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An Evaluation on Yield in Different Onion Varieties under Poplar Based Agroforestry System

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ABSTRACT: The experiment was laid out in Randomized Block Design (Factorial) with three replication and 12 treatments with and without combination of three onion varieties. The results revealed that vegetative growth characters such as plant height, leaf size and number of leaves found superior in variety Nasik red. The yield contributing characters such as bulb diameter, bulb weight, and yield t/h of bulb were recorded variety Nasik red.

KEYWORDS: Nitrogen; Onion; Vegetable

I. INTRODUCTION

Agroforestry is a combine's production on the same plot of land, from annual agricultural activities (such as crops and pasture) and from delayed long-term production by trees (for example timber and services). This is obtained either by planting trees on agricultural land or by cropping (for example after thinning) on forested land. Plots that combine arable intercrops with forestry trees are silvoarable plots, while wooded plots with pasture under the tree canopy are known as silvopastoral plots.

Poplars are among the fastest growing trees in temperate regions of the world. Intensively managed plantations of genetically superior *Populus* clones can rapidly produce large volumes of wood for fiber and fuel. In addition, poplars are also valuable for non timber uses such as ornamental plantings, windbreaks, visual screens, and soil stabilizers. The name *Populus* refers to the fact that the trees were often planted around public meeting places in Roman times. The wood of poplars is relatively soft and hence is mostly used to make cardboard boxes, crates, paper, and veneer. Poplars are rapid-growing but relatively short-lived trees.

Onion, (*Allium cepa*), herbaceous biennial plant in the amaryllis family (Amaryllidaceae), grown for its edible bulb. The onion is likely native to south-western Asia but is now grown throughout the world, chiefly in the temperate zones. Onions are low in nutrients but are valued for their flavour and are used widely in cooking. They add flavour to such dishes as stews, roasts, soups, and salads and are also served as a cooked vegetable. The common onion has one or more leafless flower stalks that reach a height of 75–180 cm (2.5–6 feet), terminating in a spherical cluster of small greenish white flowers. The concentric leaf bases of the developing plant swell to form the underground edible bulb. Most commercially cultivated onions are grown from the plant's small black seeds, which are sown directly in the field, but onions may also be grown from small bulbs or from transplants. Onions are very hardy and can survive in a wide range of growing conditions. The bulbs vary in size, shape, colour, and pungency, though warmer climates generally produce onions with a milder, sweeter flavour than do other climates. The onion's characteristic pungency results from the sulfur-rich volatile oil it contains; the release of this oil during peeling or chopping brings tears to the eyes.

II. MATERIALS AND METHODS

The experiment was carried out at the Forestry research Nursery area of a School of Forestry & Environment, Sam Higginbottom Institute of Agriculture, Technology and sciences, (Deemed to be University), Allahabad (U.P). The experiment was laid out in randomized block design with 12 treatments and 3 replication. The different treatment were

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allocated in each replication. The plot size of 2 m² was kept for all the treatments. The detail of experimental treatments is given as under:

Varieties	N-Levels
V1 Nasik Red V2 Pusa Red V3 Pusa Madhavi	120 Kg ha ⁻¹

Seeds of the selected varieties of onion were placed in lines 10 cm apart. The seeds were slightly covered with soil and irrigated with the help of sprinkler. Nursery was kept weed free manually. Seed germination started a week after sowing. The first irrigation was given at the time of sowing and other irrigation was given after an interval of 15 days or according to the need of the crop. Seedlings of the same size were transplanted with row to row distance of 30 cm and plant to plant distance of 10 cm. All the required cultural practices were kept constant such as irrigation, weeding, pest and disease control etc in all experimental plots.

Data were recorded by selecting plants randomly from each treatment plot and average was calculated for the statistical analysis. The parameters under study were plant height (cm), bulb weight (gm), bulb diameter (cm), yield (t/ha⁻¹).

III. RESULTS AND DISCUSSION

Plant height (cm). The results showed that various onion varieties had highly significant effect on the plant height. The Maximum Plant height (41.31 cm) was recorded in Nasik red, while the minimum plant height (37.73 cm) was recorded in Pusa red at 30 DAS. The effect of variety in plant height was also significant. Maximum Plant height (42.97 cm) was recorded in Nasik red, while the minimum Plant height (40.56 cm) was recorded in Pusa red at 60 DAS. Maximum Plant height (46.35 cm) was recorded in Nasik red, while the minimum Plant height (43.08 cm) was recorded in Pusa red at 90 DAS. Maximum Plant height (48.96 cm) was recorded in Nasik red, while the minimum Plant height (45.54 cm) was recorded in Pusa red at 120 DAS.

Bulb diameter (cm). The effect of varieties on maximum bulb diameter was significant. Maximum bulb diameter was recorded in Nasik red (3.53cm) followed by the Pusa madhavi (3.23cm) and Pusa red (2.94 cm).

Bulb Weight (gm). The effect of varieties on maximum bulb Weight was significant. Maximum bulb Weight was recorded in Nasik red (36.22 gm) followed by the Pusa madhavi (32.23 gm) and Pusa red (27.16 gm).

**Table I. Plant height (cm), bulb weight (gm), bulb diameter (cm), yield (t/ha⁻¹) of three onion varieties as affected yield.
Plant height (cm),**

Levels of Variety (V)	30 DAS					60 DAS				
	Levels of Nitrogen (N)				Mean (V)	Levels of Nitrogen (N)				Mean (V)
	Control (0)	Nitrogen 120 kg	Nitrogen 120 kg	Nitrogen 120 kg		Control (0)	Nitrogen 120 kg	Nitrogen 120 kg	Nitrogen 120 kg	
V ₁	38.03	39.66	42.72	44.83	41.31	38.55	41.91	44.58	46.87	42.97
V ₂	34.57	36.65	38.55	41.14	37.73	37.28	39.53	41.91	43.51	40.56
V ₃	36.43	38.48	40.54	42.56	39.50	39.31	41.27	43.19	45.31	42.27
Mean (N)	36.34	38.26	40.60	42.84		38.38	40.90	43.23	45.23	

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Levels of Variety (V)	90 DAS				Mean (V)	120 DAS				Mean (V)
	Levels of Nitrogen (N)					Levels of Nitrogen (N)				
	Control (0)	Nitrogen 120 kg	Nitrogen 120 kg	Nitrogen 120 kg		Control (0)	Nitrogen 120 kg	Nitrogen 120 kg	Nitrogen 120 kg	
V ₁	42.73	45.05	47.72	49.99	46.37	45.60	47.43	50.21	52.60	48.96
V ₂	40.47	42.29	43.59	46.00	43.09	43.11	44.60	46.17	48.28	45.54
V ₃	41.01	43.18	45.30	48.17	44.42	43.73	45.60	47.65	50.88	46.97
Mean (N)	41.41	43.51	45.54	48.05		44.15	45.88	48.01	50.59	

Bulb diameter (cm)

Levels of Variety (V)	Levels of Nitrogen (N)				Mean (V)
	Control (0)	Nitrogen 120 kg	Nitrogen 120 kg	Nitrogen 120 kg	
V ₁	2.69	3.17	3.58	4.69	3.53
V ₂	2.27	2.63	3.11	3.74	2.94
V ₃	2.61	2.77	3.41	4.14	3.23
Mean (N)	2.52	2.85	3.36	4.19	

Bulb Weight (gm)

Levels of Variety (V)	Levels of Nitrogen (N)				Mean (V)
	Control (0)	Nitrogen 120 kg	Nitrogen 120 kg	Nitrogen 120 kg	
V ₁	25.89	32.81	40.54	45.63	36.22
V ₂	17.08	25.45	30.63	35.47	27.16
V ₃	22.81	30.15	35.09	40.86	32.23
Mean (N)	21.93	29.47	35.42	40.65	

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Levels of Variety (V)	Levels of Nitrogen (N)				Mean (V)
	Control (0)	Nitrogen 120 kg	Nitrogen 120 kg	Nitrogen 120 kg	
V ₁	3.54	4.84	6.02	7.47	5.47
V ₂	2.25	3.40	4.42	5.47	3.89
V ₃	3.15	4.25	5.30	6.40	4.78
Mean (N)	2.98	4.16	5.25	6.45	

Total yield (t ha⁻¹) The varieties maximum yield (5.47 t/ha⁻¹) was recorded in Nasik red followed by Pusa madhavi. Similarly the minimum yield (3.89 t/ha⁻¹) was recorded Pusa red. The result was found similarly by Soleymani and Shahrajabian (2012) revealed that the maximum bulb diameter, bulb height, weight of bulb, total yield and favorite yield was related to application of 200 kg N/ha, and there were no significant differences between 200 or 300 kg N/ha.

IV. CONCLUSION

It was concluded that onion variety Nasik red is the best variety and 120 kg N ha⁻¹ optimum dose for obtaining maximum onion growth and yield under poplar based Agroforestry system.

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