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## Influence of different growing conditions on germination and growth attributes of leafy vegetables

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**Abstract**

Present investigation was laid out in Factorial Randomized Block Design (FRBD) with two growing conditions, open field (G<sub>1</sub>) and polyhouse (G<sub>2</sub>) with four leafy vegetables *viz.*, Amaranthus (V<sub>1</sub>), Beet leaf (V<sub>2</sub>), Coriander (V<sub>3</sub>) and Fenugreek (V<sub>4</sub>) comprising eight treatments replicated thrice. The high germination percentage, and the higher values of growth attributes *viz.*, plant height, No. of branches per plant and No. of leaves per plant minimum days to potential germination (7.75) and days required for horticultural maturity (30.00) were recorded under polyhouse condition as compared to open field conditions. Among, the leafy vegetables, amaranthus recorded higher germination percentage, and showed better performance with respect to most of the growth attributes of the plant. It has also taken less number of days (4.73) for potential germination and days required to horticultural maturity (33.00).

**Keywords:** Open field, polyhouse, leafy vegetables, germination, growth

**Introduction**

The huge gap between present production and future requirements necessitates for high production and productivity of horticultural crops for ensuring availability. The production of quality vegetables and other horticultural crops can be enhanced either by increasing productivity, use of improved cultivar/hybrids and effective production systems, bringing additional land under horticulture crops or by promotion of protected cultivation which can support in adverse climatic conditions. Among horticultural crops, production of vegetables under protected condition has proved the best alternative to use the land and other resources more efficiently. The protected cultivation particularly in vegetable crops has made it possible for year round production and availability of quality produce both for domestic use and export purposes. But the information regarding the performance of different leafy vegetables under protected conditions is very scanty. In recent days farmers are also asking the economics of leafy vegetables under protected conditions. Hence the present investigation was laid out.

**Material and Methods**

An investigation entitled “Influence of different growing conditions on growth, yield and quality of leafy vegetables” was undertaken at the experimental farm, Department of Horticulture, VNMKV, Parbhani, during *Kharif* season, 2016. The experiment was laid out in Factorial Randomized Block Design (FRBD) with two growing conditions, open field (G<sub>1</sub>) and polyhouse (G<sub>2</sub>) with four leafy vegetables *viz.*, Amaranthus (V<sub>1</sub>), Beet leaf (V<sub>2</sub>), Coriander (V<sub>3</sub>) and Fenugreek (V<sub>4</sub>) comprising eight treatments replicated thrice. The leafy vegetables were shown on 20 August 2016 by line sowing methods with 15 cm row to row spacing. The observations on growth attributes *viz.*, germination %, days required for potential germination, plant height, and number of branches plant, number of branches plant and number of leaves plant were recorded and subjected for statistical analysis as per Panse, V. G. and Sukhatme, P. V. (1985).

**Results and Discussion**

**Effect on growth**

The data on germination and growth attributes of different leafy vegetables as influenced by different growing conditions is presented in Table.

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The seed germination of different leafy vegetables sown under different growing conditions was non significantly influenced. However, the parameters like days required for

potential germination, plant height, number of branches and number of leaves per plant showed significant differences.

**Table 1:** Effect of growing conditions on germination and growth attributes of leafy vegetables.

Treatment	Germination (%)	Days to potential germination	Height of plant (cm)	No. of branches Per plant	No. of leaves per plant
<b>Factor A: Growing conditions (G)</b>					
G <sub>1</sub> : Open field	86.14	9.40	27.62	1.05	19.64
G <sub>2</sub> : Polyhouse	90.07	7.75	44.28	1.93	28.03
SE <sub>±</sub>	2.86	0.39	1.13	0.04	0.70
CD at 5%	NS	1.20	3.44	0.14	2.13
<b>Factor B: Leafy vegetables (V)</b>					
V <sub>1</sub> : Amaranthus	91.99	4.73	55.90	2.62	39.43
V <sub>2</sub> : Beet leaf	87.47	5.57	36.16	1.40	9.37
V <sub>3</sub> : Coriander	82.93	18.70	18.70	0.95	19.57
V <sub>4</sub> : Fenugreek	90.02	5.29	29.04	1.00	26.98
SE <sub>±</sub>	4.04	0.56	1.60	0.06	0.99
CD at 5%	NS	1.71	4.86	0.19	3.01
<b>Growing conditions (G) x Leafy vegetables (V)</b>					
G <sub>1</sub> V <sub>1</sub> : Amaranthus in open field	89.97	5.33	40.86	1.85	31.66
G <sub>1</sub> V <sub>2</sub> : Beet leaf in open field	85.86	5.99	29.66	0.99	8.47
G <sub>1</sub> V <sub>3</sub> : Coriander in open field	80.66	20.37	12.27	0.72	15.88
G <sub>1</sub> V <sub>4</sub> : Fenugreek in open field	88.04	5.88	19.68	0.62	22.56
G <sub>2</sub> V <sub>1</sub> : Amaranthus in polyhouse	94.01	4.13	70.93	3.39	47.20
G <sub>2</sub> V <sub>2</sub> : Beet leaf in polyhouse	89.07	5.15	42.65	1.80	10.27
G <sub>2</sub> V <sub>3</sub> : Coriander in polyhouse	85.20	17.03	25.13	1.18	23.26
G <sub>2</sub> V <sub>4</sub> : Fenugreek in polyhouse	92.00	4.70	38.40	1.37	31.39
SE <sub>±</sub>	5.72	0.79	2.27	0.09	1.40
CD at 5%	NS	2.41	6.88	0.28	4.26

### Effect of growing conditions

The data regarding effect of growing conditions i.e open conditions and protected conditions influenced various growth attributes of leafy vegetables showed significant differences. Where significantly maximum germination percentage (90.07), days required for potential (9.40), height of plant (44.28 cm), number of branches per plant (1.93) and number of leaves per plant (28.03) was recorded in poly house conditions while minimum germination percentage (86.14%), days required for potential (7.75), plant height (27.62 cm), number of branches per plant (1.05) and number of leaves per plant (19.64) in open field condition.

### Effect of leafy vegetables

Among the leafy vegetables tried the maximum germination percentage was recorded in amaranthus (91.99), followed by fenugreek (90.02), while it was minimum (82.93) in coriander. Vegetables with maximum days to potential germination (18.70) was required for coriander, followed by beet leaf (5.57), while, it was minimum (4.73) in amaranthus. The maximum plant height and number of branches was recorded in amaranthus (55.90 cm and 2.62), followed by beet leaf (36.16 cm and 1.40), while it was minimum (18.70 cm and 0.95) in coriander, respectively. Regarding number of leaves per plant was recorded maximum in amaranthus (39.43), followed by fenugreek (26.98), while, it was minimum (9.37) in beet leaf.

### Interaction effect

The interaction effect of growing conditions on germination percentage of leafy vegetables was non significant. However, the amaranthus under polyhouse recorded maximum germination (94.01%) and it was minimum (80.66%) in coriander under open field condition. The interaction effect of growing conditions and leafy vegetables on days to potential

germination was found significant. In the treatment combination of polyhouse produced amaranthus required minimum (4.13) days to potential germination, followed by fenugreek grown under polyhouse (4.70) condition, While, it was maximum (20.37 days) in coriander in open field condition. The treatment combination of amaranthus in polyhouse has recorded maximum (70.93 cm) plant height which was followed by beet leaf under polyhouse (42.65 cm), while it was minimum (12.27 cm) in coriander in open field condition. The treatment combination of amaranthus grown under polyhouse condition recorded maximum (3.39) number of branches per plant followed by amaranthus in open field (1.85), while it was minimum (0.62) in treatment combination of fenugreek grown under open field condition. The interaction effect of amaranthus in polyhouse recorded maximum (47.20) number of leaves per plant followed by amaranthus (31.66) in open field, while, it was minimum (8.47) in beet leaf in open field condition. Improved growth parameters in polyhouse might be due to the favourable micro-climatic conditions. Similar, results were reported by Ramesh and Arumugam (2010) [4] observed increases in growth attributes per plant under polyhouse, in tomato, eggplant and chillies. The results are in close conformity with the findings of Dixit (2007) found that the higher number of branches per plant were recorded under protected environment and the same traits were recorded lowest in outdoor cultivation. Similar, results have also been obtained by Cheema *et al.*, (2013) [1], Rana *et al.*, (2014) [5] in tomato; Rao *et al.*, (2013) [6] in capsicum; in tomato and Sam and Regeena *et al.*, (2016) [7] in tomato and capsicum.

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