

THE EFFECT OF NITROGEN AND DEFOLIATION TIMING ON OAT / MEDIC MIXTURES

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In medic based pastures of southern Australia it is desirable to replace the common volunteer annual grasses (*Hordeum* spp., *Lolium rigidum*, *Vulpia* spp. and *Avena* spp.) with a grass species that does not host the common cereal root diseases cereal cyst nematode *Heterodera avenae* (CCN) and take-all *Gaeumannomyces graminis*. The use of CCN resistant oat cultivars can accomplish this by replacing the volunteer grasses in the medic based pasture, however previous experiments (1) have shown that competition between oat/medic mixtures tends to favour the oat component at the expense of medic drymatter and seed production.

MATERIALS AND METHODS

A trial to evaluate the effect of nitrogen and defoliation timing on the botanical composition of various oat/medic mixtures was established at Roseworthy campus in 1994. In a split plot designed field experiment five oat/medic sowing ratios (100:0, 75:25, 50:50, 25:75, 0:100) were tested with two nitrogen treatments (0 and 34 kg/ha nitrogen as ammonium nitrate) applied at seeding and two defoliation timings (early and late) with four replicates. Monocultures were sown at 100 kg/ha of pure germinating seed (Oats cv. Potoroo, Medic cv. Paraggio) with 20 kg/ha of phosphorous. There were three harvests with early defoliations taken 52, 74 and 96 days after sowing and late defoliations 62, 84 and 106 days after sowing.

RESULTS AND DISCUSSION

At harvest 1 there was a significant interaction between sowing ratio and the addition of nitrogen; and sowing ratio and defoliation timing. The most productive treatment being the oat monoculture irrespective of nitrogen application or defoliation timing. At harvest 2 there was an interaction between sowing ratio and defoliation with all oat/medic combinations yielding similar to the oat monoculture at the early defoliation and significantly more at the late defoliation. By harvest 3 there was a sowing ratio by nitrogen; and sowing ratio by defoliation timing interaction with the 75% medic:25% oats sowing ratio producing significantly more than all other treatments. The total of the combined three harvests produced both sowing ratio by nitrogen; and sowing ratio by defoliation timing interactions however total production was increased only slightly with the oat/medic mixtures irrespective of applied treatments. In general the addition of nitrogen and delayed defoliation increased total production in the oat/medic mixtures.

The results indicate that initial drymatter production is maximised by an oat monoculture but total production throughout the growing season is maximised with an oat/medic mixture. The most productive sowing ratio was 75% medic:25% oats. This combination would be appropriate for a pasture in rotation with cereals maximising biologically fixed nitrogen. The main deficit with this mixture is the inability to provide early production, a desirable attribute for livestock production.

The results must be considered in the context that 1994 was an extremely dry year with the growing season rainfall 44% below average, this induced water stress reduced the ability of the plants to regrow after each harvest and accounts for the low drymatter production. Under these conditions both inter and intra-specific competition is increased effecting the results.

REFERENCES

1. Roberts, G.N., Tow, P.G. and Carter, E.D. 1993. 17th Intl. Grassld. Cong. pp. 2203-2205.