



Short Communication

Morphotaxonomy and Phenology of three different accessions of *Sesbania cannabina* Poir

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Abstract

Present experiment was undertaken to study the morphological and phenological variations among the three different accessions viz. E2435736, E2435738 and E2466700 of *Sesbania cannabina* obtained from NBPGR, New Delhi, India. For this purpose dry and healthy seeds were soaked in distilled water for 14 hours. After soaking seeds were sown in field in a definite pattern at Department of Botany, University of Allahabad, Allahabad, India. Sowing was done in the month of June, 2009. Data for germination and survival percentages were taken after 15 and 30 days, respectively. The study of phenology was undertaken to investigate number of days required for flowering initiation in all three accessions. The morphotaxonomy of three accessions showed that accession no. E2435738 and E2466700 are closer to each other than the E22435736. Accession number E22435736 was found to be an early flowering accession.

Keywords: *Sesbania cannabina*, accessions, morphotaxonomy, phenology, germination, survival.

Introduction

Sesbania cannabina Poir. belongs to family fabaceae and is an annual slender subshrub, up to 3.5m tall. It is commonly called canicha, danchi, dunchi fibre, prickly sesban, prickly sisham, sesbania pea (English); sesbane (French); canicha, danchi, dhaincha (Hindi); sanô (Tibetan); mrindazia, msalia-Nyuma (Swahili); sano-khangkhok (Thai). Its native distribution remains unclear since it has been introduced and naturalised in a wide area and has been reported from India, Iraq, Myanmar, Malaysia, New Caledonia, Phillipines, Mauritius, Ghana, Indo-China and the South Pacific Islands. It is thought to be native to Australia in all inland states except for Victoria, and also in the Northern Territory, and extending its native range in the islands to the north into Papua New Guinea and Indonesia¹.

It is cultivated almost in monsoon season and grows well in loamy, clayey, black and sandy soil. Annual *Sesbania* species such as *S. cannabina*, *S. rostrata* and *S. bispinosa* are widely used in Asia as green manures in paddy rice cultivation because of their ability to withstand waterlogging. Techniques and timing of interplanting *S. cannabina* for use as a green manure for rice have been developed in southern China (FAO, 1977). It grows well under waterlogged or un irrigated conditions, tolerant to high temperatures (36-44°C), high soil alkalinity (pH 10) and establishes during rainy season in a wide variety of soils such as loamy, clayey, black and sandy soils². *Sesbania cannabina* is normally spreading shrub, but in dense stands they are less branched. They grow very rapidly and may reach a height of over 3.5 m in 6 months, making them very competitive

with weeds. Root nodules that effectively fix atmospheric nitrogen are formed with *Rhizobium*.

The taxonomy of the 3 annual species (*Sesbania cannabina*, *S. sericea* and *S. bispinosa*) of *Sesbania* is very confusing and in the agronomic literature it is often impossible to attribute information unequivocally to a single species. The differences between *Sesbania bispinosa* and *Sesbania cannabina* in particular are small and can mainly be found in the morphology of the keel. *Sesbania cannabina* has sometimes been included in *Sesbania bispinosa* and also in *Sesbania sericea*. Only a thorough, worldwide revision of the genus might bring clarity³. Present study describes the variations between 3 different accessions of *Sesbania cannabina*.

Material and Methods

Three different accessions E2435736, E2435738 and E2466700 of *Sesbania cannabina* were obtained from National Bureau of Plant Genetic Resources (NBPGR), New Delhi. Dry and healthy seeds of each accessions were soaked in distilled water for 14 hrs. After soaking seeds were sown in field in a definite pattern in Department of Botany, University of Allahabad, Allahabad-211002, India to raise the population. Data for germination and survival percentages were taken after 15 and 30 days respectively. Data for morphological characteristics were taken after 45 days and days to flower initiation was the number of days required to initiation of flower in plants. Data for seed length, breadth was taken after completion of experiment. Statistical analysis was done using statistica 8 software.

Results and Discussion

Germination and survival percentages: Table 1 show the germination and survival percentages of three accessions of *Sesbania cannabina*. The values for germination and survival percentages are same in case of 1st (E2435736) and 2nd (E2435738) accessions which are 66% and 75%, respectively. While germination and survival percentages in case of 3rd accession (E2466700) was higher i.e. 83% and 100%, respectively.

Table-1
Germination and survival percentages of three different accessions of *Sesbania cannabina*

<i>Sesbania cannabina</i> accessions	Germination % (mean)	Survival % (mean)
E2435736	66	75
E2435738	66	75
E2466700	83	100

Morphological Characteristics (table 2): Among all three different accessions 2nd and 3rd accession appears to be closer with each other. While the 1st accession showed more distant relationship among all three. The plant height and stem girth in case of 1st accession was minimum, while maximum in case of 3rd accession. Internodes length in all three accessions showed much variation, as it was 7.64±0.20 cm in case of 3rd accession and 5.65±0.17 cm in case of 1st accession. Unlike the plant length, stem girth and internodes length the maximum number of leaves/plant was observed in case of 2nd accession and minimum in case of 3rd accession. The number of days required for initiation of flower was considerably less in case of 1st accession (33 days), while 65 days in case of two other accessions. The maximum seed length was observed in case of 2nd accession, while minimum was in case of 3rd accession. Maximum and minimum seed width was observed in case of 1st and 2nd accession, respectively. Seed coat colour of 1st and 2nd accession was deep brown and shiny, while incase of 3rd accession it was light brown with black patches.

Discussion: *Sesbania cannabina* is a multipurpose leguminous crop and is widely adaptable to different adverse climatic conditions such as waterlogging, drought, soil salinity, etc⁴. It is widely used as green manure crop due to presence of root nodules and inherent nitrogen fixation capacity. Beside these facts *Sesbania* germplasm resource base has received inadequate attention. The collections of approximately 125 accessions maintained at the Department of Agronomy and Soil Science, University of Hawaii⁵, and of approximately 180 accessions (including many endemic Australian accessions) gathered by Australia's CSIRO, are perhaps the largest in existence. The U.S. Department of Agriculture (USDA) also maintains some *Sesbania cannabina*. More extensive collections of materials, particularly from Africa and South Asia, are an urgent need for future selection and breeding programmes of this genus.

Table-2
Morphological characteristics of three different accessions of *Sesbania cannabina*

Characters	<i>Sesbania cannabina</i> accession no.	Mean±SE
Plant height (cm)	E2435736	170.00±0.00
	E2435738	180.00±0.00
	E2466700	200.00±2.88
Stem girth (cm)	E2435736	3.62±0.10
	E2435738	3.92±0.07
	E2466700	3.96±0.05
Internode length (cm)	E2435736	5.65±0.17
	E2435738	5.98±0.30
	E2466700	7.64±0.20
No. of leaves/plant	E2435736	39.50±0.50
	E2435738	36.65±0.50
	E2466700	32.20±1.28
Days to Initiation of first flower	E2435736	33 days
	E2435738	65 days
	E2466700	65 days
Seed length (mm)	E2435736	3.30±0.22
	E2435738	3.86±0.97
	E2466700	2.90±0.10
Seed breadth (mm)	E2435736	2.00±0.00
	E2435738	1.92±0.04
	E2466700	1.96±0.04
Seed coat colour	E2435736	Deep brown & shiny
	E2435738	Deep brown & shiny
	E2466700	Light brown with black patches

During the present study even with such small accession numbers, high levels of genetic variability were observed. Among the three accessions studied intraspecific variability was observed for all the characters evaluated. Second and third accession is closer, while first accession shows more variation from the 2nd and 3rd accession. The considerable variations were observed in case of internode length between 3rd and two other accessions. Differences between no. of leaves/plant and seed lengths of three different accessions was also considerable, while difference between seed width was not considerable. Number of days required for flowering in case of 1st accession is half as in case of other two accessions.

Conclusion

On the basis of considerable variations between these three different accessions these can be developed into separate varieties and accession no. E2435736 may be developed as an early flowering variety with great value. The early flowering varieties takes less time in field and provide flowers, fruit and seeds in less time which is of great economic importance.

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