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## Efficacy of open nursery bed and root trainer on germination and growth of Hackberry (*Celtis australis* Linn.) a multipurpose tree species

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### Abstract

Performance of Hackberry seedlings raised in open bed and root trainer were compared for quality parameters viz. germination, survival, plant height and collar diameter. Open bed seedlings gave better survival and growth performance as compared to root trainer raised seedlings.

**Key words :** *Celtis australis*, open beds, root trainers, seedlings

### Introduction

The increasing demands for fuel wood, fodder, building material, agricultural implements etc. are main causes of deforestation. It is possible to minimize deforestation by providing rural people with sufficient fuel, fodder and small timber by exclusive cultivation of multipurpose trees on marginal lands, waste lands or in association with crop cultivation on agricultural lands.

Hackberry *Celtis australis* (family : ulmaceae) is one of the multipurpose tree species of Kashmir valley found in subtropical to temperate regions of the world spreading over North Africa to Europe to west Asia (Anonymous, 1976). *Celtis australis* is a moderate sized deciduous tree of north western Himalaya found primarily in the subtropical and dry temperate zones of Jammu and Kashmir within a wide altitudinal range of 500-2500 m (Troup, 1921). This species has a great potential for adoption in various social/agroforestry models in India (Bhardwaj and Dhiman, 1989). To make an agroforestry, social forestry programme successful, availability of inputs particularly the planting material is important for raising nursery of suitable species. The present study was carried out to enrich the meagre knowledge available about the nursery and sowing techniques of this species.

### Materials and Methods

The experimental site i.e., forest nursery at Shalimar was situated at 34.08°N latitude and 74.83°E longitudes at an altitude of about 1587 meters above mean sea level. The soil of the nursery was well drained silty loam type and the climate in general is temperate type. The region faces a wide severe winter from November to March and temperature ranges from a minimum of -8°C in winter to a maximum of 33°C in summer. The area receives an annual precipitation of 676-1193 mm.

The seedling nursery of *Celtis australis* (Hackberry) was raised from bold and filled seeds in both nursery beds as well as in root trainers. Open beds of size 1 x 1 m were prepared, mixed with sand and dal weed and 400 seeds were closely sown in four beds during last week of March, 2006. Beds were irrigated as and when required and were kept weed free. The sowing in root trainer was also carried out simultaneously on 25-03-2006. The root trainers were filled with mixture of soil, well decomposed dal weed (*Ceratophyllum* sp., *Potamogeton* sp. *Myreophyllum* sp.) and sand mixed in the ratio of 2:1:1 respectively. Three hundred bold and filled seeds were sown in 12 root trainers with capacity of 150 CC of 25 holes each. The experiment was laid out in completely randomized design with three replications each. The observations in terms of germination, survival, average plant height and average collar diameter during one growing season (270 days) was monitored and recorded.

### Results and Discussion

There was non-significant differences in germination percentage in open bed (48.16) v/s root trainer (51.16%). A highly significant difference was observed in survival percentage, average plant height and average collar diameter (Table 1). Significantly higher survival of 90.32 per cent was observed in open bed conditions as

compared to 81.28 per cent in root trainers. Similarly, height and collar diameter was significantly better in open bed as compared to root trainers.

**Table 1 : Nursery raising of Hackberry (*Celtis australis* L.) in open bed and root trainers**

Type of Nursery	Germi- nation (%)	Surv- ival (%)	Average plant height (cm)	Average collar diameter (mm)
Open beds	48.16	90.32	66.66	4.66
Root trainer	51.16	81.28	23.03	1.90
CD at 0.05	-	2.67	5.69	0.65

Similar results were obtained by Mughal (1996) who reported that *Cupressus torulosa* and *Cedrus deodara* attain optimum shoot and root development when grown in open nursery beds, whereas, seedling raised in root trainer did not exhibit better growth in terms of height and root development. Sutherland and Day (1988) reported increase in seedling grown with increase in volume of container.

Thus the open bed raised seedlings were found to be better as compared to seedling raised in root trainers. However, in present study, root trainers of one size and one combination of medium was used, therefore, their

importance can not be ignored. Better indicative results could be obtained, when the seedlings are assessed for growth and survival after two to three years of field planting.

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