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Survival and Biomass Production of *Salvadora persica* on Various Types of Salt Affected Soils under Arid Conditions in Rajasthan and Gujarat

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Abstract: *Salvadora persica* (L), popularly known as miswak, toothbrush tree or khara jal, is facultative halophyte tree species growing on arid salt affected lands in Rajasthan, Gujarat, Punjab, Haryana and western Uttar Pradesh. Despite its multifold uses it is not very popular in afforestation program. Its slow growing nature may be the reason. Field trials were laid in arid sandy salt affected soils in Kaparda and Gangani in Jodhpur, Rajasthan, and highly saline black silty clay soils in little Rann of Kachchh, Patan Gujarat. It had very high survival rate at all the sites with appreciable biomass production. The survival was above 90% at Kaparda with slow growth, 85.2 to 66.7% survival and 7 to 12 kg plant^{-1} biomass yield with the use of FYM, gypsum and nitrogen on sandy soil, Gangani, Jodhpur at 72 months and 97.5 to 97.9% survival and 2.6 to 7.17 kg plant^{-1} biomass yield with FYM, wheat husk and nitrogen on silty black salty soil, Kordha Patan at 50 months. Thus, it can be concluded that with slight management *S. persica* is the best plant for various types of salt affected soils. Plantation of this important tree species will not only rehabilitate these wastelands, but also provide valuable products for livelihood support.

Key words: *Salvadora persica*, FYM, gypsum, nitrogen, wheat husk, growth.

Salvadora persica (L), popularly known as miswak, toothbrush tree or khara jal, belonging to family Salvadoraceae, is an important salt tolerant indigenous tree species growing on arid salt affected lands in Rajasthan, Gujarat, Punjab and Western Uttar Pradesh (Anon., 1986). It is a preferential halophyte that stores excess salts in mature and senescent leaves and in the bark which, when shed, remove excess salts (Amonkar and Karmakar, 1978). It is planted in saline coastal area (Makwana *et al.*, 1988). It has multifarious uses: Twigs and young stems as a toothbrush; shoots as camel fodder; plant ash provides salt, bark in suppressing the bacterial growth and plaque formation in mouth; back pains, chest diseases, and stomach aches; seeds are used as a tonic and seed oil is rubbed on the skin for rheumatism. Seed is rich in oil and contains lauric, myristic, and palmitic acids with potential for making soaps, candles, and using it as a substitute for coconut oil (FAO, 1986; Hallawany, 2012; Kumar *et al.*, 2012). Despite its multifold uses it is not very popular in afforestation program its slow growth may be the reason. Field trials were laid in arid sandy salt affected soils in Kaparda and Gangani (Arya *et al.*, 2005; Arya and Lohara, 2005) in Jodhpur, Rajasthan, and highly saline black silty clay soil in little Rann of Kachchh, Patan, Gujarat, and salient findings are presented here-

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Materials and Methods

Trial 1

The first trial was raised on a degraded saline alkali shallow loamy sand soil at Kaparda, Jodhpur where pH_2 was 8.9-9.2, EC_2 was 12-17 dS m^{-1} and SOC was 0.12 to 0.15% with a gypsum requirement of 10 t ha^{-1}. Soil depth was 0-40 cm with rocky substratum below. Trial was laid in July 1992 with five treatments T_1: Gypsum (10 t ha^{-1}); T_2: Gypsum + Drainage Channel (DC along plant rows, 30 cm deep and 40 cm wide); T_3: Soil replacement with normal soil + FYM (5 kg plant^{-1}); T_4: Gypsum + FYM + Zn (7 g $ZnSO_4$ plant^{-1}) + DC + Nitrogen (15 g urea plant^{-1}) and T_5: Control in randomized block design (RBD) with three replications having 15 plants per replication at a spacing of 2 x 4 m. The rainfall received was 326 mm with a long dry spell of 46 days in 1993, 596 mm in 1994, 325 mm in 1995 and 406 mm in 1996.