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Growth and yield of *Artemisia Annua* as affected by different plant geometry

■ RAJESH CHOUDHARI[1] AND ROSHAN CHOUDHARY

AUTHORS' INFO

Associated Co-author :
[1]Directorate of Research, Maharana Pratap University of Agriculture and Technology, UDAIPUR (RAJASTHAN) INDIA

Author for correspondence :
ROSHAN CHOUDHARY
Directorate of Research, Maharana Pratap University of Agriculture and Technology, UDAIPUR (RAJASTHAN) INDIA
Email : roshan6109@yahoo.co.in

ABSTRACT : A field experiment was conducted at G. B. Pant University of Agriculture and Technology, Pantnagar, U. S. Nagar (Uttarakhand) during the *Rabi* 2007-08 to find out the effect of planting geometry on *Artemisia annua* crop. The experiment consisted eight treatments of different planting geometry *viz.,* (30x30 cm, 30x45 cm, 30x60 cm, 45x60 cm, 45x75cm, 45x90 cm, 60x75 cm and 60x90 cm) were laid out in Randomized Block Design with three replications. Result revealed that maximum leaf yield (2.46 t/ha) was recorded at 45x60 cm which was significantly higher than all other treatments. However, because of significant difference in variation of dried leaf yield of crop, artemisnin yield varied significantly over the treatments. Plant geometry that 45x60 cm spacing was optimum for getting higher leaf yield (2.46 t/ha) and Artemisinin yield (5.16 kg/ha) in *Tarai region* of Uttarakhand.

Key Words : Artemisinin yield, Leaf yield, Plant geometry

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Medicinal plants constitute an important resource in the process of drug development. Numerous plants derived active principles and their derivatives have been developed as drugs against many diseases for their effective treatments. Multiple drug resistance of parasites/ pathogens still poses problems. One important plant genus in traditional chinese medicine (TCM) which is known to contain many bioactive components is *Artemisia annua*. The genus belongs to the family of Asteraceae and about 500 species belong to it (Van Agtmael, 1999). Most Artemisia herbs are perennials and grown in the northern hemisphere. *Artemisia annua* L. is a vigorous, annual, aromatic, herbaceous medicinal plant attaining 1-3 m height and 1 m in width. The plant produces anti-malarial, antibacterial agents and natural pesticides. The main chemical constituents of *Artemisia annua* L. include volatile essential oils and nonvolatile sesquiterpenoids, flavonoids, coumarins, proteins and steroids. The sesquuiterpenes include artemisinin, artemisnin, artemisinin, artemisinin, artemisinin, artemisinin, artemisic acid, artemisilactone, artemisinol and epoxyarteannuinic acid (Peigen, 2002; Anonymous, 1977; Ying *et al*., 1982). Artemisinin content in *Artemisia annua* L. is very low being 0.01-0.8 per cent (Van Agtmael *et al.*, 1999). Artemisinin contains an endoperoxide bridge, rarely found in secondary metabolites. For improving artemisinin production, *Artemisia annua* plant is still the most potent and economic source for production of cheap and large quantities of artemisinin and thus it is very important to optimize site specific agronomy of this crop for harvesting maximum biomass leaf of the crop. Crop geometry is very important and primary information required for cultivation of any crop for getting optimum production.

RESEARCH PROCEDURE

A field experiment was conducted at College Agronomy Farm, G. B. Pant University of Agriculture and Technology, Pantnagar, during *Rabi*, 2007. The soil had pH 6.8, 0.91 per cent organic carbon, 211 kg/ha available nitrogen, 32.64 kg/ha available P_2O_5 and 172.4 kg/ha available K_2O. The experiment consisted of eight treatments of different planting geometry *viz.,* (30x30 cm, 30x45 cm, 30x60 cm, 45x60 cm, 45x75 cm, 45x90 cm, 60x75 cm and 60x90 cm) were laid out in Randomized Block Design with three replications. The experiment was transplanted on 6-2-2007 with the 35 days old seedlings. The crop was raised under irrigated conditions.

RESEARCH ANALYSIS AND REASONING

The results of the present study as well as relevant discussions have been presented under following sub heads: