Effects of a recurrent selection scheme, applied to an interspecific hybrid *Pennisetum purpureum* Schum. (elephantgrass) *x Pennisetum glaucum* (L.) R. Br. Stuntz (pearl millet), on several seed quality parameters

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Introduction Elephantgrass cultivars and introductions show practically no viable pure seeds and their uses in cultivated grasslands are exclusively dependent on vegetative propagation. Therefore, in large areas, sowing operation costs make unfeasible setting up new pastures. On the other hand, pearl millet is a high seed producer species though presenting some forage constraints (poor forage production, low regrowth potential after cutting or grazing and low field persistence). Recently, an hexaploid interespecific hybrid between the two species was developed (Schank & Diz, 1996), which is able to produce viable pure seeds, in variable amounts according to the genotype considered (Diz & Schank, 1995). This research aimed to check several seed quality parameters in two selected populations, derived from the original F_2 interespecific hybrid population.

Materials and methods Sample seeds of selected individuals of cutting (CT, tall plants with low-tillering potential, long and broad leaves, thick stems with long internodes and erect growth habit populations) and grazing types (GT, small and high-tillered individuals with short and fine leaves, thin stems with short internodes and prostrated growth habit) were collected during two selection cycles. The following seed traits were recorded for both selected populations as well as for control original F_2 population: 1,000 seed weight, number of seeds/g, physical purity, standard germination and vigour percentages (accelerated ageing test after 24, 48 and 72h) (ISTA, 1985) as well as mean germination times (T_{50}) (Alvarado & Bradford, 1988).

Results CT and GT populations presented marked increases in physical purity percentages mostly due to increases of phenotypic uniformity, after 2 recurrent selection cycles (47.3 and 45.1%, as compared to F_2 population - 13.6%)., CT population showed the highest value for number of seed/g (375.7) and the smallest for 1,000 seed weight (2.878g), clearly indicating that the selection scheme favoured, in this case, the occurrence of a higher amount of smaller seeds (Table 1). Seeds of both populations revealed higher germination percentages than those of the control though mean germination times (T_{50}) were similar for all populations. Vigour results revealed the superiority of selected populations, when compared to the control (24 and 48h); after 72h CT population significantly outperformed the others. Few differences among populations were detected as (T_{50}); however GT population presented a delayed germination at 72h as compared to the others.

Table 1 Mean physical seed quality traits results for two selected populations derived from an interspecific hybrid *P. purpureum* x *P. glaucum*, as compared to those of the original F2 population, after 2 selection cycles

Population	Purity	1,000 seed	Number	Germination		Vigour (Accelerated Ageing Test)					
	(%)	weight (g)	seeds / g	%	T_{50} (d)	%	T_{50}	%	T_{50}	%	T_{50}
Cutting type	47.3a	2.878b	375.7a	59.6a	4.9a	60.5a	4.4a	51.6a	4.1a	54.5a	3.9b
Grazing type	45.1a	3.163a	328.2b	51.3a	4.5a	54.9a	3.9a	52.6a	4.3a	33.8b	5.4a
Original F_2	13.6b	3.269a	308.1b	40.4b	4.5a	41.7b	3.8a	41.5b	3.9a	30.5b	4.0b
Mean	35.3	3.103	337.3	50.4	4.7	52.4	4.0	48.5	4.1	39.6	4.4
C.V (%)	7.5	3.4	3.3	7.5	3.5	7.8	4.1	8.2	3.9	8.7	3.4

C.V. (%) = coefficient of variation; b) Means followed by different small letters, in the same column, are statistically different according to the Duncan test *at $p<0.05$.*

Conclusions The recurrent selection scheme used was effective in improving physical purity, germination and vigour percentage results for both selected populations.

References

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