Seed Production

Research Note

A RELATIONSHIP BETWEEN SEED YIELD OF WHITE CLOVER AND DENSITY OF YARROW.

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SUMMARY

Samples were taken from a yarrow (*Achillea millefolium*) infested white clover (*Trifolium repens* cv Huia) seed crop. The seed yield of the clover declined with increasing density of yarrow to almost zero at 500 yarrow flower stems/m². This was caused mainly by a reduction in the numbers of seed heads.

METHOD

In order to assess the effect of yarrow on the yield of a white clover seed crop, measurements were made in an infested paddock on the Lincoln College Research Farm in January 1981. Thirty 0.1 m² samples, ten from each of three areas within the crop were taken. For each sample the following were recorded: yield of machine-dressed clover seed, 1,000 seed weights, number of seeds/head, number of heads and number of yarrow flower stems. (Yield of seed = number of heads x seeds/head x weight/seed). The samples were taken so as to cover the range in density of yarrow flower stems.

RESULTS AND DISCUSSION

The yield of clover seed declined with increase in yarrow density to close to zero at 500 yarrow flower stems /m² (Fig. 1A). Of the yield components, the number of heads (Fig. 1B) was most affected by increase in yarrow density. The number of seeds per head (Fig. 1C) was also affected, but the weight of individual seeds was unaffected (Fig. 1D).

Weight per seed is considered to be a relatively stable component of yield in most plants and results here support this. The number of seeds/head can, on the other hand be considerably influenced by environmental conditions. Poor pollination at high yarrow densities could account for the reduced number of seeds/head but this may equally have resulted from competitive stress influencing flower formation and/or seed filling. The reduction in the numbers of clover seed heads could have resulted from reduced numbers of clover plants or from less vigorous plants associated with increasing yarrow density. The reason for this decline can only be speculated on but competition for light is likely to have been important, for the yarrow stems reached 1 m in height shading the lower-statured clover. Clovers are light-demanding plants requiring very high light intensities to achieve optimum growth (Blackman and Wilson 1951) while stolon formation is reduced under low light intensities (Beinhart 1963). Competition for water or nutrients could however have been occurring.

It must be pointed out that although it has been assumed that the differences in clover yield were caused by the variations in yarrow density, there is no evidence to validate this assumption. It is possible that the variable yields of clover resulted partly or wholly from some other factor which reduced the growth of clover and allowed the yarrow to increase.

Proc. 34th N.Z. Weed and Pest Control Conf.

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Fig. 1: The effect of yarrow on the components of white clover seed yield. Different symbols represent different parts of the paddock.

REFERENCES

- Beinhart, G., 1963. Effects of environment on meristematic development leaf area and growth in white clover. *Crop Science* 3: 209-213.
- Blackman, G.E. and Wilson, G.L., 1951. Physiological and ecological studies in the analysis of plant environment. VII. An analysis of the differential effects of light intensity on the net assimilation rate, leaf area ratio and relative growth rate of different species. *Annals of Botany* 15: 373-408.