RED CLOVER: A NOTE

L. B. ANDERSON
Grasslands Division, DSIR, Palmerston North

AMONG legumes used in pastures red clover has an important role in maintaining pasture production in late summer. when-temperature and soil moisture levels may limit the growth of white clover. Under these conditions red clover is capable of high levels of growth and is one of the most productive pasture species at that time.

Two red clover types which have long been used in farming practice in New Zealand are classified on the basis of early or late flowering. The early flowering type, New Zealand broad red clover (cowgrass) , is more erect in habit than the late flowering type. It has been used in pasture mixtures since the early days of sowing in New Zealand, and from the natural strains which developed under different climatic and/or management conditions selections were made which formed the basis of the pedigree strain, N.Z. broad red clover, later called 'Grasslands Hamua'. The later flowering (about 4 weeks) type is New Zealand Montgomery red clover, which was introduced to New Zealand in 1930 (Levy, 1970). This cultivar is more prostrate in habit and denser tillering than 'Hamua'. Selection and breeding of this type of plant have led to the cultivar 'Grasslands Turoa'. Since certification it has been used for short-rotation and permanent pastures, particularly in the South Island where it has been valuable in the drier areas of South Canterbury and North Otago (Corkill, 1950).

'Grasslands Hamua' is less persistent under close grazing than 'Turoa' (Corkill, 1949, 1950; Suckling, 1966). Edmond (1964) has shown that under heavy treading red clover was an early casualty among the survivors of different pasture species. This may well contribute to the poorer survival of the more erect form 'Hamua' as well as to the generally short life of both cultivars in pastures. Corkill (1950) and Brougham (1960) have both indicated that red clover yields best. under a lax grazing system in the summer. Therefore, in making the best use of the potential of red clover for extending seasonal production, it should, once established, be given special grazing management.

Tetraploids in red clover have been produced in Scandinavian countries for many years and more recently in some European countries. They are superior to corresponding diploids in yield

(up to 30% more DM produced), nutritive value, persistence and resistance to pests and diseases. But it is only in recent years that the real impact of the use of tetraploid red clovers has occurred in Europe and Great Britain, in particular where there had been a marked fall in the use of red clover, This drop in use was regarded as being due to older varieties being unreliable and to a shift towards the use of fertilizer N (Aldrich, 1974). The high and increasing cost of nitrogen resulted in rethinking the role of legumes. As a result there has been a much greater use of tetraploid red clovers, to the extent that 16% of the total red clover used was tetraploid (Rogers, 1975), and the amount is increasing annually.

Grasslands Division has in recent years released a late flowering tetraploid red clover (Pawera) which was derived largely from seed of Turoa origin but includes some material of Swedish origin (Anderson, 1973a). That this tetraploid is more productive than the diploid Turoa has been shown by Anderson (1973b), Scott et *al.* (1974), Musgrave (1976), and Pineiro and Harris (1978). It is also producing well in Southland (R. J. M. Hay, pers. comm.). Under difficult dryland conditions in North Otago, autumn production of Pawera was no better than that of Turoa, but spring and summer productions were superior (Sheath et *al.,* 1976). This cultivar shows a great deal of promise where the environmental conditions suit its capacity for growth. Being developed from plant material generally adapted to cool temperate regions, its potential may not always be expressed when used in extreme dryland situations. It is likely that usage of Turoa will fall if Pawera lives up to its promise as a very productive late flowering cultivar of red clover.

This brings us to another programme within red clover, which is being carried out by Grasslands Division. This has involved crossing an early flowering ecotype from the Mediterranean region (Morocco) with Grasslands Hamua (Anderson, 1970). This programme is being carried out at both the diploid and tetraploid levels and shows considerable promise of not only extending the growth of red clover from earlier in the spring to later in the autumn, but also of increasing persistency in some dryland situations. For example, in a small trial of simulated plots on sand country at Flockhouse near Palmerston North, these two experimental cultivars were more productive and persistent than Turoa, Hamua or Pawera. The same pattern has been evident in some progeny blocks of single plants at Grasslands Division over several years.

There does appear to be some resistance to the use of red clover on farms because of the possibility of bloat or ewe infertility. Such animal problems may be compounded rather than diminished by the use of more vigorous tetraploid red clovers. However, bloat can be controlled by spraying pastures or dosing cattle with the appropriate oils, etc. A drop in lambing percentages due to ewe infertility caused by oestrogenic compounds in red clover can also be avoided by management. Keeping ewes off any pure or near pure stands of red clover during the critical mating period, no matter how tempting such areas may be, would help tremendously. On the other hand, oestrogens are said to be useful in lamb fattening.

In an endeavour to find plant material with less bloating potential, Grasslands' Division have screened thousands of red clover plants for tannins without any success to date. Screening included not only the cultivars Turoa, Hamua and Pawera, but also hundreds of introduced lines from many parts of the world. Plans are also under way to screen Pawera red clover for plants with a low formononetin content, the oestrogen responsible for lowered fertility in ewes.

The bulk of red clover seed used annually in New Zealand is probably sown in permanent pasture rather than as a pure stand with annual or biennial ryegrasses or other annual or biennial species for short-term pastures. Used in the latter way, high yields of nutritious herbage can be obtained- either for grazing or conservation and such systems maximize potential red clover production.

REFERENCES

Aldrich, D. T. A., 1974. *J. Br. Grassld Soc., 29:* 249-51.

Anderson, L. B., 1970. *Proc. 11th inf. Grassld Congr.:* 198-202.

——— 1973a. *N.Z. Jl agric. Res., 16: 395-8.*

——— 1973b. N.Z. *Jl exp. Agric., 1: 233-7.*

Brougham, R. W., 1960. *N.Z. Jl agric. Res., 3:* 125-36.

Corkill, L., 1949. Emp. *J.* exp. Agric., 17: 157-69.

——— 1950. *Grasslands Bull. No. 3.*

Edmond, D. B., *1964. N.Z. Jl agric. Res., 7:* 1-16.

Levy, E. B., 1970. *Grasslands of New Zealand.* Govt. Printer, Wellington. 374 pp.

Musgrave, D. J., *1976. Proc. N.Z. Grassld Ass., 38:* 126-32.

Pineiro, J. A.; Harris, W., 1978. *N.Z. Jl agric. Res., 21: 83-92.*

Rogers, H. H., 1975. *A. Rep. Pl. Breed. Inst. Corn. 22-57.*

Scott, D.; Stringer, G. C.; O'Connor, K. F.; Clifford, P. T. P., 1974. N.Z. *Jl exp. agric., 2: 251-9.*

Sheath, G. W.; Galletley, W. *S., 1976: Proc. N.Z. Grassld Ass., 38: 140-50.*

Suckling, F. E. T., 1966. *Hill Country Improvement.* Newton King Bull.