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Quality seed production in *Stylosanthes spp.* as affected by varieties, spacing and seed treatments

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Stylosanthes popularly known as stylo is an important legume fodder crop of subtropical and temperate region of the America, tropical Africa and South-east Asia. Stylo belong to the genus *Stylosanthes* of sub-tribe *Stylosanthinae*, tribe *Aeschynomeneae*, sub-family *papilonideae*, family *leguminosae (*Polhill and Raven, 1981). Stylo mostly prefer tropical and subtropical climates and have varied edaphic requirements, most of them requiring well drained rocky, gravelly and loamy soil. Thus *stylo* has a good scope for improvement of pasture lands of tropical and subtropical India. Large scale seed production of traditional *S. hamata* being labour intensive and time consuming operation, has been a major obstacle in the widespread cultivation.

The field experiment consisted of twenty four treatment combinations involving three varieties (*Stylosanthes seabrana* 115995, *S. seabrana* 70 A and *S. hamata*); two spacings (30x10 cm and 45x10 cm); four presowing seed treatments (sun drying, scarification, acid treatment and control). The experiment was conducted at Mahatma Phule Krishi Vidyapeeth, Rahuri in a factorial randomised block design with three replications during the *kharif* 2004. Sowing was done by dibbling seed per hill as per the spacing treatments (30x10 cm = 9 rows and 45x10 cm = 6 rows) in line drawn by marker. The plot size was 1.80x2.70 m. The presowing seed treatments were T_1 (*sundrying*) : Seeds were exposed to sun for 6 hours period everyday from 4 days prior to sowing; T_2 (s*carification*) : mechanical scarification by sand paper to loosen the hard seed coat; T_3: (acid treatment) seeds were dipped in 0.02 per cent sulphuric acid solution for 10 minutes and then sun dried and T_4 (*control*): without any seed treatment. Observations for days to flower initiation, days to 50 per cent flowering, days to maturity, plant height, number of primary branches/plant, number of secondary branches/plant, number of seeds per capsule, seed yield/plot, seed yield/ha were recorded on five randomly selected plants from each net plot. Observations on seed quality parameters *viz.,* 1000-seed weight, germination percentage, seedling vigour index and seed recovery (%) were recorded in the laboratory for all the twenty four treatments after harvest. Seed germination (%) was estimated by using ISTA norms. One hundred seeds each in three replications from each treatment were kept for germination at 20^0C for 15 days by using top of paper (TP) method. The seedlings were categorised into normal and abnormal seedlings. The germination percentage was computed on the basis of normal seedlings only. Seedling vigour index was calculated by using mean root, shoot length and mean germination percentage as per the equation suggested by Abdul Baki, and Anderson (1973). The statistical analysis was carried out by following the usual procedure for Factorial Randomised Block Design as per Panse and Sukhatme (1978). The data on seed quality parameters was analysed as per the standard method of Factorial Completely Randomised Design (Snedecor and Cochran 1967).

The seed yield and quality parameters studied were significantly influenced by the *stylo* varieties / species. *S. seabrana* 70-A recorded significantly less number of days to flower initiation, days to 50 per cent flowering, it also recorded significantly higher number of seeds per capsule, seed yield/ha, germination percentage and seedling vigour index. *S. seabrana* 115995 recorded significantly higher seed recovery percentage while *S. hamata* produced significantly higher secondary branches per plant (Table 1). Number of authors have reported the effect of varieties on different characters in *stylo* (Hopkinson and Walker, 1984; English and Hopkinson, 1985 and Agishi 1994.).

Seed yield, germination %, seedling vigour index and seed recovery percentage were significantly influenced by various spacings. The spacing 30x10 cm resulted in

Table 1 : Seed yield and seed quality parameters of Stylo as influenced by various treatments.

Treatment	Days to flowering initiation	Days to 50 per cent flowering	Plant height	Number of primary branches / plant	Number of secondary branches / plant	Number of seeds per (kg) capsule	Seed yield/ha weight	1000 seed (g)	Germi-nation (%)	Seedling vigour index	Seed reco-very (%)
Varieties											
V_1:*S.seabrana* - 115995	65.00	70.00	73.83	8.22	23.05	10.52	977.36	2.99	54.87	281.68	97.17
V_2:S.*seabrana* 70A	64.00	69.00	73.81	8.61	22.51	11.67	1139.92	2.99	56.92	295.42	96.99
V_3 : *S. hamata*	67.00	73.00	41.68	5.95	36.27	7.74	106.56	2.97	50.25	257.01	95.76
S.E. ±	0.19	0.22	0.49	0.27	0.64	0.11	4.77	0.00	0.42	2.19	0.06
CD at 5 %	0.54	0.63	1.39	0.76	1.82	0.32	13.58	0.01	1.2	6.23	0.17
Spacings (cm)											
S_1 : 30 x 10	66.00	71.00	63.08	7.46	27.28	9.89	803.21	2.99	54.89	282.02	96.77
S_2 : 45 x 10 cm	66.00	71.00	63.13	7.73	27.27	10.07	679.35	2.99	53.14	274.05	96.52
S.E. ±	0.16	0.18	0.39	0.22	0.52	0.09	3.89	0.03	0.35	1.79	0.05
CD at 5 %	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	11.09	N.S.	0.98	5.08	0.14
Seed treatments											
T_1 : Sundrying	66.00	71.00	63.73	7.94	28.25	9.86	721.32	2.98	53.39	275.41	96.73
T_2 : Scarification	65.00	70.00	63.03	7.44	26.81	9.93	735.13	2.99	54.50	281.22	96.56
T_3 : Acid treatment	65.00	70.00	62.96	7.34	27.07	9.97	824.52	2.99	56.33	290.10	96.54
T_4 : Control	66.00	71.00	62.71	7.34	26.98	10.16	684.15	2.99	51.83	265.42	96.74
S.E. ±	0.22	0.26	0.56	0.31	0.74	0.13	5.51	0.04	0.49	2.52	0.07
CD at 5 %	0.63	0.73	N.S.	N.S.	N.S.	N.S.	15.68	N.S.	1.39	7.19	0.19
Interaction(V x S)											
S.E. ±	0.27	0.31	0.69	0.38	0.90	0.16	6.75	0.05	0.60	3.09	0.08
CD at 5 %	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	19.20	N.S.	1.39	7.19	0.19
Interaction(V x T)											
S.E. ±	0.38	0.44	0.98	0.53	1.28	0.23	9.54	0.07	0.85	4.38	0.12
CD at 5 %	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	27.16	N.S.	N.S.	N.S.	0.34
Interaction(S x T)											
S.E. ±	0.31	0.36	0.79	0.43	1.04	0.18	7.79	0.06	0.69	3.57	0.09
CD at 5 %	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Interaction(VxSx T)											
S.E. ±	0.54	0.63	1.38	0.75	1.80	0.32	13.49	0.01	1.19	6.19	0.17
CD at 5 %	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	38.41	N.S.	N.S.	N.S.	N.S.
General mean	66.00	71.00	63.11	7.56	27.28	9.93	741.28	2.99	54.01	278.03	96.64

Table 2 : Mean seed yield per ha (kg) as influenced by varieties, spacing and seed treatments.

Treatment	T_1		T_2		T_3		T_4		Mean
	S_1	S_2	S_1	S_2	S_1	S_2	S_1	S_2	
V_1	1064.47	801.09	1097.39	852.53	1227.02	958.15	1056.23	762.00	977.36
V_2	1136.57	1115.91	1194.78	1043.20	1304.52	1226.33	1105.62	992.45	1139.92
V_3	113.85	96.01	116.59	106.30	119.34	111.79	102.19	86.42	106.56
Mean	771.63	671.00	802.92	667.34	883.62	765.43	754.68	613.62	741.28
S.E. ±		13.495							
C.D. at 5 %		38.408							

significantly higher seed yield, germination %, seedling vigour index and seed recovery percentage. The effect of spacing on various traits in S*tylosanthes* have been reported by Khara *et al.,* (1990) and Kachelriess and Tarawali (1994)

The presowing seed treatment with 0.02 per cent sulphuric acid resulted in significantly higher seed yield (824.52 kg/ha), germination percentage (56.33), seedling vigour index (290.10) and significantly less number of days to 50 per cent flowering (69.83) (Table 1).

Considering the three factor interaction significantly highest seed yield of (1304.52 kg/ha) was obtained in treatment combination (V2S1T3) *S. seabrana* 70A, 30x10

cm spacing and presowing acid treatment of 0.02 per cent sulphuric acid (Table 2).

From the above study, it can be concluded that the sowing of *Stylosanthes seabrana* 70 A variety at 30x10 cm spacing and presowing seed treatment of 0.02 per cent sulphuric acid was found to be beneficial in increasing the seed yield. However, for quality seed production 30x10 cm spacing with presowing seed treatment of sulphuric acid (0.02 %) found to be beneficial.

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