Department of Primary Industries
primefact

Pregnancy toxaemia in breeding ewes

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Geoff Casburn Sheep Development Officer Wagga Wagga

Pregnancy Toxaemia, also known as lambing sickness or twin lamb disease, is caused by low levels of glucose in the blood which adversely affects brain and nervous system function.

It most commonly occurs in ewes bearing twin and sometimes large single lambs during the last month of pregnancy, when there is a high demand for glucose from the rapidly growing foetuses. The incidence of the disease may typically be between 1-2% and up to 10% of twin-bearing ewes.

Glucose and Ketones

The level of glucose in the blood is directly related to amount and quality of the feed being digested.

Near term, rapidly growing foetuses and udders require a significant amount of glucose and at times this cannot be met from the diet alone and needs to be sourced from the ewe's own reserves.

During this process, fat is used as a major maternal energy source and ketones are produced as a consequence. The more fat used by mum, the more ketones produced. Ketones are used as an energy source by muscle in times of severe nutrient deficiency.

Over a prolonged period of severe undernutrition, the level of ketones produced become toxic. This leads to a further fall in feed intake and eventually clinical signs of pregnancy toxaemia.

Fat mobilisation also occurs during short periods of fasting (such as before shearing) or during periods of unfamiliar handling practices and stress associated with infection or bad weather.

These practices generally do not result in pregnancy toxaemia on their own. When they coincide with prolonged under-nutrition during late pregnancy, they can be enough to 'tip the balance' and cause pregnancy toxaemia.

Symptoms

The first signs of the disease are ewes walking around with their heads held high, not feeding and separated from the mob. They can be blind and walk into fences or they may stand with their head near the ground.

If they lie down they are unlikely to rise unless assisted and there could be a discharge from the nose and mouth and sometimes a dark discharge from the vagina. Pregnancy toxaemia often results in the animal dying, as treatment is seldom successful.

Diagnosis

Hypocalcaemia has similar symptoms to pregnancy toxaemia and is often mistaken for the disease.

However, hypocalcaemia is easily treated with an injection of Calcium Boro-gluconate resulting in rapid recovery, often with animals getting to their feet within minutes.

The first step in diagnosis of pregnancy toxaemia is to provide the recommended dose of calcium Boro-gluconate. If ewes don't recover quickly then it is likely they are suffering from pregnancy toxaemia, in which case they may benefit from continual treatment with a glycerol drench.

Seek veterinary advice for correct diagnosis and treatment.

The main focus should be on prevention by ensuring the remainder of the mob have adequate nutrition and not unduly stressed.

Targeted feeding requires pregnancy scanning for litter size, as without this information some ewes will be fed too much or too little.

Causes

There are three general scenarios that lead to pregnancy toxaemia:

1. Stress and fasting
2. Over-fat ewes
3. Inadequate pasture

1. Stress and fasting

Pregnancy toxaemia can be triggered by stress resulting from unfamiliar locations, transport, cold wet weather, internal parasites and foot abscess or by fasting due to extended periods of handling (ie shearing). For example, ketones have been shown to remain elevated for 5 days after transport, indicating lasting effects of stress.

On their own these practices generally don't result in pregnancy toxaemia, as their impact on fat utilisation is often within acceptable limits.

However, when these circumstances coincide with prolonged under-nutrition, it can be enough to 'tip the balance' and cause pregnancy toxaemia in twin-bearing ewes during late pregnancy.

Prevention

It is most important to provide adequate nutrition during last month of pregnancy. If supplementary feeding is required, commence feeding earlier to allow ewes time to adjust.

Plan handling operations to occur prior to the last month of pregnancy. If handling is required during late pregnancy, handle with care, for short periods and ensure ewes have access to adequate feed before and immediately after.

If shearing is necessary, be flexible with the order of shearing. Allow the twin-bearing ewes to be shorn with minimal time in the shed and yards.

If transporting ewes to a new location, provide adequate feed well before the trip and upon their arrival. Ensure any husbandry procedures, such as mustering, are carried out a number of days beforehand allowing time to recover before the journey.

If the season is shaping up to be wet with pasture conditions likely to promote foot abscess, select paddocks for twin-bearing ewes that contain dry areas to allow feet to dry out, such as contour banks, dam walls or roads.

When feeding grains to late pregnant ewes, agricultural lime and salt should be provided and should gradually be removed if grain feeding ceases.

If ewes are on grazing wheat or oat forages, lime, magnesium and salt should always be offered.

2. Over-fat ewes

Pregnancy toxaemia also occurs when twin-bearing ewes are 'fat as mud'. The reason for this is 'fat' ewes eat significantly less than 'thin' ewes in late pregnancy.

This problem more commonly occurs in autumn lambing crossbred ewes in the mixed cropping regions of the state.

It often follows favourable summer and autumn rain as ewes continue to gain weight after spring due to grazing lush lucerne and early sown dual purpose cereals.

Table 1 lists the differences in estimated feed intake of twin bearing ewes grazing both high quality and quantity pasture with fat scores ranging from 3 to 5.

Pasture intake decreases as fat score increases, to the point where a fat score 5 ewe at day 130 of pregnancy loses 169 grams/day. At this level of weight loss, the ewe needs to be handled carefully to reduce the risk of pregnancy toxaemia

Table 1. Estimated voluntary pasture intake and liveweight change in a twin-bearing ewe.

Fat score and liveweight (including foetal weight)	130 days pregnant	
	Intake kg/DM	LWT change (g)
Fat score 3 (68kg)	**1.61**	**38**
Fat score 4 (74kg)	**1.42**	**-60**
Fat score 5 (80kg)	**1.17**	**-169**

GrazFeed: 2000 kg/ha green (75% digestible), 60 kg SRW.

Low pasture biomass compounds weight loss in over-fat ewes.

This scenario often occurs during winter lambing following good summer rain combined with a tight autumn finish. Ewes become fat over summer and autumn and pasture growth slows preventing the expected carryover of feed into winter.

At 1000 kg/DM/ha green, fat score 5 ewes lose 218 grams/ day. This is effectively a 'double whammie' as intake is being restricted by low pasture mass and ewes being over-fat (Table 2).

Table 2. Estimated performance of twin-bearing ewes, 130 days pregnant with different fat scores, grazing varying quantities of pasture.

130 days pregnant Fat score and liveweight (including foetal weight)	500 kg/DM/ha		1000 kg/DM/ha	
	Intake kg/DM	LWT change (g)	Intake kg/DM	LWT change (g)
Fat score 3 (68kg)	**1.08**	**-181**	**1.46**	**-29**
Fat score 4 (74kg)	**0.95**	**-247**	**1.29**	**-113**
Fat score 5 (80kg)	**0.78**	**-361**	**1.06**	**-218**

GrazFeed: Pasture 75% digestible (green), 60 kg SRW.

In this situation ewes will need to be handled carefully to prevent any stress or fasting. Ideally supplementation to reduce weight loss would be advisable.

Supplementation will be required to reduce the risk on pregnancy toxaemia when pasture quality falls below 1000 kg/DM/ha (Table 6).

Prevention

Prevent animals from becoming over fat

The best way to prevent pregnancy toxaemia resulting from ewes being over-fat is to prevent ewes from getting too fat in the first place.

The warning signs are ewes in fatscore 3.5 of greater at joining and good soil moisture to drive pasture growth.

It is not uncommon to achieve liveweight gains between 35 to 55 grams/head/day over a wet summer and autumn period.

Weight gains of this magnitude can equate to approximately 1 fat score. To achieve this, pastures need to have a digestibility of between 70 to 75% and a green biomass of 1200 kg/DM/ha or greater.

This level of weight gain can be disastrous for autumn lambers as the ewes are commonly fat score 3.5 or greater coming out of spring. For spring lambers, this will cause similar problems especially if the season progresses following an early autumn break.

If the ewes are fat score 3.5 or more after joining, it is often too late to wait until scanning to identify twin-bearing ewes and take action to reduce their fat score if needed.

The damage has been done, as in most cases ewes are unable to lose the required weight without negatively impacting on the growing foetus**.**

It is better to **reduce** weight gain in all fat ewes leading up to scanning rather than **induce weight loss** in twins from scanning onwards.

In this instance, the only real option is to minimise further weight gain and plan to feed energy-dense feeds such as grain in the last month of pregnancy.

Controlled weight gain

In good seasons, controlled weight gain requires careful grazing management.

For ewes with a fat score of 3.5, maintaining pastures at around 800 kg/DM/ha green or 2.5cm in height will effectively limit weight gain to approximately 10 grams/ head/day. This ensures ewes remain on a rising plane of nutrition through joining while maintaining a suitable fat score for lambing.

Stock density needs to be managed to roughly match pasture growth rates once pastures reach around 800 kg/DM/ha green.

At this level of biomass, a 60 kg Merino ewe will eat approximately 1.2 kg/day of actively growing pasture. If the pasture is growing at around 30 kg/ha/day, the stock density will need to be about 25 ewes/ha. This number needs to be adjusted as conditions change.

If appropriate stock densities cannot be achieved, another option is to select paddocks with large amounts of carryover dead or rank pasture biomass, as pasture germination and growth may already be restricted in these paddocks.

Grazing dual purpose cereal crops should be avoided as feed quality and accessibility make limiting weight gain to 10 grams/head/day nearly impossible.

Supplementation with energy-dense grains

Over-fat ewes within four weeks of lambing will need supplementation of high energy dense feeds such as cereal grain or lupins. Energy dense feeds help to overcome energy deficits resulting from lower feed intakes.

To achieve cost effective supplementation the aim is to reduce ewe weight loss to acceptable levels Table 3.

The level of supplementation for fat score 5 ewes limits weight loss to around 200 g/d. While this level is quite high compared to ewes in fat score 4, the ewe will still have sufficient fat reserves to call upon during lactation. However, careful handling will be essential to prevent the ‘balance being tipped’ towards pregnancy toxaemia.

Table 3. The estimated level of daily barley supplementation to achieve acceptable levels of weight loss in fats core 4 and 5 twin-bearing ewes, 130 days pregnant and varying pasture biomass.

Fat score and liveweight (including foetal weight)	130 days pregnant			
	500 kg/DM/ha green		**750 kg/DM/ha green**	
	Barley kg (as fed)	LWT change (g)	Barley kg (as fed)	LWT change (g)
Fat score 4 (74 kg)	**0.70**	**-102**	**0.4**	**-107**
Fat score 5 (80 kg)	**0.67**	**-209**	**0.40**	**-208**

GrazFeed: Green biomass 75% digestible, 60 kg SRW, Barley 13 ME and 12% CP.

Note: Grain should be introduced gradually to prevent acidosis and feeding should begin early to account for this period.

For fat score 4 ewes, the targeted level of weight loss is considerably lower to ensure they have sufficient fat reserves during lactation.

In both instances the level of weight loss will increase as pregnancy progresses, especially in the last two weeks prior to birth. In all instances ewes need to be handled carefully to avoided stressful situations.

3. Inadequate pasture

Pregnancy toxaemia is often associated with drought when pastures are clearly inadequate to meet the needs of the pregnant ewe, but can occur at other times when pastures are either short or low in quality.

For all seasonal conditions, it is important to assess pastures regularly to monitor quantity and quality. Using livestock condition as a guide is often too late, as for a noticeable change in fat score to occur ewes will have been losing weight for some time.

Pasture quantity

When pasture biomass falls below 1000 kg/DM/ha green, twin-bearing ewes in late pregnancy (day 130) are forced to utilise increasing amounts of fat (Table 4).

At 500 kg/DM/ha the level of weight loss is moderate to high and requires supplementation to lower the risk of pregnancy toxaemia and to ensure the ewe retains sufficient fat reserves for lactation.

When pasture biomass is 750 kg/DM/ha the level of weight loss may be acceptable, however if ewes are fatscore 2.5 or less, supplementation may be beneficial to ensure the ewe retains sufficient fat reserves for use during lactation.

Table 4. Predicted performance of twin-bearing ewes, 130 days pregnant, fat score 3, grazing different amounts of high quality pasture.

Dense pasture kg/DM/ha green	130 days pregnant	
	Intake kg/DM pasture	LWT change (g)
500 (1.5cm)	**1.08**	**-181**
750 (2.2cm)	**1.32**	**-85**
1000 (3.0cm)	**1.46**	**-29**

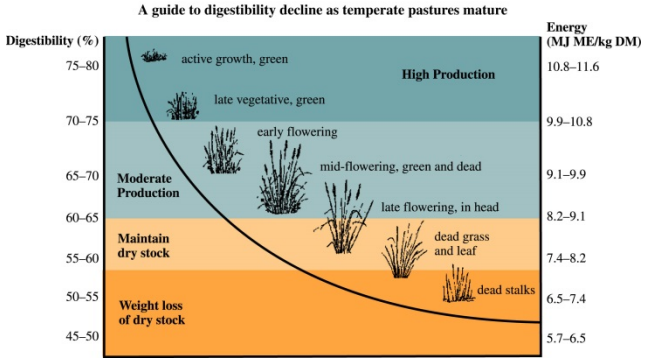
GrazFeed: green pasture (75% dig), 60 kg SRW, fat score 3.

Pasture quality

The quality of pasture also has a large impact on animal performance. As plants mature their digestibility declines, resulting in lower available energy and reduced feed intake.

Figure 1 depicts the change in digestibility and the corresponding fall in metabolisable energy as the plant grows and matures. Pastures may have sufficient quantity however they may lack quality.

Figure 1. A guide to digestibility - temperate pastures.



1.

Prograze Segment 2.

Table 5 lists the predicted performance of ewes grazing pastures of different quality with 1500 kg/DM/ha.

At 60% digestibility and below ewes will require supplementary feeding to reduce the risk of pregnancy toxaemia and to ensure they have sufficient fat reserves for lactation.

While the level of weight loss at 65% digestible is acceptable, ewes may require supplementation if pasture biomass falls below 1500 kg/DM/ha or if their fat score is below 3.

Table 5. Predicted performance of twin-bearing ewes at day 130 of pregnancy, fat score 3, grazing pastures with different digestibility.

Pasture digestibility	130 days pregnant	
	Intake kg/DM pasture	LWT change (g)
55%	**1.06**	**-286**
60%	**1.24**	**-195**
65%	**1.38**	**-110**
70%	**1.51**	**-28**

GrazFeed: pasture 1500 kg DM/ha, 60 kg SRW, fat score 3.

Prevention

Pregnancy scanning

Pregnancy scanning for twins and singles is an important step in the prevention of pregnancy toxaemia.

It allows targeted management of twin-bearing ewes, not only to ensure their greater nutritional needs are met, but also their need to be lambed in smaller mobs and in the most sheltered paddocks.

For some, the need to split twins and singles varies from year to year, however ewes should still be identified on an annual basis to allow the option to treat separately should the need arise.

Paddock selection

When pasture quantity and or quality are limiting intake, it is important to allocate the best paddocks to twin-bearing ewes in both late pregnancy and at lambing.

This reduces the need/level of supplementary feeding required (Table 6) and may reduce the need to handle/move ewes unnecessarily.

Sometimes there is a trade-off between the nutritional needs of late pregnancy and paddock availability, as paddocks are often saved for lambing.

There are no hard and fast rules. It is about assessing the circumstances each year. Start with the pasture quantity and quality in each paddock. Use Tables 4 and 5 as a guide to animal performance. Assess each paddock's potential for pasture growth and the level of supplementary feeding required.

Consider the need for worm free pastures and shelter. Group paddocks with similar attributes together and allocate mobs accordingly. Monitor progress.

Supplementation

It is inevitable that twin-bearing ewes in late pregnancy and early lactation will lose maternal bodyweight. To minimise the risk of pregnancy toxaemia, avoid prolonged periods of significant weight loss and stress related to handling activities.

The level of supplementation required will depend on the minimum acceptable level of weight loss. Table 6 lists the amount of supplementation required to limit weight loss to 100g/h/d at day 130 of pregnancy. The actual weight loss will increase especially in the last two weeks before lambing. However the risk of pregnancy toxaemia is acceptable as long as stress inducing activities are avoided.

A lower level of supplementation maybe adequate with good ewe condition and management practices, however a higher level may also be necessary if ewes are in poor condition.

Ewes in fat score 3 can afford to lose two to three kilograms of maternal body weight during late pregnancy. This level of weight loss imposes no unreasonable demand on the ewe, while minimising the cost of supplementation.

Table 6. The level of barley required (g/d 'as fed') to limit weight loss to 100 g/d for fatscore 3, twin-bearing ewes at day 130 of pregnancy, grazing pasture with varying levels of biomass and digestibility.

Pasture digestibility.	130 days pregnant				
	Pasture biomass kg DM/ha				
	500 kg	750 kg	1000 kg	1250 kg	1500
55%	**1040**	**960**	**880**	**820**	**780**
60%	**930**	**800**	**680**	**580**	**490**
65%	**800**	**590**	**340**	**230**	**0**
70%	**630**	**330**	**0**	**0**	**0**
75%	**420**	**0**	**0**	**0**	**0**

GrazFeed: 60 kg SRW, fat score 3, 68 kg liveweight (including foetuses).

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