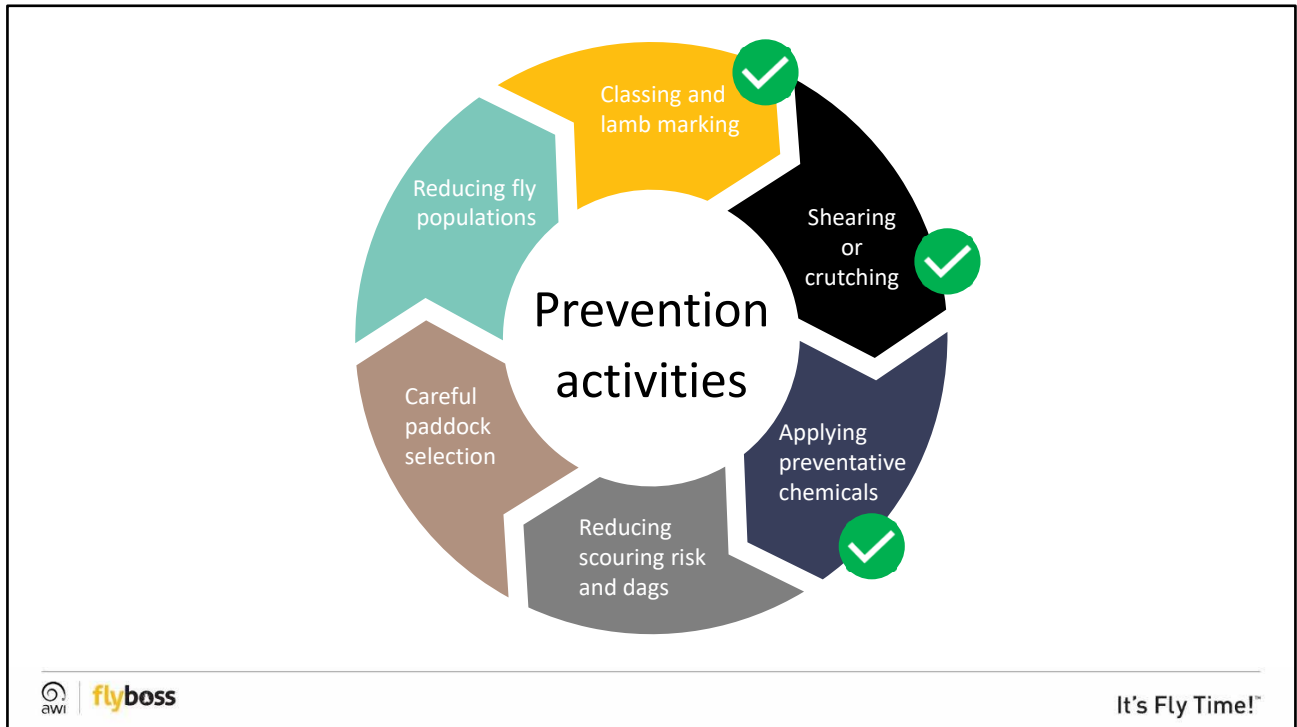
- For those who think chemicals still work on your property there is a great resource available which covers how to strategically manage the use of chemical treatments to reduce the risk of a resistance problem developing.
- Essentially, if you don't have a resistance problem, you don't want to develop one so this factsheet will give you some tips about avoiding that.
- You can download the factsheet from flyboss.com.au – just search resistance management strategies.
<http://www.flyboss.com.au/sheep-goats/files/pages/treatment/insecticide-resistance/resistance-management-strategies/190415-SHEEP-BLOWFLY-RESISTANCE-MANAGEMENT-STRATEGY-FINAL-GD3349.pdf>

Chemical resistance

- Do you think resistance might be increasing on your property?
- Read *A fly in the ointment* available from www.flyboss.com.au
- Search “resistance management strategies”



- For those that indicated you think you already have a resistance problem developing on your property there is another resource available for you which covers other strategies you can use to limit the development of further resistance on your property.
- You can download the factsheet **A fly in the ointment** from flyboss.com.au – just search resistance management strategies:
<http://www.flyboss.com.au/sheep-goats/files/pages/treatment/insecticide-resistance/resistance-management-strategies/GD4044-Fly-in-the-Ointment-Factsheet-3.pdf>



- We have discussed:
 - classing and lamb marking which includes breeding and selecting sheep which are less susceptible to flystrike, as well as mulesing high risk sheep and docking lamb's tails to the optimal length when marking;
 - shearing or crutching to reduce wool length so wool dries more quickly;
 - applying preventative chemicals to sheep to protect against strike;

- It's now time to consider:
 - reducing the risk of scouring which causes dags;
 - careful selection of paddocks; and
 - reducing fly populations.

Reducing scouring risk and dags



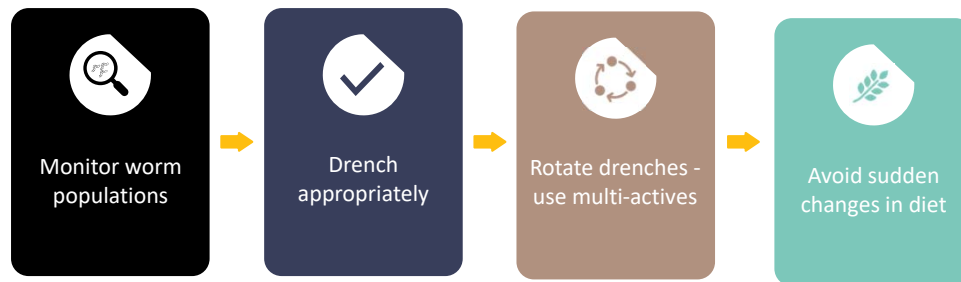
Scouring leads to dags
Breech stays warm and moist



Ideal conditions
to attract flies

- Another preventative activity is reducing scouring.
- Scouring can cause dags to form rapidly.
- Dags can then cause the wool and skin around the breech to stay moist and warm, this creates an odour which attracts the gravid fly looking to lay eggs. This environment provides a suitable site for female flies to lay eggs and for maggots to develop.
- Preventing scouring and dags is an important step to improve animal welfare and reduce the risk of breech strike.

Reducing scouring risk and dags



- Worms can cause scouring so controlling the risk of scouring is an important preventative activity.
- If you live in an area where there is a high risk of dags occurring, add lowering dags into your breeding objective.
- To control worms you need to:
 - Monitor worm populations using faecal egg counts and drench when required.
 - When drenching, remember to use the right drench for the job and the right dose.
 - Rotate drenches and use drenches with multi-actives when possible. More information on this can be found at wormboss.com.au
 - Avoid sudden changes in diet that may induce scouring such as the introduction of grain or forage crops.

Careful selection of paddocks

Select paddocks which:

- Are open with more wind
- Have less ground cover, timber and wet areas
- Do not have large worm populations



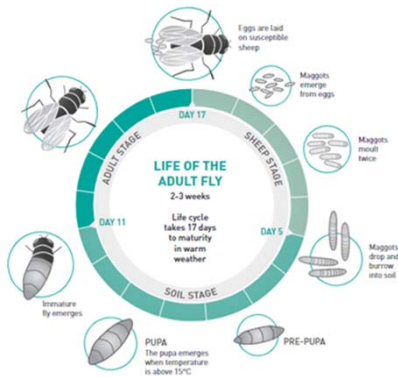
Source: FlyBoss



It's Fly Time!

- Putting more susceptible sheep in certain paddocks is another key prevention activity.
- Select paddocks that help mitigate the environmental factors that contribute to flystrike and avoid hotspots that encourage fly activity.
- This might include paddocks that are more open and exposed to wind and those with less timber and wet areas.
- Fly activity will be reduced in these paddocks and sheep will dry out more quickly.
- Avoid paddocks that may be contaminated with a large worm population (for example, those that have been recently grazed) during the fly season. This will help prevent scouring.

Reducing the presence of flies



The lifecycle of *Lucilia cuprina*, the Australian sheep blowfly

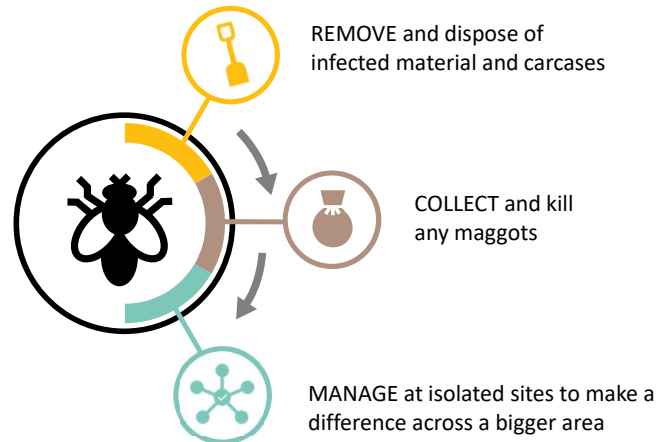
Source: Levot (1999) from *Managing Breech Flystrike* (2019), AWI



It's Fly Time!

- The final preventative activity I'll cover is focused on reducing the presence of flies.
- The Australian sheep blowfly female prefers to lay its eggs on live sheep. Damp, smelly wool is their ideal environment.
- A female can lay 300 eggs every 4-8 days which explains how "fly waves" can quickly escalate.
- Within 12-24 hours, the eggs hatch into maggots (larvae) which grow by feeding on the sheep through wounds, existing strike and weeping skin.
- The maggots drop off the sheep in about three days and burrow into the ground to pupate before emerging as immature flies about a week later, depending on temperature.
- To complete their lifecycle, larvae need a feed rich in protein to commence their lifecycle.
- The sources of protein include exudate from wounds, existing strikes, weeping skin, carcasses and protein-rich manure.
- Other fly species that can cause secondary infections may also use these sources of protein (including carcasses, animal and household waste) to lay eggs and to hatch maggots.

Reducing the presence of flies



- Removing flies from the equation can help to prevent strike in the first place.
- Some key points for reducing the presence of flies:
 - Remove and dispose of any fleece or waste animal matter (dags, dirty wool, horn tips, tails etc) to eliminate these as a source of protein for both the Australian sheep blowfly and other flies. Carcasses of sheep that have died from flystrike should also be removed and disposed of – ideally by burying them. Although carcasses aren't a big part of the lifecycle for the Australian sheep blowfly, many maggots may be able to complete their development before other fly species infect the carcass and out compete them.
 - Collecting maggots from wool clippings when you've treated an animal is also important. It might not be something you automatically think about but doing this helps reduce the number of flies and can prevent a fly wave. Prevention is better than treatment.
 - Remember that flies do not generally travel far (about 3km) so managing them at isolated sites and at a property level can make a significant difference to the level of flystrike on individual properties and in the local area.
- Importantly, these activities which help reduce fly populations should be timed before the first emergence of flies from the pupae stage - not just within the fly season.
- Reducing the feed source by disposing of fleece, waster matter and carcasses is important before temperatures reach above 15oC – that is, towards the end of winter and not just once spring has sprung when we think flies are about.
- If you starve the newly emerged flies you slow the population reproductive rate over the next few months – by the end of the fly season your local population size (and therefore fly pressure) will be lower. Then you will have even less flies

that have survived winter to emerge the following winter/spring when over 15°C.



- So that covers the full range of prevention activities.
- A combination of these activities is best rather than relying on any single activity alone and should be considered in your integrated flystrike management plan.
- Don't forget, at the end of the fly season, reassess your flystrike management plan and make changes where necessary.

Take to the farm messages

4

Well-timed, preventative activities can help reduce the risk of flystrike

5

Some types and classes of sheep are more susceptible to flystrike

6

A well thought out integrated flystrike program is crucial

- Now to summarise what we've discussed for prevention:
 - Well-timed preventative activities can help reduce the risk of flystrike and the development of fly waves.
 - Some types and classes of sheep are more susceptible to flystrike and should be targeted for preventative treatment.
 - A well thought out integrated flystrike program is required, make sure you have a plan which includes preventative activities we've covered today.

Take to the farm messages

7

No single preventative activity should be relied upon alone

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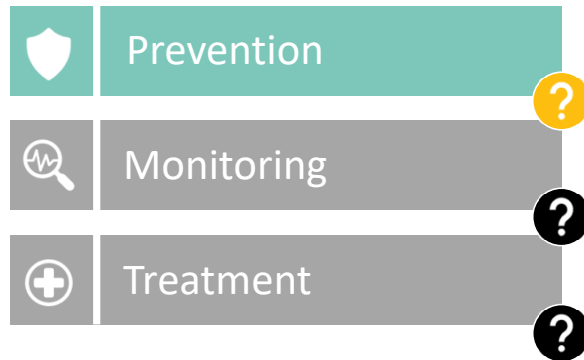
Monitoring is required even with the use of preventative activities

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Flystrike management considers prevention, monitoring, treatment

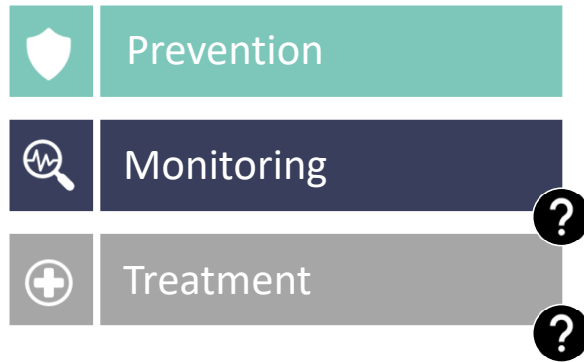
- No single preventative activity should be relied upon alone – make sure you use a range of well-timed activities in combination.
- Monitoring activities (which we will hear about next) are still required even with the use of preventative activities including the use of preventative chemicals. Constant vigilance is crucial.
- Effective flystrike management requires the combination of prevention, monitoring and a treatment – which we will shortly cover.

Questions



- That brings us to the end of our section on prevention so we'll check for questions before moving onto Monitoring.
- *Asks for questions from participants about what has just been covered and provide answers. You may need to go back to slides to reinforce messages.*

Progress check



- We're going to look at monitoring activities to control flystrike.

What we will cover - monitoring



Why monitoring is important



How to monitor for flystrike



Signs of flystrike



Questions

- During this section, I'll cover a number of key items in relation to monitoring flystrike, this includes identifying:
 - why monitoring is important and the role it plays in short term flystrike management;
 - how to monitor for flystrike; and
 - the signs of flystrike.
- We will also have time at the end of this section for questions before we move onto the final section regarding treatment of flystrike.



Why monitoring is important

- Let's look at why monitoring is important.

The aim of monitoring

Detect and deal with flystrike as soon as possible to prevent:

- Further suffering in flystruck animals
- Increased flystrike across the flock
- Negative impacts on:
 - wool production
 - condition and fertility
 - growth and survival



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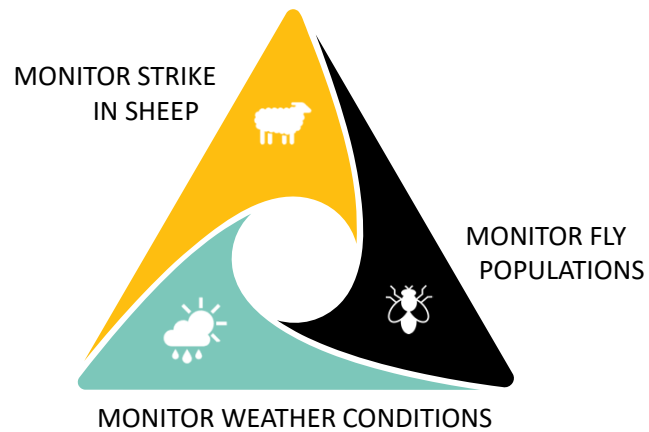
- Monitoring flystrike is an important tool for woolgrowers to use, particularly when conditions indicate an increased risk of flystrike.
- The aim of all monitoring activities should be to detect and deal with flystrike as soon as possible.
- Doing so means you can:
 - stop the flystrike from worsening in individual animals and prevent further suffering of flystruck animals;
 - prevent fly populations increasing and flystrike spreading through the entire flock or your area – it's better to prevent than have to treat the outcome; and
 - avoid negative impacts on wool production, condition, fertility, growth and survival due to poor health or damage from strike.



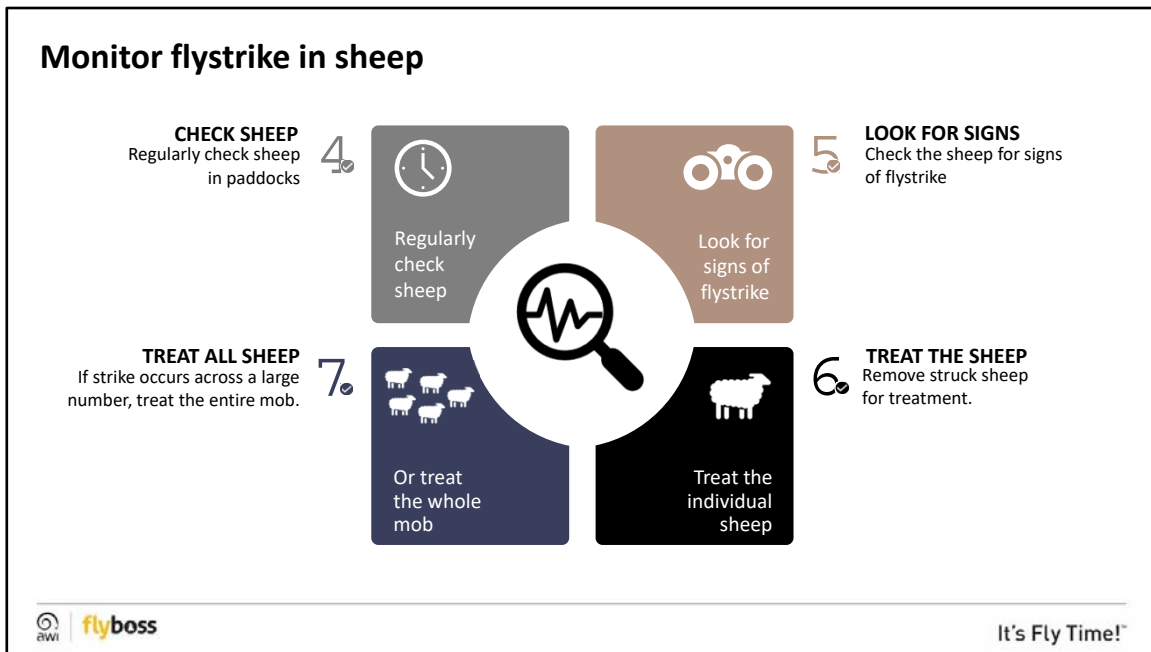
How to monitor for flystrike

- So, how do you monitor for flystrike?

Monitor conditions required for flystrike



- Monitoring flystrike really means monitoring the conditions required for flystrike.
- Remember, the conditions required are:
 - The presence of susceptible sheep;
 - The presence of flies; and
 - Favourable weather conditions.
- Monitoring therefore means:
 - Monitoring strike in sheep;
 - Monitoring fly populations; and
 - Monitoring weather conditions.



- Regularly checking mobs of sheep and carefully looking for signs of flystrike is an important part of flystrike management.
- This is a particularly important activity when favourable conditions for flies occur.
- Not only will this allow you to identify and deal with struck sheep but it will also allow you to monitor the severity of the flystrike event. That is whether it is a one-off event or if it's a sign of an imminent outbreak.
- Checking sheep doesn't mean bringing the sheep into the yards but rather going around the paddocks carefully and looking at the sheep for signs of flystrike.
- If you find signs of flystrike in sheep, remove the sheep for treatment.
- If the strike appears to be more extensive and across a large portion of the flock, then you may need to bring the entire mob in for treatment.



Signs of flystrike

- When you are monitoring flystrike in sheep, it's important to understand the signs of flystrike and how severe it is.

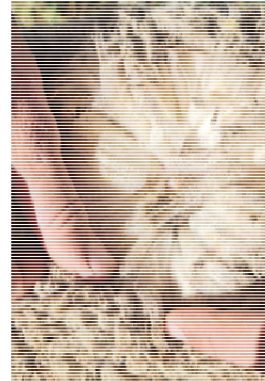
Covert flystrike

Covert flystrike is:

- Common
- Not easily seen unless looking closely



Covert strikes can last for some weeks and advance or resolve



Covert flystrike can be difficult to detect unless handling sheep

- Small areas of flystrike that cannot be detected easily are quite common and are known as covert flystrikes.
- They are difficult to detect unless you are looking closely at sheep, such as when handling them for crutching, shearing or marking.
- Covert strike can last for some weeks before advancing into more obvious flystrike during warm, moist conditions or they can resolve without the need for treatment.

Early detectable flystrike

Early detectable flystrike signs:

- Discoloured wool
- Sheep behaviour



As soon as detected, implement treatment and prevention



Discoloured wool may indicate early detectable flystrike



It's Fly Time!

- Early signs of flystrike which should be noted in a monitoring program including patches of wool that appear discoloured from chewing or rubbing.
- These generally do not have a large strike wound but it will become progressively darker with more exudate (weeping).
- Sheep also usually behave differently as they will be uncomfortable and irritated. They may twitch their tail, bite or scratch at the affected area if they can reach it, especially with breech strike. They may also stamp their feet, duck their head and arch their backs but will generally stay with the mob.
- As soon as an early detectable strike is confirmed, implement treatment activities and take steps to prevent further flystrike from occurring.

Early detectable flystrike

Act now to prevent advanced strike:

- Treat struck sheep
- Work out cause of strike
- Crutch or apply preventative chemicals



If a fly wave is likely, increase monitoring and prevention

- Start by treating all struck sheep and then work out why the strike has occurred.
- This allows you to determine whether it is an anomaly, that is only one particularly susceptible sheep is affected, or if it is an indicator that an outbreak is imminent.
- If the strike appears to have affected more than one particularly susceptible sheep, consider whether the strike occurred due to a management error (for example: poor or delayed crutching or chemical application error) or if it's due to a 'fly wave'? This can help determine what the next course of action may be.
- If you think an outbreak or fly wave might happen, increase monitoring and take action such as crutching or chemical preventions as soon as possible.
- If shearers cannot be arranged, consider alternative options, such as additional jetting with a preventative treatment which may provide interim protection until shearing or crutching can be arranged.

Advanced flystrike

Signs of advanced flystrike:

- Wound is large, wet, dark and smelly
- Affected area is swollen and inflamed
- Isolation, fatigue and loss of appetite



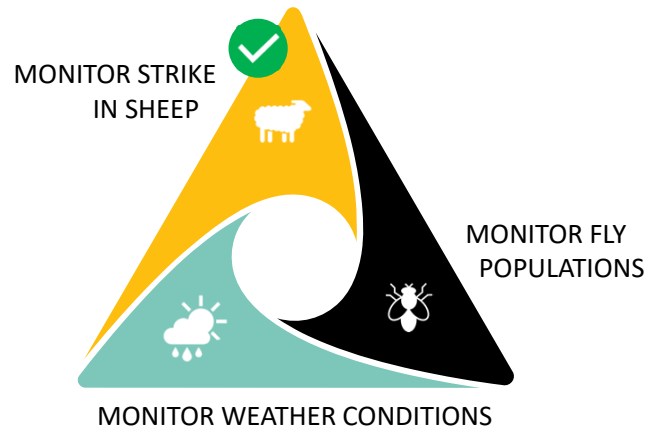
Treat immediately to promote wellbeing - increase monitoring



An obvious wound site

- The signs of advanced strike are more obvious because the wounds are larger and the toxins released by maggots can cause 'whole of body' effects for the sheep including fever and potentially sepsis or septic shock.
- Wounds from advanced strike are large, wet, dark and smelly and maggots will be moving outwards to consume healthy tissue. Affected areas will be swollen and inflamed due to the toxins released by the maggots.
- Sheep will be suffering significant pain and inflammation, as well as fever and other whole of body effects.
- Sheep won't be able to keep up with the mob when grazing and will often be found on their own. They will become increasingly affected by the flystrike, stop eating and drinking, will lie down and not want to get up.
- Without treatment, sheep will generally die quickly, anywhere from hours to three or so days. If sheep with advanced flystrike are found, treat animals immediately and increase the frequency of monitoring as it is likely that more flystrike will occur in the following days or weeks.

Monitor conditions required for flystrike



- That that covers monitoring sheep, let's have a look at monitoring fly populations.

Monitor fly populations

Regularly check:

- Sheep camps
- Watering points
- Fly traps (where used)



Sheep watering points and camps attract flies



Watering points act as epicentres for infection



It's Fly Time!

- Adult flies do not normally travel further than 3 km so sheep camps and watering points can act as epicentres for infection. Check these areas regularly for blowflies and struck sheep.
- Remember – part of the lifecycle is maggots that drop off struck sheep and form pupae in the soil. So, it makes sense that where sheep spend a lot of time will be where a lot of flies develop.
- Fly traps are a useful tool to monitor fly activity in northern areas of NSW and Qld but are less useful in southern regions.
- If any Australian sheep blowflies are caught in traps or found around camps and watering points, this should be taken as a warning that flies are about and, given favourable conditions, flystrike could occur.

Monitor fly populations – adult flies



An adult female (left) and male (right) Australian sheep blowfly

Source: J Larsen, L Tyrell and N Andersen, The Mackinnon Project, University of Melbourne, from *Early Season Treatment and the Control of Breech Strike in Unmulesed Sheep – A National R&D Technical Update* (2010), AWI

- When monitoring fly populations, it's important to know how to spot the different fly species so you can determine if the Australian sheep blowfly is about.
- Many of you will be familiar with the Australian sheep blowfly but as a recap:
 - The adult Australian sheep blowfly is about 9 mm long (body length) and is a metallic green/bronze colour with reddish eyes.
 - You can see here the very distinctive colour.

Monitor fly populations - blowfly larvae

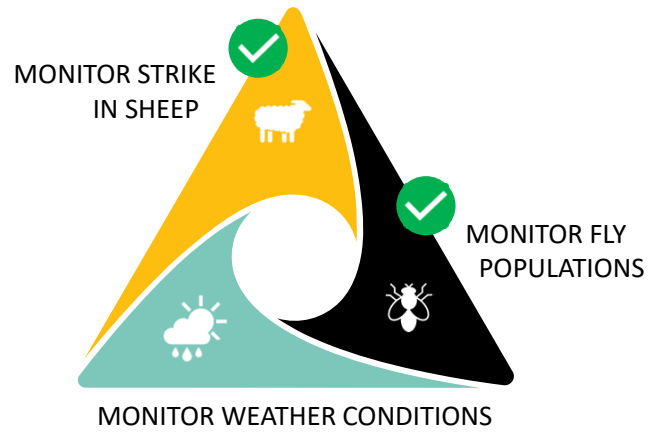


Various stages of Australian sheep blowfly larvae development

Source: S De Cat and J Larsen, The Mackinnon Project, University of Melbourne,
from *Managing Breech Flystrike* (2019), AWI

- Egg-bearing female flies lay small white eggs on live sheep.
- These larvae or maggots are creamy coloured and hatch within 12-24 hours of the eggs being laid.
- The maggots drop off the sheep after about three days (around 13 mm in length) and burrow into the ground to pupate. The pupa become barrel-shaped as the outside shell hardens and darkens from yellow to red-brown.
- When conditions are favourable, they emerge as immature flies about one week later.

Monitor conditions required for flystrike



- That covers monitoring fly populations, let's have a look at monitoring weather conditions.

Monitor weather conditions



REMEMBER - Blowflies prefer:



Temperatures
> 15°C



Wind speeds
< 9 km/h

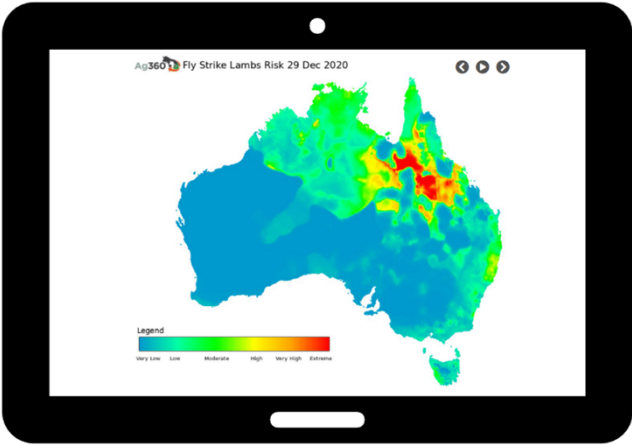


Regular and
consistent rainfall



Monitor sheep carefully when
favourable conditions occur

- Remember from the prevention section, consecutive warm, calm, wet days above 15°C provide ideal conditions for female flies to lay eggs on sheep and are a good indicator that strike may occur.
- Monitoring the weather helps you to know in advance when conditions are likely to favour flies.



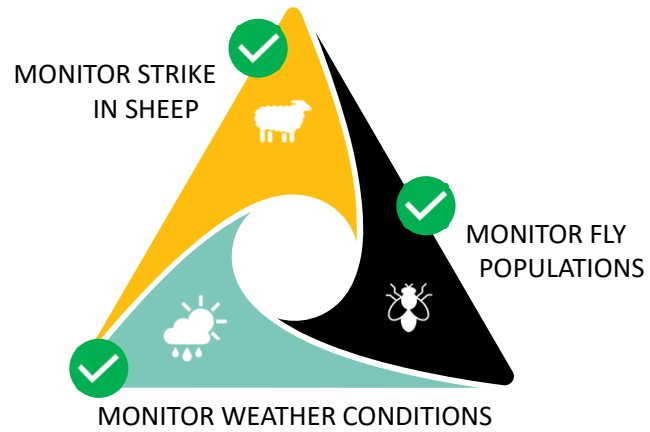
Check your risk at FlyBoss

Access free national risk maps for flystrike via FlyBoss

www.flyboss.com.au/sheep-goats/management/national-risk-maps

- A forecast of wetter than average conditions can be a valuable indicator of increased fly activity.
- This summer is predicted to be wet for most of the eastern states. This is likely to extend the fly season and increase the risk of flystrike.
- You can access free national risk maps for flystrike via FlyBoss.
- *It is recommended that you use the most current map available when presenting, or visit the site live:*
<http://www.flyboss.com.au/sheep-goats/management/national-risk-maps.php>

Monitor conditions required for flystrike



- And they are the key monitoring activities you need to be undertaking regularly.

Take to the farm messages

4

Monitoring activities help detect signs and conditions of flystrike

5

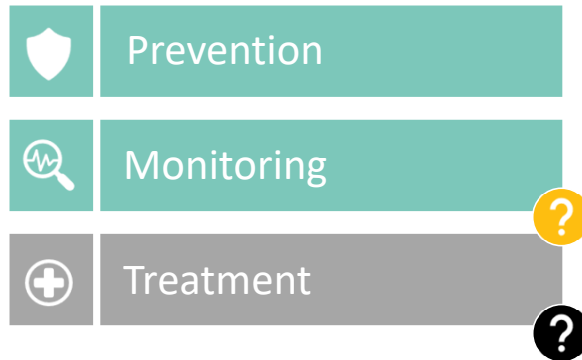
Monitoring is a combination of checking sheep, flies and weather

6

Monitoring is important even with the use of preventative activities

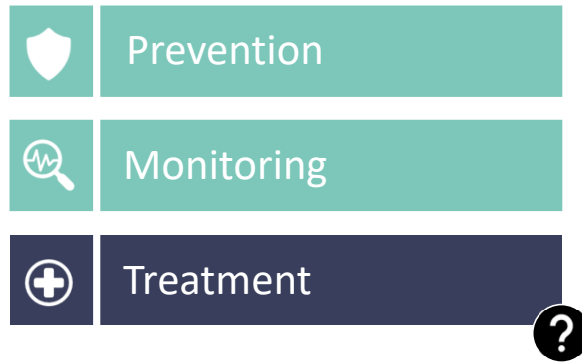
- Now to summarise what we've heard for monitoring:
 - Regular monitoring activities will help you to detect signs of flystrike in sheep as well as conditions which may favour flystrike. Finding these as early as possible helps prevent severe infections.
 - Monitoring involves a combination of checks including looking for flystrike in sheep, checking populations of flies and checking weather conditions.
 - Monitoring is an important activity to undertake regularly even with the use of preventative activities including chemicals.

Questions







- That brings us to the end of our section on monitoring so we'll check for questions before moving onto treatment.
- *Asks for questions from participants about what has just been covered and provide answers. You may need to go back to slides to reinforce messages.*

Progress check



- We've now covered prevention and monitoring so in this next section we'll look at treating flystrike when it occurs.

What we will cover - treatment

-  How to treat flystruck sheep
-  What chemical treatment to use
-  How to treat the cause of additional strike
-  Overall questions

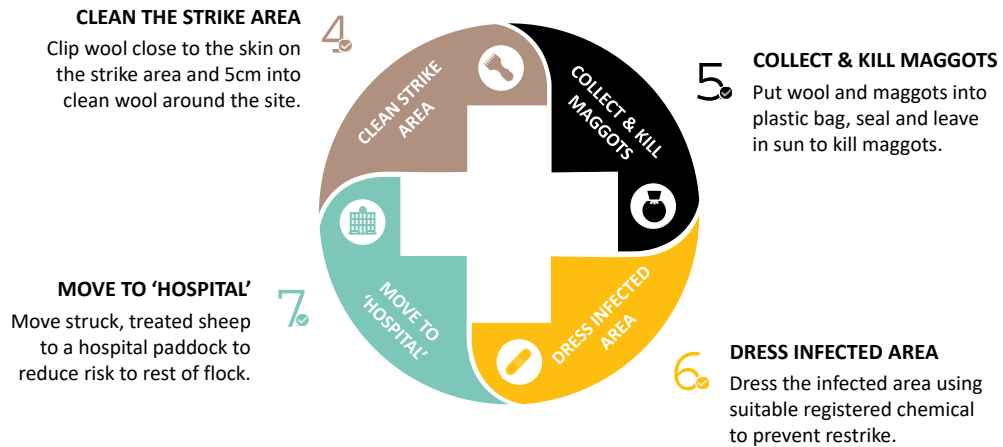
- Treating flystrike is essential to protect the health and welfare of your flock, break the lifecycle of flies and prevent economic losses.
- In this section, we will look at how to treat flystruck sheep including how to select suitable chemical treatments.
- We will also review how to kill maggots and remove sources of protein to help break the lifecycle of flies and prevent additional strike.



How to treat flystruck sheep

- So, you have been monitoring your sheep and you find a flystruck one, what do you do next?

Steps to follow



It's Fly Time!

- The first step is to clean the strike area.
- This means the area of the strike wound and around the site.
 - Remove struck wool by clipping the wool on and around the infected area. Clip the wool close to the skin. Machine shearing with a hand piece is generally better than using manual hand shears.
 - Clip into at least 5 cm or one blow with a handpiece, of clean wool around the struck area to ensure all maggot trails have been exposed and create a buffer so the infected skin can dry out.
 - If you find maggot trails, follow these and clip out all infected wool.
- Many maggots may escape treatment if care is not taken. Poor control of maggots can lead to further strike as well as resistance to treatment and prevention chemicals.
- It is important to collect as many maggots as possible during treatment and kill them.
 - Don't just kick the maggots and wool clippings down the chute if you're in the shed.
 - To dispose of maggots effectively, place all clipped wool and all maggots into a plastic bag that

can be sealed.

- Leave the bag in the sun for several days to kill the maggots.

- Once you've cleaned the site and cleaned up the wool and maggots, the next step is to dress the infected area.
 - Dress the infected area using a suitable registered chemical to prevent the wound from being re-struck while it is healing.

- After dressing the wound, you then need to move struck sheep to a 'hospital' paddock (if possible) to reduce the risk of attracting more flies to the rest of the flock. Provide the treated sheep with fresh feed and water, shelter and contact with other sheep and monitor them regularly.

- For treating sheep with severe flystrike, it is best to consult your local vet as these sheep are at greater risk of death.

- Make sure you follow all the steps described to effectively treat struck sheep, prevent additional strike and avoid the development of resistance to chemicals.



What chemical treatment to use

- Now let's have a look at what chemicals you can use.

Dressings

Chemical treatments or 'dressings':

- Help prevent restrikes
- Provide short-term protection
- Shouldn't be relied upon alone



Keep records of treatments

- Chemicals are registered to be used as either a preventative measure (which we've heard about) or to treat struck animals as what's called a 'dressing'.
- Dressings can help kill existing maggots and prevent re-strike while the wound dries out and heals but may only provide protection for a relatively short period of time.
- When considering a dressing, check for withholding periods and intervals.
- Dressings should be used in combination with other measures and shouldn't be relied upon alone.
- The active ingredients in registered dressings are:
 - cyromazine;
 - spinosad;
 - ivermectin; and
 - diazinon.

- Remember to keep accurate treatment records.

The image shows a tablet displaying the FlyBoss website. The website has a navigation menu with options like Home, Susceptibility, Breeding and Selection, Management, Treatment, FlyBoss Tools, and News. The main content area is titled 'Lice and Flystrike Products' and includes sections for 'Choosing the right chemical', 'Choosing the right application method', and 'Choosing the right time to treat'. Below these are filters for 'Feed type' and 'Application method'. A table lists various products with columns for 'Product and Manufacturer', 'Chemical Group & Active', 'Application Time and Cost', and 'Time Periods (Days)'. The table lists products like 'Bayer', 'Oxi-Band', 'Oxi-Band 2000', 'Oxi-Band 3000', 'Oxi-Band 4000', 'Oxi-Band 5000', 'Oxi-Band 6000', 'Oxi-Band 7000', 'Oxi-Band 8000', 'Oxi-Band 9000', 'Oxi-Band 10000', 'Oxi-Band 11000', 'Oxi-Band 12000', 'Oxi-Band 13000', 'Oxi-Band 14000', 'Oxi-Band 15000', 'Oxi-Band 16000', 'Oxi-Band 17000', 'Oxi-Band 18000', 'Oxi-Band 19000', 'Oxi-Band 20000', 'Oxi-Band 21000', 'Oxi-Band 22000', 'Oxi-Band 23000', 'Oxi-Band 24000', 'Oxi-Band 25000', 'Oxi-Band 26000', 'Oxi-Band 27000', 'Oxi-Band 28000', 'Oxi-Band 29000', 'Oxi-Band 30000', 'Oxi-Band 31000', 'Oxi-Band 32000', 'Oxi-Band 33000', 'Oxi-Band 34000', 'Oxi-Band 35000', 'Oxi-Band 36000', 'Oxi-Band 37000', 'Oxi-Band 38000', 'Oxi-Band 39000', 'Oxi-Band 40000', 'Oxi-Band 41000', 'Oxi-Band 42000', 'Oxi-Band 43000', 'Oxi-Band 44000', 'Oxi-Band 45000', 'Oxi-Band 46000', 'Oxi-Band 47000', 'Oxi-Band 48000', 'Oxi-Band 49000', 'Oxi-Band 50000', 'Oxi-Band 51000', 'Oxi-Band 52000', 'Oxi-Band 53000', 'Oxi-Band 54000', 'Oxi-Band 55000', 'Oxi-Band 56000', 'Oxi-Band 57000', 'Oxi-Band 58000', 'Oxi-Band 59000', 'Oxi-Band 60000', 'Oxi-Band 61000', 'Oxi-Band 62000', 'Oxi-Band 63000', 'Oxi-Band 64000', 'Oxi-Band 65000', 'Oxi-Band 66000', 'Oxi-Band 67000', 'Oxi-Band 68000', 'Oxi-Band 69000', 'Oxi-Band 70000', 'Oxi-Band 71000', 'Oxi-Band 72000', 'Oxi-Band 73000', 'Oxi-Band 74000', 'Oxi-Band 75000', 'Oxi-Band 76000', 'Oxi-Band 77000', 'Oxi-Band 78000', 'Oxi-Band 79000', 'Oxi-Band 80000', 'Oxi-Band 81000', 'Oxi-Band 82000', 'Oxi-Band 83000', 'Oxi-Band 84000', 'Oxi-Band 85000', 'Oxi-Band 86000', 'Oxi-Band 87000', 'Oxi-Band 88000', 'Oxi-Band 89000', 'Oxi-Band 90000', 'Oxi-Band 91000', 'Oxi-Band 92000', 'Oxi-Band 93000', 'Oxi-Band 94000', 'Oxi-Band 95000', 'Oxi-Band 96000', 'Oxi-Band 97000', 'Oxi-Band 98000', 'Oxi-Band 99000', 'Oxi-Band 100000'.

Below the tablet, two URLs are provided:

www.flyboss.com.au/sheep-goats/treatment/products

www.flyboss.com.au/sheep-goats/treatment/choosing-the-right-chemical



REMEMBER

Access tools to help with chemical selection via FlyBoss

- As we heard earlier, you can access tools to help with chemical selection via FlyBoss.

Chemical resistance



REMEMBER

- Chemical resistance is a growing concern
- Some chemicals won't kill maggots



www.flyboss.com.au



It's Fly Time!™

- Also remember that resistance of flies to chemicals is a growing concern as resistance reduces the effectiveness of treatment over time.
- That's why it's important to use chemicals properly for treatment, the same as prevention.
- Be aware that some chemicals used as dressings may not kill maggots.
- Don't forget the two factsheets you heard about earlier in relation to chemical resistance which are available by searching for "resistance management strategies" on FlyBoss.



How to treat the cause of additional strike

- Another important treatment activity is treating the cause of additional strike.

Break the blowfly lifecycle

Prevent further strike:

- Remove protein sources
- Destroy maggots



Effective control prevents the spread of flies



It's Fly Time!

- Remember, to complete their lifecycle, female adult flies must have access to feeds that are rich in protein.
- Preventing additional strike means breaking the blowfly lifecycle by removing sources of protein including carcasses, household waste and any fleece or waste animal matter (dags, dirty wool pieces, horn tips, tails etc).
- Killing maggots when you treat flystrike is also very important as obviously this breaks the lifecycle.
- Even maggots that have been treated with dressings should be killed as these may hatch into flies that are resistant to chemical treatments.
- And remember, because flies do not generally travel far, managing them at isolated sites and a property level can make a significant difference to the broader spread of flies.

Take to the farm messages

4

Use a combination of treatment activities, not one single activity

5

Correctly treat sheep, kill maggots and remove protein sources

6

Flystrike management should also consider prevention and monitoring

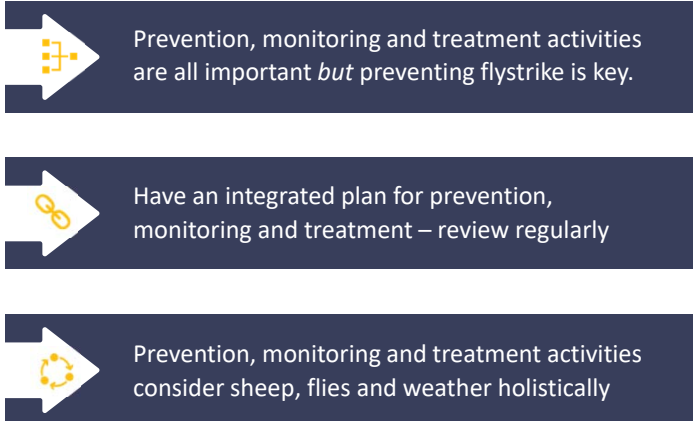
- In summary, when it comes to treating flystruck sheep, make sure you use a combination of treatment activities and that you don't rely on one single activity alone.
- It's important to make sure all flystruck sheep are effectively treated, all maggots are killed and sources of protein are removed to aid the sheep's recovery and to prevent additional strikes.
- Treatment of flystrike should be considered as part of a larger flystrike management plan which also incorporates prevention and monitoring activities, as we've heard about today.

Progress check



- That's the end of our section on treatment and takes us to the end of three sections we had planned for today.
- Before we move onto questions, just a final summary about key points from today.

Summary



- Prevention, monitoring and treatment activities are all important but preventing flystrike is key.
- Have an integrated plan for prevention, monitoring and treatment and review it regularly.
 - No single preventative, monitoring or treatment activity should be relied upon alone. Remember it's a strategy, we're using them all together.
- These prevention, monitoring and treatment activities need to consider sheep, flies and weather holistically.
- Thank you everyone for your attention, I'll hand over to *[Facilitator]* and we will go through questions.

Questions



FACILITATOR

- *Summary of key points E.g. how prevention, monitoring and treatment can't be considered in isolation of each other and each contributes differently to effective flystrike management/getting the balance of activities right is key to effective flystrike management.*
- Move onto questions either on the topic of treatment which we just finished or if there are any other questions overall about prevention, monitoring and treating flystrike.
- *Facilitator – asks questions from participants and Deliverer answers.*
- *[have three questions prepared]*

Resources



www.flyboss.com.au
www.wool.com

- In summary, when it comes to treating flystruck sheep, make sure you use a combination of treatment activities and that you don't rely on one single activity alone.
- It's important to make sure all flystruck sheep are effectively treated, all maggots are killed and sources of protein are removed to aid the sheep's recovery and to prevent additional strikes.
- Treatment of flystrike should be considered as part of a larger flystrike management plan which also incorporates prevention and monitoring activities, as we've heard about today.



Please provide your feedback

Help us improve the presentation
by answering 5 short poll questions



It's Fly Time!

- Thank you everybody for your attendance today.

- Before we go, it would be great if you could stay on and answer five short poll questions to help us improve this presentation.

- The poll results will be anonymous, we won't be sharing or discussing them at the end like we have with other poll questions.

- *Did you learn something new today?*
 - Yes
 - No

- *Do you intend to make on-farm changes as a result of today's webinar?*
 - Yes

- *No*
 - *Unsure*
 - *N/A (not a woolgrower)*
- *Do you intend to seek further information on flystrike management as result of what you heard in today's webinar?*
- *How would you rate the value of the webinar to your business? (1 - not valuable, 10 – extremely valuable)*
 - *1-10*
- *What area was of most interest to you?*
 - *Prevention*
 - *Monitoring*
 - *Treatment*



THANK YOU

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