SHORT COMMUNICATIONS

Evaluation of *Stylosanthes* Germplasm Based on Seed Protein Profile

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Stylosanthes commonly known as Stylo is an important range legume. In early seventies this crop was introduced in India from Australia and South America. It provides nutritive forage for animals, improves soil fertility and as pioneering colonizers reclaim degraded lands (Chakraborty *et al.,* 1998). It is also considered a nurse crop in plantation on degraded lands. Therefore, *Stylosanthes* has been identified as an important forage crop by different government and semi government agencies. Since the time of its introduction, four species *viz., S. hamata, S. scabra, S. humilis* and *S. guianensis* were largely evaluated at different sites of India (Rai and Pathak, 1985; Rai and Patil, 1985; Ramesh *et al.,* 1997). *S. hamata* is almost naturalized in this country and has shown promise in terms of production and seed yield. Though *S. scabra* is hardy and late maturing, enough attention has still not been paid to harness its potential. In recent past through germplasm exchange programme Indian Grassland and Fodder Research Institute, Jhansi has received a reasonable numbers of germplasm largely consisting *S. hamata, S. humilis* and *S. scabra* from ILRI, Ethiopia. Additional set of promising lines have been received from Australia in 1998 under an ACIAR-ICAR collaborative program. Under this programme along with *S. scabra, S. hamata* and *S. guianensis,* a new species *viz., S. seabrana* was introduced first time in India. Though *Stylosanthes* accessions have been characterized using seed protein patterns (Robinson and Megarrity, 1975), the information pertaining to newly introduced species i.e., *S. seabrana* is lacking. In the present communication we report the identification of *S. seabrana* lines from the existing stocks of ILRI materials on the basis of morphology and seed protein patterns as well as variability study in terms of protein bands in identified *S. seabrana* accessions along with other species namely *S. scabra* and *S. viscosa.*

Six lines of *S. seabrana* (CPI 2523, 2534, 2539, 110372, 104710,105546B) were grown at Central Research Farm of Indian Grassland and Fodder Research Institute, Jhansi in 3x4 m plot in three replications. Forty-eight lines of *S. scabra* were placed in three rows, one meter each, without replications along with checks on every five-line intervals. Along with morphological attributes and flowering behaviors seeds from individual plant looking morphologically similar to *S. seabrana* was collected. The seed proteins were isolated following the procedure of Gardiner *et al.,* (1986). The SDS polyacrylamide gel electrophoresis was carried out following the procedure of Laemmli (1970).

Out of 48 lines of *S. scabra* 35 germinated and of that 10 lines was identified morphologically similar to *S. seabrana.* Though these accessions resemble *S. scabra* in many characters including growth habits, perenniality, and fruit shape. However, *S. seabrana* species showed prominent difference with respect to seedling vigour and flowering time. It flowers in advance (45-60 days), in comparison to *S. scabra.* In general *S. scabra* flowers very late in comparison to other species of *Stylosanthes* in Jhansi condition. These lines having similarity with *S. seabrana* also depicted distinctness in leaf morphology (smaller and thin), presence of prominent hairs on stem and stipule as well as low stickiness of stem and leaves in comparison to *S. scabra.* Protein profile of seeds of these lines along with *S. scabra, S. viscosa* as well as available *S. seabrana* lines was carried out using SDS polyacrylamide gel. *S. viscosa* was included in the study because it is one of the diploid progenitor of allo-tetraploid *S. scabra. S. seabrana* (*Stylosanthes.* sp. aff. *S. scabra*) have been reported as the second progenitor of *S. scabra* (Liu and Musial, 1997). Protein profile indicated the presence of many bands which was shared by all three species. Band number 2, 11, 13 20 and 21 was absent in *S. viscosa* but present in both *S. seabrana* and *S. scabra* lines indicated that these bands were shared by *S. seabrana* in *S. scabra* (Table 1). Protein band number 14, 19, 22 and 23 was present in both *S. seabrana* and *S. viscosa* but observed absent in *S. scabra.* Low level of variations in terms of seed protein profile was observed among

Table 1. Presence (+) and absence (-) of bands as revealed by SDS polyacrylamide gel from seeds of 19 accessions of *S. seabrana* and one each of *S. scabra* and *S. viscosa* line.

Accessions/	Band number																								
Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
S. scabra																									
RRR 94-97	+	+	+	+	+	+	+	-	++	-	++	+++	++	-	+	+	+	+	-	+	+	-	-	+	++
S. seabrana																									
IG 369	+	+	-	+	+	+	+	+	++	-	+	+++	++	+	+	+	+	+	+	+	+	+	+	-	++
IG387	+	+	-	-	-	-	-	-	++	-	-	+++	++	+	+	+	+	+	+	+	+	+	+	-	+
IG391	+	+	-	-	-	-	-	-	++	-	+	+++	++	+	+	+	+	+	+	+	+	+	+	+	++
IG 370	+	+	-	-	-	-	-	-	++	-	+	+++	++	+	+	+	+	+	+	+	+	+	+	-	+
IG 346	+	+	+	-	-	-	-	-	++	-	+	+++	++	+	+	+	+	+	+	+	+	+	+	+	+
IG 355	+	+	+	+	+	+	+	+	++	-	+	+++	++	+	+	+	+	+	+	+	+	+	+	+	++
IG 325	+	+	-	+	+	+	+	+	++	-	+	+++	++	+	+	+	+	+	+	+	+	+	+	-	++
IG 339	+	+	-	-	-	-	-	-	++	-	+	+++	++	+	+	+	+	+	+	+	+	+	+	-	++
IG 384	+	+	-	-	-	-	-	-	++	-	+	+++	++	+	+	+	+	+	+	+	+	+	+	-	+
IG 352	+	+	-	-	-	-	-	-	++	-	+	+++	++	+	+	+	+	+	+	+	+	+	+	-	+
EC 408403	+	+	-	-	-	-	-	-	++	-	+	+++	++	+	+	+	+	+	+	+	+	+	+	-	++
EC 408404	+	+	-	-	-	-	-	-	++	-	+	+++	++	+	+	+	+	+	+	+	+	+	+	+	++
EC 408405	+	+	-	-	-	-	-	-	++	-	+	+++	++	+	+	+	+	+	+	+	+	+	+	+	++
CPI 110372	+	+	-	-	-	-	-	-	++	-	+	+++	++	+	+	+	+	+	+	+	+	+	+	+	++
CPI 105546B	+	+	-	-	-	-	-	-	++	-	-	+++	++	+	+	+	+	+	+	+	+	+	+	+	++
CPI 104710	+	+	-	-	-	-	-	-	++	-	+	+++	++	+	+	+	+	+	+	+	+	+	+	+	+
CPI 2523	+	+	-	-	-	-	-	-	++	-	+	+++	++	+	+	+	+	+	+	+	+	+	+	-	++
CPI 2534	+	+	-	-	-	-	-	-	++	-	-	+++	++	+	+	+	+	+	+	+	+	+	+	+	+
CPI 2539	+	+	-	-	-	-	-	-	++	-	+	+++	++	+	+	+	+	+	+	+	+	+	+	+	+
S. viscosa																									
CPI 33941	+	-	+	+	+	+	+	-	++	+	-	+++	-	+	+	+	+	+	+	-	-	+	+	+	++

The relative intensity of bands are reflected with the number of + sign indicated in columns. Bands are arranged with respect to decreasing molecular weight as observed on 12% SDS denaturing polyacrylamide gel.

S. seabrana lines as limited number of protein bands which were present only in few lines of *S. seabrana* accessions and absent in both *S. scabra* and *S. viscosa* was observed (Table 1).

Six lines of *S. seabrana* evaluated at IGFRI, Jhansi showed good crop establishment as germination was more than 80 percent when seed was scarified using sand paper. Fresh and dry matter yield among six lines of *S. seabrana* (CPI 2523, 2534, 2539, 110372, 104710 and 105546B) ranged from 206q/ ha (CPI 110372) to 317 q/ ha (CPI 105546B) and 71.50q/ ha (CPI 110372) to 132.96 q/ ha (CPI 2534), respectively, in rain fed condition indicated a potential fodder crop to be utilized under different production systems (Fig. 1). Results also indicated yield differences among accessions and lines performing well, like CPI 2534, 2539 and 105546B can be promoted for large scale trials. Recent research has demonstrated a potential role of different species of *Stylosanthes* as a dried leaf meal and stylo meal block in commercial poultry and animal feed respectively (Phaikaew *et al.,* 2004; Pathak *et al.,* 2004).

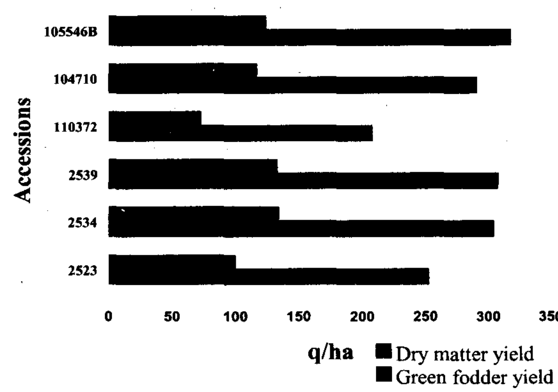

Fig. 1. Dry matter and green fodder yield of S. seabrana (CPI 105546B, 104710, 110372, 2539, 2534 and 2523) lines in second year of establishment

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Psyllid Resistance in *Leucaena leucocephala* Provenances and their Utilization in Fodder/ Fuelwood Production

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Key Words: *Leucaena*, Psyllid, *Heteropsylla cubana*, Fodder/ Fuel Wood Production

The genus *Leucaena* (Bentham) is reported to have 16 species (Brewbaker and Sorensson 1993)/ 17 (Hughes 1993), of which the most popular species introduced in India is *Leucaena leucocephala*. It has been one of most productive and versatile multipurpose tree legumes available to tropical agriculture. The limitations of leucaena most importantly include susceptibility to the psyllid insect pest-*Heteropsylla cubana*, (Shelton *et al.*, 1995). The damaging effect of the leucaena psyllid has halted promotion and new planting of leucaena in most regions.

The germplasm used around the world is genetically very narrow and mostly of one species (*L. leucocephala*). Clearly, susceptibility to psyllid attack, are partly caused by the lack of genetic diversity. Germplasm screening against natural infestation of 496 leucaena accessions belonging to fourteen species have been reported by Faruqui *et al.* (2002). The present study was undertaken to screen the promising leucaena provenances for reaction to psyllid and identify provenances with reasonable levels of resistance/tolerance and production potential.

The trial on *Leucaena* involving seven promising lines viz. S-10, S-14, S-22, S-24, K-29, K-601 and K-8 as control were subjected to field screening under natural infestation of leucaena psyllid. Round the year observations were recorded but the categorization has been made on the basis data recorded during Mid February to Mid March, a period where psyllid infestation coincides with plant growth at Jhansi. These accessions have been classified in to three categories (resistant, tolerant and susceptible based on the guidelines framed by the NFTA (Wheeler 1988).

Each leucaena germplasm showed different level of infestation of this pest and the injury levels. Provenances S-14, S-22 and K-601 had low infestation (1-4 level) and injury levels (1-2) in both the systems. K-8 indicated the high level of infestation (7-9) and damage (7-8) levels and was considered as most susceptible. K-8 of course showed a very quick recovery during the periods with high humidity or low pest load making good the losses caused.

The infestation and damage was differently reflected in plantation put under repeated cutting for forage proposes as against those left uncut K-601 showed same level of resistance (injury level 1-2) in both the systems. Similarly, at peak infestation period S-22 and S-14 had low (3-4) infestation and damage score (2-3).

The frequent cut results in to new growth that attracts the psyllid. K-8 would be a good choice for a place, which has periodicity in the psyllid populations while K-601 would grow well in the locations even with high pest density based upon their production potential and response to psyllids. It is concluded that production potential under psyllid infestation should be an important criteria for provenance selection in leucaena for specific locations. The genetic diversity available in different