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## Genetic analysis of selfed and open pollinated progenies of *Stylosanthes capitata*

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**Introduction** *Stylosanthes capitata* is the most important forage legume currently used in Brazilian Savannas . Information from genetic studies of self pollination (S1) or open pollination of the species (OP) are important both for the decision of breeding strategies as well as the composition of future cultivars .

**Material and methods** 19 progenies S1 and OP were evaluated in a random blocks design , with 6 replications and 6 plants per plot , in Campo Grande , MS , for total dry matter and seed yields . Plants were evaluated on an individual basis . Genetic and phenotypic parameters were obtained using the software Selegen-Reml/Blup (Resende , 2002) . An approximate estimate of the rate of selfing (S) of the species was presented by :  $(1+S)^2 = \frac{4\sigma_{OP}^2}{\sigma_{S1}^2}$  , in which :  $\sigma_{OP}^2, \sigma_{S1}^2$  : additive genetic variance among OP and S1 progenies , respectively .

**Results** Individual narrow sense heritabilities , for the evaluated characteristics in *S. capitata* OP and S1 progenies , were of moderate magnitude (Table 1) . The estimated genetic correlation between total dry matter and seed yields in OP progenies was 0.84 and in S1 progenies 0.71 . The magnitude of the genetic variation coefficient indicates the possibility of obtaining gains with selection in future breeding generations . A mean selfing rate of 49% was estimated for the characteristics evaluated in *S. capitata* , which shows , therefore , that the species has a mixed reproductive system . Based on this evidence , selection based on an index combining the OP and S1 progeny information was proposed . This index has as objectives the improvement of the population with a simultaneous decrease in endogamic depression and was used in *S. capitata* considering the selected progenies for each type-OP or S1-and also the index combining both progenies . The results are presented in Table 2 , for both evaluated characteristics .

**Table 1** Estimated genetic parameters in *Stylosanthes capitata* for progenies of open pollination (OP) and of a self pollination generation (S1) for the characteristics total dry matter (TDM, g/plant) and seed yields (g/plant) .

Parameter	TDM		Seed	
	OP	S1	OP	S1
Va	884.42	1440.65	8.78	17.44
Vp	2304.62	574.26	9.28	0.71
Ve	3237.64	7826.92	31.63	71.96
Vf	6426.69	9481.83	49.68	90.11
h <sub>a</sub> <sup>2</sup>	0.1376	0.1464	0.1766	0.1936
h <sub>aj</sub> <sup>2</sup>	0.2146	0.1555	0.2172	0.1951
Accuracy	0.78	0.91	0.86	0.94
Cv <sub>g</sub> (%)	18.46	21.18	26.05	34.25
μ	161.0758	179.1678	11.3704	12.1956

Va : Genetic variance among families ; Vp : Environmental variance among plots ; Ve : Residual variance ; Vf : Phenotypic variance ; h<sub>a</sub><sup>2</sup> : Individual heritability ; h<sub>aj</sub><sup>2</sup> : Adjusted heritability ; Cv<sub>g</sub> : Coefficient of genetic variance ; μ : Overall mean .

**Table 2** Order of the progenies of open pollination (OP) and self pollination generation (S1) , as well as based on an index combining information of both progenies , for the characteristics of total dry matter (TDM) and seed yields .

Order	TDM		Index	Seed		Index
	OP	S1		OP	S1	
1	77	72	72	74	66	66
2	74	77	66	77	72	72
3	79	66	75	79	76	76
4	72	79	76	72	74	75
5	64	64	64	66	65	65
6	70	76	77	70	70	70
7	76	74	70	65	75	64
8	65	70	79	64	77	77
9	66	75	65	76	64	62
10	61	65	74	75	79	74
11	75	61	62	61	62	61
12	62	62	61	62	61	79

**Conclusions** From the information obtained and pondering the need for short-term selection gains , we recommend the pursuit of synthetic populations , using the five best progenitors identified by the index combining OP and S1 . By this procedure , there should be less inbreeding and the synthetic population should maintain productivity after several generations , which is an advantage both to the pasture system and to the producer .

### Reference

Resende , M.D.V. (2002) . Software Selegen-Reml/Blup . Colombo : Embrapa Florestas , 2002b . 65 p . (Embrapa Florestas . Documentos , 77) .