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Standardization Techniques for Soil Mixture Ratio and Sowing Depth in *Solanumvirginianum* (syn. *S. surattense*) A Medicinal Plants of Thar Desert

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Seed Germination and
Plant Growth.

Abstract
It is an important constituent of well-known Ayurvedic drug "Dasmula" and "Arkadhi". All plant parts are used in Ayurveda. The plant is very prickly diffuse, procumbent, often becomes perennial reaching a spread of a meter or so under luxuries conditions. The tap root may be very extensive in a plant, which has only few leaves. Three types of flower bearing plants, i.e. dark purple, light purple and white were observed, which differs in their density and colour. The density of white-flowered plants is very low and rarely found in natural habitats. In the present studies, it was observed that seeds of S. surattense when sown at 0.5 cm depth with 2:2:1 soil ratios of sand:clay: FYM, showed maximum seedling emergence and plant growth under nursery conditions.

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INTRODUCTION

Whole plant of *S. Surattense*s used as antiasthmatic, astringent, digestive, diuretic and pungent. The drugs prepared from whole plant are used to treat stomach & throat disorders, dropsy, gum disease, enlargement of liver and spleen. Leaves are applied locally to relieve pain and juice with black pepper in rheumatism. Crushed flowers are given orally to relieve diarrhoea in children (Kumar *et al*., 2005). Bud and flowers with salt solution are given for watery eyes (Chopra *et al*., 2002). Fruits Juice of berries is useful in sore throat infection (Chopra *et al.,* 2002).Extract is effective in bronchial asthma, piles and for rejuvenation (Kumar *et al.,* 2005).

It is usually found in waste and open locations, which may or may not have visible supply of water. In western Rajasthan, it is a common in sandy places throughout the year but profusely flowering and making its presence felt mainly in winters. It may be termed as winter-summer weed as the plants produce flowers and fruits with viable seeds in both the seasons.

MATERIAL AND METHODS

Collection of Germplasm

Seeds were collected from the following three sites: Soila village, Dist. Jodhpur (75 km from University Campus in northeast direction; Site-I), Kudi Housing Board, Jodhpur (7 km from University Campus in south direction; Site-II), and J.N.V. University Campus, Jodhpur (site-III) during March-April.

For seed collections, mature yellow fruits were selected from branches and stored in paper bags. After drying of fruits, seeds were cleaned and used for germination studies. The following treatments were provided to seeds under nursery conditions:

Soil Mixtures

Before sowing, freshly collected seeds of, *S. surattense* were pretreated with 5 mg l-1 of GA3 for obtaining maximum seedling emergence. After providing above treatments, seeds were sown in polybags in four different soil mixture ratios (sand: clay: FYM) such as R1 (1:1:1), R2 (1:2:1), R3 (2:2:1) and R4 (1:2:2).

Sowing Depths

Seeds were sown in 2:1:1 soil mixture ratios at four sowing depths, viz. D1 (0.5 cm), D2 (1.0 cm), D3 (1.5 cm) and D4 (2.0 cm) after providing different pre treatments as mentioned.

RESULTS AND DISCUSSION

The data on effect of different soil mixture ratios and sowing depths on seedlings emergence and growth parameters are given in Table 1. Among different soil mixtures ratios, maximum (97.76%) seedlings emergence, plant height (39.12 cm) and collar diameter (0.675 cm) were obtained in R3 (Table 1) followed by in R4 and minimum in R1 ratio after four months of setting the experiments. Among different sowing depths, maximum seedlings emergence (93.30%), plant height (33.66 cm) and collar diameter (0.602 cm) were observed in D1 (Table 1) followed by D2 and minimum in D4 depth. The seedlings emerged after 4 to 6 days of setting the experiments. The data were significant at 1% probability levels except for seedlings emergence (days), which were non-significant.

Table 1: Effect of different soil mixture ratios and sowing depths on emergence of seedlings and growth parameters (cm) in *S. surattense* during various months

Treatments	Seedling emergence		Growth parameters (months)							
			Plant height				Collar diameter			
	Days	Percent	One	Two	Three	Four	One	Two	Three	Four
Soil mixture ratios:										
R_1	6	64.40	6.16	12.23	19.56	24.06	0.214	0.378	0.412	0.454
R_2	5	73.33	6.67	13.65	21.12	26.72	0.257	0.398	0.427	0.507
R_3	4	97.76	9.14	17.16	31.20	39.12	0.372	0.507	0.596	0.675
R_4	5	79.96	7.26	14.04	25.96	30.41	0.292	0.404	0.457	0.535
CD	NS	17.363**	0.846**	1.267**	1.597**	2.371**	0.060**	0.073**	0.088**	0.072**
Sowing depths:										
D_1	4	93.33	7.94	15.27	27.11	33.66	0.317	0.425	0.529	0.602
D_2	5	71.06	6.77	13.67	23.16	29.65	0.252	0.348	0.457	0.504
D_3	6	59.96	5.89	12.34	20.17	24.29	0.224	0.324	0.409	0.487
D_4	6	57.73	5.01	11.09	18.50	21.01	0.204	0.287	0.366	0.417
CD	NS	14.553**	0.894**	1.239**	1.602**	1.867**	0.042**	0.076**	0.059**	0.083**

NS = Non-significant; and ** = Significant at P = 1%

Kasera *et al.* (2003) observed that 2:1:2 ratios of sand:clay: FYM were suitable for seedling growth and biomass yield in *Leptadaenia reticulata* under nursery conditions. Saharan *et al.* (2002) observed maximum germination and better growth performance in 1:2:1 ratio at 0.5 cm depth for *Evolvulus alsinoides*. Kasera and Prakash (2005) reported that 1:1:1 soil mixture ratio was highly suitable for an early establishment and plant growth of *Commiphora wightii* under nursery conditions. Nautiyal *et al.* (2001) reported 60% seed germination of *Picrorhiza kurrooa* in sandy loam soil under nursery conditions. Singh *et al.* (2003) observed maximum fruit yield and biomass of S*olanum xanthocarpum* in 1:2 ratio of soil: FYM.

CONCLUSION

In the present studies, it was concluded that seeds of *S. surattense* when sown at 0.5 cm depth with 2:2:1 soil ratios of sand:clay:FYM, showed maximum seedling emergence, plant growth and biomass productions under nursery conditions. The response of FYM application can be attributed to the better nutrient availability due to better absorption and assimilation and its favorable effect on physical and biological properties of soil, resulting in an increased growth and yield. The higher amount of clay attributes for increasing nutrients status of the soil and in improving the water holding capacity of the soil and with increasing the depth, germination percentage decreased significantly. Application of organic and inorganic fertilizers and microbial processes for aiding nutrients are the main mechanisms for building up the soil productivity and promoting plant growth. Among biofertilizers, mycorrhiza has been recognized as a potential biotechnological tool for enhancing plants growth and reclaiming wastelands (Sharma *et al.*, 2002).

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