

WHITE CLOVER IMPROVEMENT AND BREEDING

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White clover is widely distributed in the world and grows best in the humid section of temperate zones. It gains agronomic importance as a pasture crop due to the high quality feed and its capacity to fix atmospheric nitrogen which is beneficial to the companion grasses as well. The production and usefulness of the clovers are limited by certain factors which include unreliability in yield between and within years, lack of or insufficient winter growth among the locally adapted ecotypes and lack of persistence under low soil moisture and increasing temperature in summer.

A plant improvement program was initiated by the Victorian Department of Agriculture in collaboration with NSW Agriculture and Department of Primary Industries (Qld) to address these issues and to develop locally bred white clover/s with broad adaptation and to develop winter active germplasm to obtain valuable feed during the winter feed gap.

MATERIALS AND METHODS

1. Development of broadly adapted locally bred cultivars

A collection of 5000 plants of cv. Irrigation was taken from 42 farms (20-60 years old) in North Central Victoria. These were spaced-planted and selected over 3 years for leaf and stolon density, growth habit and leaf size, seasonal and total productivity and field tolerance for viruses. Superior plants were polycrossed and the half-sib families are being evaluated in row trials at Timboon, Kyabram, Hamilton, Ellinbank in Victoria, Berry in NSW and Gatton in Queensland. These are also being evaluated as plots (2x1 m) simulated sward at Hamilton and Timboon. Superior families will be selected and polycrossed to form a synthetic variety(ies) which will be evaluated at multi-location sites and cultivars released.

2. Development of winter active white clover

An Israeli selection with good winter forage production and high total yield has been crossed to cv. Irrigation to introgress adaptability, persistence, stolon density and productivity of cv. Irrigation to the winter active material. Selections have been conducted from the hybrid F2 population and the evaluations of half-sib families from these genotypes in both row and plot trials at multilocation sites (see above, commenced in 1995) are expected to identify superior genotypes with both good productivity and winter activity. Polycrossing of superior families will lead to synthetic varieties formation and subsequent release of cultivars.

RESULTS AND DISCUSSION

1. Several half-sib families of cv. Irrigation have shown to be significantly better for yield ($P < 0.05$) compared to standard cultivars such as Irrigation, Kopu, Pitau and Haifa. The analysis of variance has shown that the variance is significant ($P < 0.05$). This clearly indicates that there exists a potential among the half-sib families for selections for improved productivity. Several superior half-sib families are also being evaluated under 2x1 m mixed plots with ryegrass cv. Yatsyn 1 as the companion grass to measure their competitive abilities.

2. Several half-sib families from the winter active hybrid F2 generation selections have shown better seedling vigor than certain standards. Further evaluations will indicate their potential for improved winter activity.

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