

SELECTION FOR HERBAGE YIELD AND FLOWERING IN LADINO WHITE CLOVER

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ABSTRACT

A geno-phenotypic recurrent selection program is being carried out on ladino white clover (*Trifolium repens* L.) aiming to combine good DM and seed yields. Selection criteria includes plant density, vigor, winter growth, flowering and diseases resistance. The performance of selections in terms of DM yields and seed production was evaluated in separate trials. Two cycles of selection increased flowering by 36% and seed yield by 59%. Preliminary data on herbage yields shows a very good performance of the selected material and suggests the feasibility of combining high DM and seed yields.

KEYWORDS

White clover, selection, flowering, yield

INTRODUCTION

The use of white clover in Uruguay is based on medium-large leaved types with early and profuse flowering, being Zapicán the most widely sown cultivar. Ladino types usually give the highest herbage yields (García, 1993), but their usage is restricted because of low seed yields and less winter growth than the cultivars in use. The cultivar Regal, for example, yields 15% more herbage than Zapicán but its seed yield is about half that of Zapicán. A breeding program was started in 1991 aiming to combine the good yielding ability of the best large leaved types with an acceptable seed yield. In this paper we report some advances from this program.

MATERIALS AND METHODS

A geno-phenotypic recurrent selection is begin carried out on ladino clover populations derived mainly from cultivar Regal. The main characters selected in spaced plant nurseries are: plant density (leafiness), vigor, winter growth, amount of flowering and disease resistance. The selection pressure per cycle is about 1-2% and the best plants from the best families are selected at the end of the second year of each cycle. The selected genotypes are cloned and polycrossed in bee cages. In this paper we report on the performance of the synthetics produced in the first (SY92) and second (SY94) cycles of selection, produced in 1992 and 1994. Seed production of the synthetics (Table 1) was evaluated in a randomized block trial with five replicates sown in April 1995. Plots were of 1 m² made by 36 seedlings transplanted at 0.15 m each one. During winter and spring, the trial was mown two times before October 12. At harvest (mid- December), inflorescences were counted and 20 ripe heads per plot removed for seed head yield and 1000 seed weight determinations. Seed yield was assessed by hand collection of the ripe heads from each plot.

Herbage yields for the SY92 synthetic (Table 2) was evaluated in a conventional cutting trial, plot size 7 m², 4 replicates, sown in April

1993. Both trials were at La Estanzuela (34½ S).

RESULTS AND DISCUSSION

The number of inflorescences is recognized as one of the main determinants of the seed yield in white clover and it has been shown to have a relatively high heritability (Williams, 1987). The cultivar Regal, a widely known ladino variety, was used as the main base population and the Table 1 shows that two cycles of selection has significantly increased the number of ripe heads at harvest by 36% and the harvested seed yield by 59%. The gain in cycle 1 was higher than in cycle 2 for inflorescence production and seed yield. Characters such as the seed yield per inflorescence and seed weight, which were not taken into account in the selection, remained unchanged. The synthetic SY94 is 22% below Zapicán in seed yield, but the results are encouraging that after completion of the third cycle a reasonable level of seed production will be obtained allowing the economic multiplication of the cultivar.

The inclusion of flowering as a selection criteria has important implications since it has been stated by some authors that an increase in flowering could be detrimental to the vegetative persistence (Gibson, 1957; Williams, 1987). However, recent studies by Annicchiarico and Piano (1995) suggested that variation within ladino ecotypes make possible the simultaneous selection for herbage and seed yield. The variation and interrelationships between characters observed in our nurseries support this view. We are giving strong emphasis to plant density and vegetative vigor, as well as to flowering, during the selection. Preliminary data on herbage yield (Table 2) showed very good performance from the synthetic SY92. Agronomic evaluation of SY94 is being carried out, including trials under grazing. The data available suggest the feasibility of combining high DM yields with reasonable good seed yields within these ladino populations.

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Table 1

Seed yield and seed yield components of white clover cultivars and synthetics.

	Total flowers m ²	Ripe flowers m ²	Seed yield per flowerhead mg	1000 seed weight g	Potential yield kg/ha	Harvested yield kg/ha
Regal	377	321	59.7	0.538	190	133
SY92	480	384	65.2	0.576	248	183
SY94	579	436	65.1	0.555	278	212
Zapicán	796	576	50.1	0.618	289	274
LSD 5%	84	70	NS	0.056	62	52

Table 2

Herbage yield (DM t/ha) of SY92 synthetic and three white clover cultivars.

	Year 1 1993	Year 2 1994	Year 3 1995	Total
SY92	3.15	8.14	4.60	15.90
Regal	2.80	7.38	4.23	14.41
Zapicán	3.26	6.26	4.22	13.75
Osceola	2.97	6.91	3.62	13.51
LSD 5%	0.26	1.01	0.87	1.57