The Yield Performance of White Clover Cultivars on the Northern Tablelands of NSW

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The Northern Tablelands of New South Wales is considered to be one of the safest white clover *(Trifolium repens)* areas in the Australian white clover zone (Duncan, 1991). The main role for white clover on the Northern Tablelands is to improve diet quality, especially during summer-autumn. However, soil moisture stress in summer

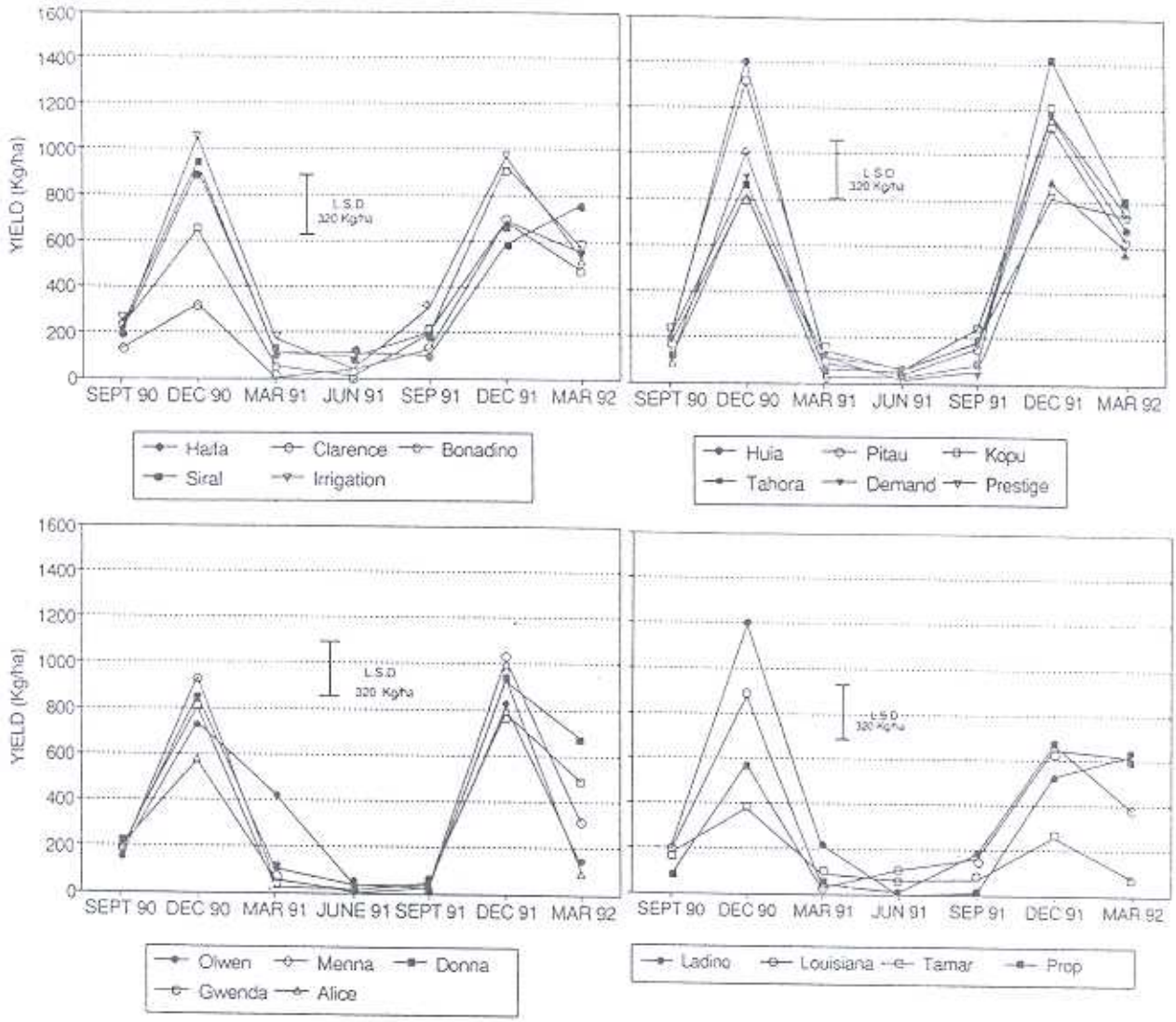

Figure 1: Yield performance of white clover cultivars on the Northern Tablelands of NSW.

limits persistence, and cold winter conditions limit total seasonal performance.

The Northern Tablelands comprises 3.2 million hectares of high altitude (800-1200 m) country. Soils generally are acid, nutrient deficient (especially phosphorus and nitrogen) and exhibit poor water relations. The climate is characterised by annual rainfall ranging from 600 mm to 1200 mm, with some 60%summer incidence (October-March). Winters are cold (July min. 0°C) while summers are warm (Jan max 26°C). Precipitation exceeds evaporation only in June and July when pastures are winter dormant.

Naturalised white clover ecotypes are present across the Northern Tablelands, but are unproductive. Currently available cultivars show poor adaptation to environmental conditions. Cv. Haifa is considered to be the most successful cultivar with best yield performance and regeneration characteristics (Hartridge, 1979). However, the phenomenon of "Haifa decline" has determined the need for a better adapted cultivar (Lowien, 1991).

Duncan (1991) proposed that successful adaptation requires the following characteristics:

- dense stolon growth to enhance regeneration;
- tolerance of summer moisture stress;
- capacity to withstand intensive defoliation;
- ability to compete with summer growing perennial grasses, improved winter growth; and,
- freedom from bloat.

METHODS

A field study commenced in 1989 at the Agricultural Research and Advisory Station, Glen Innes to assess adaptive characteristics of 20 prominent cultivars, pre-release lines and ecotypes to support plant improvement work of the National White Clover Improvement Program. Measurements include seasonal yield, stolon development, flowering and seed production, phenology and pests/disease incidence, preferential grazing and nutritive value.

RESULTS & CONCLUSION

Seasonal yield trends for 1990 and 1991 are presented. Data are presented for the initial two years of the study.

1. *Spring:* Although severe spring drought was experienced in both years, spring yields differed significantly (range: 320 - 1410 kg/ha) with cvv. Huia, Kopu and Tahora best. Cv. Tamar was consistently low yielding.
2. *Summer:* Summer rainfall was above average in both years, but moisture stress conditions still exerted yield depressing effects on all cultivars (range: 3 - 430 kg/ha). Cv. Olwen showed remarkable tolerance to moisture stress in the first year.
3. *Autumn:* All cultivars showed similarly slow autumn recovery (range: 2 - 90 kg/ha).
4. *Winter:* Differences between cultivars in winter yield were small (range: 80 - 220 kg/ha). However, below average rainfall in both winters probably limited variation between cultivars in winter activity. Other data show substantial differences in stolon development and seedling recruitment that indicate potential significance for perenniality and persistence.

ACKNOWLEDGMENTS

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