

The significance of lupins as flush feed for sheep

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Flush feed is primarily aimed at increasing ewe fertility (number of ewes pregnant) as well as ovulation rate (number of ova released). Flushing has been used with great success for many years in sheep production. To maximise the success achieved with flush feed, the ewe's condition needs to improve prior to breeding (she should have a condition score of at least 3,5 out of 5 at mating). Energy and protein each play a pivotal role in increasing the ovulation rate.

While a flush effect can be achieved by letting ewes graze on good quality pastures or providing grain-based supplements to increase their condition, no other single source of nutrition can outperform lupins when it comes to improving ewe fertility and ovulation rate. This is largely due to the high levels of energy and protein in lupin seeds.

What's more, lupins have the added advantage of being rich in the fertility-supporting trace mineral manganese. The formula to achieving exceptional flush results lies in lupins' overall nutrient composition – a composition that is very difficult to replicate.

South African varieties

Three cultivars are generally cultivated in South Africa:

- *Lupinus angustifolius* is a narrow-leaved plant with blue or pink/purple

flowers and is the most common type cultivated. It is a bitter cultivar with varying levels of protein compared to the sweet species.

- *Lupinus albus* is a sweet cultivar with broad leaves and white flowers.
- *Lupinus luteus* is a broad-leaved, sweet cultivar with yellow flowers.

All three cultivars have sweet and bitter varieties. In addition, South Africa is also home to sweet lupins with blue flowers, so don't rely on the colour of the flowers for cultivar identification – rather go according to the taste and colour of the seed.

The bitter taste of bitter lupins can be ascribed to the alkaloids (around 0,5 to 2%) the cultivars contain – these alkaloids can be toxic if high volumes are ingested. Past processes involved soaking the seed in water to remove the alkaloids. Modern sweet cultivars, on the other hand, contain less than 0,03% alkaloids and are therefore more palatable.

Practical application

The best results are achieved with sweet lupins, with reports indicating 250 to 500g of sweet lupins/ewe/day as the most optimal. However, the quantity of lupins will vary according to the condition and age of the sheep, as well as the type of grazing available. These factors play an integral role in the success achieved with lupins as a flush feed. In this regard, it is

advisable to first discuss the issue with a knowledgeable animal nutritionist.

Sheep are also not as prone to contracting acidosis on lupins because of the seeds' low starch and high oil and fibre content, as well as the fact that practically no adaptation period is necessary. It is highly digestible and sheep have no problem picking up the seeds from the soil.

Guard against 'too'

As always, too much of a good thing can be detrimental. Because of lupin seeds' high oil content, daily ingestion of large amounts of seeds can lead to rumen impairment. This is one reason why lupins are only included up to a certain level in sheep feed.

The largest fraction of lupins' total protein content is digested in the rumen (so-called rumen-degradable protein or RDP). Soluble protein makes up approximately 80% of this RDP. An excess of soluble protein can cause frothy bloat – another reason why lupins must not be included at too high levels.

However, some techniques can be applied to keep the RDP levels of lupins at an acceptable level. Using a 5mm sieve to coarsely grind lupins can reduce the RDP fraction by around 30% and increase the amount of soluble protein digested in the small intestine. Extrusion, or compressing lupins at high temperatures, is another method of reducing the crop's RDP level.



Bitter lupins contain white-speckled grey seeds.



The seeds of sweet lupins are white with brown specks.

For example, compressing lupins at a temperature of 195°C will basically halve the RDP.

Note limitations

A common practice, especially in some regions of the Western Cape, is leaving ewes on lupin fields for the entire breeding season. However, livestock producers need to be vigilant as fungi such as *Diaporthe toxica* can quickly take hold in a lupin field if conditions are optimal (high moisture and ambient temperatures). This fungus produces secondary metabolites called phomopsins that can cause severe liver damage and jaundice in sheep. Some lupin cultivars available for cultivation show higher resistance against this fungus, reducing the incidence of lupinosis in livestock.

Do note that lupins on their own are not a balanced feed; minerals such as calcium and sulphur must be supplemented when feeding lupins at high levels. In addition to energy and protein, the animal's

vitamin and mineral status is also a vital part of successful conception. The recommendation is therefore to include lupins, where possible, in a balanced nutritional programme.

Sweet lupins can be included at high levels (up to 60% in lick supplements or 20% in complete feeds) in flush licks or flush feed mixes. These mixes need to be balanced so as to provide all the nutrients sheep require during the breeding season. Recommended intakes will be influenced by the ewes' condition and available grazing. The salt that the lick supplement contains can be adjusted upward or downward, and the amount of grain increased or decreased to regulate lick intake.

The inclusion of lupins in a balanced lick supplement also simplifies management. For instance, the supplement does not have to be put out in small quantities daily, as in the case of whole kernels. However, sheep need to have unrestricted access to good quality grazing or roughage while on the lick supplement. When it is part of a

complete feed, it must be given daily, with the trough space large enough so that all ewes can feed simultaneously.

Keep to a schedule

Start with flush feed at least three weeks prior to the breeding season. The objective with this is to flush a ewe for at least one oestrus cycle before mating. This way, ewes will be ready to mate during their second cycle. Flush feeding will have to start earlier if ewes must regain a condition score of more than 0,5 (i.e. below a condition score of 3 out of 5). Continue with the flush feed for the duration of the breeding period until approximately two weeks after the rams are removed, to promote foetal attachment.

The judicious inclusion of lupins in sheep nutrition programmes will have a huge positive impact on the condition and fertility of a flock. Speak to your nearest livestock nutritionist to find out more about lupins as part of flush feed for sheep. **SF**

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