Phytophthora root rot, spotted clover aphids and phosphorus deficiency limit growth of irrigated subterranean clover

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Farmers have reported poor growth of irrigated subterranean clover pastures throughout the Murrumbidgee and Murray Valleys for several years. NSW Agriculture's Subcheck program identified irrigation management, grazing, fertilizer use, diseases and insect pests as constraints and now guides farmers to produce better irrigated pastures (Noad 1996). However, the roles of Phytophthora root rot (PRR) and low available phosphorus (P) are not fully appreciated. Also, the spotted clover aphid (SCA), first recognised in the area in 1990, causes symptoms that overlap those of root disease, nutrition and viruses.

This project aims to understand the separate effects and possible interactions between PRR, SCA and P on the growth of irrigated sub clover.

Methods

The 1995 experimental sites were in irrigated pastures near Swan Hill, Wakool, Bunnaloo, Deniliquin, Finley, Coleambally, Hillston and Hay. In the previous year, all sites had poor pasture growth. Treatments were: nil; insecticide (Metasystox) sprays at 3 week intervals in autumn and spring; fungicide (metalaxyl) applied as granules before first watering; phosphorus (superphosphate) at 40 units; and 4 combinations of these.

Soil samples from each site were assayed for the presence of *P. clandestina* and P. Daily rainfall, maximum and minimum temperatures, and dates of watering were recorded by the farmers. Seedling emergence was counted at 4 and 8 weeks after first watering. At 4 weeks, seedlings were dug up and examined for root rot and presence of fungi. Pasture growth was estimated by rising plate in autumn, winter and spring. Pasture composition was estimated by rod point. Aphids were collected by vacuum, identified, and counted in autumn and spring.

Results

Phytophthora clandestina was present at all sites except Swan Hill and Deniliquin. Fungicide increased seedling numbers at 3 sites, autumn dry matter (DM) at one, and spring DM at one. P was low at 6 sites. Fertilizer increased autumn DM at 3 sites, winter DM at 4, and spring DM at one, and increased the proportion of sub clover compared with grass at 3 sites in autumn and grass at one site in spring. SCA infested 4 sites in autumn. Insecticide increased DM and clover content at 3 of the sites in autumn, 2 in winter, and 1 in spring. SCA were absent from all sites in winter and present at low numbers at some sites in spring. Interactions of fungicide, insecticide and fertilizer occurred at several sites, affecting seedling numbers and pasture composition at various times through the year.

Conclusion

PRR, P and SCA can each affect subclover growth and pasture composition in autumn, winter and spring. At some sites, no response occurred until at least 2 of the limiting factors were improved. Thus, no response to P may occur when PRR or SCA are also present. This masking of response may be why many farmers do not apply fertilizer to pastures, and why many pasture soils have very low P.

Reference

Noad, W. (ed.) 1996. *1996 Irrigated Subcheck Recommendations*. NSW Agriculture.