

HIGH OESTROGENIC SUB CLOVERS

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Subterranean clover is the most widely sown annual pasture legume species in southern Australia, it is well adapted to our Mediterranean-type climate having been sown over an estimated area of 29 million ha. A recent AWI survey of more than 200 producer fields sampled over autumn and winter of 2014 throughout all four states of southern Australia showed that while many pastures still had high clover composition, these often contained the older clover varieties e.g., Mt Barker, Seaton Park and Trikkala. Leaf identification of the sub clover seedlings in samples also showed these samples often contained or were dominated by the older high oestrogenic clover varieties such as Yarloop, Dwalganup, and Dinninup.

Classic Clover disease

It is well known that many forage legumes contain phytoestrogens, compounds known to have oestrogenic activity that can cause infertility and other reproductive disorders in grazing animals. While this infertility syndrome is commonly known as ‘clover disease’ (permanent infertility), it includes a range of ‘disorders’ including maternal dystokia, uterine prolapse, increased death rate of ewes, and post-natal mortality of lambs. One of the challenges is that this problem frequently goes undiagnosed. This is because often there are no visual signs that ewes are suffering from permanent infertility as ovarian function remains normal and ewes will show normal oestrous cycles. The lack of visual signs means that this condition often goes unnoticed by producers and consultants especially in the merino and merino crossbred breeds.

Phytoestrogen Effects on Fertility

It was estimated in 1990 that one million ewes were affected in southern Australia from clover disease and that, on average, affected flocks have around a 10% increase in non-pregnant ewes. Further, the financial losses with decreased ewe reproduction are often difficult to assess by the producer because they represent “lost opportunities” rather than an explicit cost. It is unfortunate that the low fertility of ewes is often overlooked, as there is a significant economic loss in sheep grazing oestrogenic sub clover, estimated at up to 8% of whole farm profitability. Sub clinical infertility may also occur after even short grazing periods on high oestrogenic clovers and the problem may even persist when animals are returned to grazing non-oestrogenic pastures. The alternative of grazing potent pastures with wethers can also lead to lactation or mortalities from swelling of the bulbourethral gland in extreme cases.

Influenced by environmental factors and practices

The magnitude of the problem will vary with pasture composition and oestrogenicity and may also vary during the year and with the season. The concentration of phytoestrogens is also affected by genetic and many different ‘environmental factors’. For example, in the high oestrogen varieties of sub clover i.e. Yarloop and Dinninup, oestrogen concentration is increased by nutrient deficiency (low sulphur and low phosphorus), by disease (e.g. red leaf virus, root disease) and by drought stress. Many of the herbicide sprays and management practices will also encourage clover dominance so there is little dilution of the oestrogenic clovers in the pasture. Further, it is important to note that if such sub clover is conserved as hay or as well-made silage, their oestrogenic potency can be maintained. It is also important to note that as grazing frequency and pressure increases (and as occurs particularly over the autumn-winter feed-gap period) so does the risk of causing permanent ewe infertility which can become worse with each year’s exposure to pastures high in oestrogens. Also naturalised variants of sub clover cultivars have evolved and were present locally (from natural crossing events) and occur widely i.e. Eden Valley in SA (higher oestrogenic strain of Mt Barker). The levels of oestrogenic compounds in other sub clover variants remains unknown.

Conclusion

Discussions with consultants and agronomists showed only a few were able to identify sub clover varieties or advise clients with confidence on issues of ‘clover disease’ in sheep. Consequently, they could not advise which paddocks were at high risk for breeding ewes or even to restrict the exposure of animals to phytoestrogens. If producers are unaware of these high oestrogenic sub clover varieties or strains are not kept in check (i.e. maintained at low botanical composition), they can adversely impact sheep production again as we found in the 1960 and 70’s with cases where lambing percentages fall to as low as 10-30%. However, less severe examples are still common, with a recent report from a producer of low ewe fertility in merinos (65% lambing percentage and only 35% in maidens) in old established pastures with the cause identified as clover disease.

There is a wealth of published studies covering more than 60 years of observations on the deleterious effects of oestrogenic pastures in southern Australia and New Zealand, however, there is a now need to again provide clear guidance producers and consultants on the effects of high oestrogen clovers on ewe fertility and measures to control these substances in pastures. Recent discussions with producers at field days showed there is significant interest in learning sub clover identification and how the level of clover content and current variety can impact on ewe fertility. However, we still suggest that a comprehensive industry extension plan covering all the key aspects of clover disease and management seems to be an imperative.