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Perspectives in the Selection of a Semiexotic Maize for Forage Use

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INTRODUCTION

In the Northeast of Spain and probably in other areas in the South of Europe, it would be possible to use forage corn of the FAO 900 and even 1000 cycles. We intend to evaluate the viability (fitness of the cycle to the climate, potencial of productivity, response to selection, ...) of a program designed to obtain such varieties of corn by mean of the combination of adapted material (a conventional grain-hybrid) and exotic materials. The incorporation of exotic tropical material should lengthen the cycle and promote the vegetative development of the plant although certain disadvantages could arise (1,2).

MATERIAL AND METHODS

The exotic material, ETO, was used as a source of a long cycle and great vegetative development, while the hybrid P-3186 was employed as a source of grain production. The first generation of the cross P-3186 x ETO (F1) was open pollinated to obtain a second and third generations, (F2) and (F3). A selection pressure of 10% was applied simultaneously to the population F2 for the traits absence of smut and high grain production (F3s). A comparative study was conducted on the parents and subsequent semi-exotic populations to determine the viability of the material and its response to the selection. The realized heretability of ear yield was also estimated.

RESULTS

The selection response for ear production was estimated to be 18.73 g/plant, which signifies an increase of 22%, the heretability for this trait being 0.45. The rest of the results are reported in Table 1.

DISCUSSION AND CONCLUSIONS

The semi-exotic populations (F1,F2,F3,F3s) have a longer cycle than P-3186 but mature sufficiently to be used as forage (harvested with the moisture of the grain at 40%). The disadvantages are an elevated level of smut infection and an increased ear height which renders the plant more susceptible to root lodging (the selection process decreases the nº of plants with smut infection, but this continues to be high). The production of grain is apreciably inferior to that of P-3186 though the recuperation achieved with one generation of selection is considerable. As proposed, the superior vegetative development found in ETO was incorporated in the semi-exotic material thereby increasing the total forage yield. The significant response to the selection for grain obtained under a low pressure, together with the estimated heretability, should permit a considerable increase in the proportion of grain. So, in conclusion, the use of semi-exotic materials as a base to obtain long-cycle forage maize appears to be not only viable, but also promising.

Table 1: Comparative study. Values in each column which are followed by the same vertical line are not significatively different (p≤0.05).

Days to pollen shedding		Smut index		Ear height/T. height	
P-3186	76.7	ETO	0.58	ETO	0.76
F1	83.8	F1	0.43	F1	0.67
F2	83.8	F3	0.39	F2	0.67
F3s	85.2	F2	0.38	F3s	0.67
F3	85.4	F3s	0.31	F3	0.66
ETO	94.3	P-3186	0.04	P-3186	0.55
Ear yield kg/ha DM		**Stover yield kg/ha DM**		**Forage yield kg/ha DM**	
P-3186	9961	ETO	14954	F1	21628
F3s	8247	F1	14278	F3s	20838
F1	7350	F2	14000	F3	20473
F2	6686	F3	13825	F2	20251
F3	6648	F3s	12593	P-3186	19868
ETO	2884	P-3186	9907	ETO	17838

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