

EFFECT OF SOWING TIME AND SPACING ON THE PERFORMANCE OF CAPE GOOSEBERRY (*Physalis peruviana* L.) IN CENTRAL UTTAR PRADESH

Deepa H. Dwivedi, Sanjeev Rao, Shreesh Kumar Gautam* and Pawan Kumar

Department of Applied Plant Science (Horticulture), Babasaheb Bhimrao Ambedkar University, Vidya-Vihar Raebareli Road Lucknow-226 025(Uttar Pradesh)India.

*E-mail: gautamshreesh@gmail.com

ABSTRACT : Study on the effect of sowing time and spacing on the performance of Cape gooseberry (*Physalis peruviana* L.) in central Uttar Pradesh was conducted at Horticulture Research Farm, BBA University, Lucknow, India during 2011-12. The experiment was laid out in split plot design with three dates of sowing [D₁ (3 Nov., 2011), D₂ (8 Nov., 2011) and D₃ (13 Nov., 2011)] and four spacing [S₁ (35x90cm), S₂ (40 x 90cm), S₃ (45x90 cm) and S₄ (50x90 cm)] and was replicated thrice. Results revealed that maximum plant height (54.25 cm.), number of leaves/plant (60.50), number of internodes (11.50), diameter of stem (5.65 cm), number of branches/plant (7.88), number of flowers/plant (4.66) and number of fruits (5.55) were obtained at first date of sowing *i.e.*, D₁ (3 Nov., 2011). The spacing of 40 × 90 gave significantly maximum plant height, number of internodes, diameter of stem, number of branches, number of flowers and number of fruits. The treatment D₁S₂ (3 Nov. sowing with 45 x 90 cm spacing) was found to be the best for proper growth and development of the plant and fruiting performance of cape gooseberry.

Keywords : Cape gooseberry, spacing, sowing time.

Cape gooseberry (*Physalis peruviana* L.), a member of family Solanaceae, is an Andean herbaceous crop growing erect up to one meter in height (which may occasionally attain 1.8 m height) grown for its edible fruits. It is an underexploited crop usually cultivated as an annual, but in the absence of frost it can be a perennial (Legge, 1). Fruits are yellow-orange berries (1 to 3.5cm diameter), very juicy, aromatic, with a characteristic bitter-sweet flavour. They are enclosed by the ascent epicalyxes, which give them the shape of a bladder (Morton, 3). Successful cultivation of any crop depends upon several factors *viz.* date of sowing, plant spacing and other cultivation practices. Optimum plant spacing ensures proper growth and development of plant resulting in maximum yield and economic use of land. However, there are no reports regarding optimum sowing date and spacing for the successful cultivation of Cape gooseberry, especially under the agro climatic condition of Central Uttar Pradesh. The present investigation was thus designed to find out the most suitable sowing 'time' and spacing to achieve higher yield and quality fruits in Cape gooseberry.

MATERIALS AND METHODS

The present investigation was carried out during 2011-12 at the Horticulture Research Farm of the Department of Applied Plant Science (Horticulture), Babasaheb Bhimrao Ambedkar University, Lucknow. The experiment was laid out in split plot design with

three dates of sowing *viz.*, D₁ (3 Nov., 2011), D₂ (8 Nov., 2011) and D₃ (13 Nov., 2011) in combination with four spacings *viz.*, S₁- (35 × 90cm), S₂- (40 × 90cm), S₃- (45 × 90 cm) and S₄- (50 × 90 cm). Each combination replicated thrice. Seeds were procured from local reliable sources and 200 seeds were sown in seedling trays (sand: soil, 1: 2, respectively) at different dates (D) as per details given above. Transplanting of seedlings having different vigour and height (according to date of sowing) were carried out in well prepared plots. Transplanting was done in the evening hours and irrigation was done immediately after transplanting. Intercultural operation, irrigation and plant protection measures were adopted as per standard practices. The observations were recorded manually on number of leaves per plant, number of branches per plant, number of internodes per plant, plant height (cm) using a meter scale, stem diameter (cm) using digital vernier calipers (Mitutoyo, Japan) and number of flowers and number of fruits per plant. Average data was analyzed statistically by following procedure of Panse and Sukhatme (4).

RESULTS AND DISCUSSION

Under the present study it was observed that the first date of sowing was found to be significantly better for the vegetative growth (Table 1) as well as flowering and fruiting (Table 2) as compared to other dates of sowing. However, spacing did not have any significant effect on the same. It was observed that treatment

Table 1 : Effect of date of sowing and plant spacing on performance of Cape gooseberry.

Treatments	Plant height (cm) 60 DAT	No. of leaves /plant 60 DAT	No. of inter-nodes / plant 60 DAT	No. of branches/ plant 60 DAT	Stem diameter (cm) 60 DAT	Flowering 60 DAT	No. of fruits/ plant 60 DAT
D ₁ S ₁	51.5	52.05	11.5	7.77	5.43	4.21	3
D ₁ S ₂	54.25	60.5	10.75	7.88	5.5	3.99	5.55
D ₁ S ₃	49.5	59.52	10.77	7.55	5.65	4.66	4
D ₁ S ₄	53.55	59.08	10.45	6.55	5.35	3.33	3.55
D ₂ S ₁	42.5	52.15	9.95	6.33	4.95	2.22	0.77
D ₂ S ₂	40.15	51.65	9.75	6.77	5.1	3.11	0.11
D ₂ S ₃	38	50.29	9.67	7.55	5.05	2.99	0.11
D ₂ S ₄	36.18	50.05	9.25	5.77	4.85	2.88	0
D ₃ S ₁	29.15	42.25	7.73	6.22	4.8	2.33	0
D ₃ S ₂	28.5	40.67	8.1	6.22	4.5	2.66	0
D ₃ S ₃	32.8	46.25	8.15	5.88	4.55	2.44	0.22
D ₃ S ₄	33.15	54.5	9.3	5.77	4.75	2.44	0
CD (P=0.05)							
D	1.07	0.66	0.48	0.11	0.07	0.15	0.67
S	2.04	1.46	1.28	0.26	0.13	0.26	0.57
D × S	3.54	2.52	2.22	0.49	0.23	0.46	0.99

*Sowing dates: 3rd November (D₁), 8th Nov. (D₂) and 13th Nov. (D₃).

*Plant Spacing: 35 × 90 cm (S₁), 40 × 90 cm (S₂), 45 × 90 cm (S₃) and 50 × 90 cm (S₄).

combination D₁S₂ (3 Nov., 2011 sowing with 40x90 cm spacing) performed best as compared to other treatments. The plant height was recorded to be significantly better under treatment D₁S₂ (54.25 cm). However, the maximum number of internodes/plant (7.88) was recorded in treatment D₁S₃. Number of leaves/plant was recorded to be significantly maximum (60.50) under first date of sowing, *i.e.*, 3rd Nov., 2011. The maximum number of branches/plant (7.88) were observed in D₁S₂ followed by D₁S₁ (7.77) and D₁S₃ and D₂S₃ (7.55 each) at 60 DAS. Thus, it is clear that first date of sowing was superior over second and third date of sowing with closer spacing. There was maximum flowering under the treatment D₁S₃ (4.66 flowers/plant) followed by D₁S₁ (4.21) and D₁S₂ (3.99) as compared to other treatments at 60 DAT. In a study on tomato and capsicum, Moldoveanu *et al.* (2) and Satpute *et al.* (5) also concluded that increased plant density enhanced earliness in flowering. This could be due to high temperature and proper utilization of nutrients because of which a greater vegetative growth was shown in treatment with early sowing and close spacing. The first date of sowing was statistically superior, over the second D₂ (8 Nov., 2011) and third

D₃ (13 Nov., 2011) dates of sowing which did not perform well (Table 1). This could be due to low temperatures existing towards mid-late November which delayed the seed germination. Due to the relatively higher temperature (20-22°C) in the beginning of November *i.e.*, D₁ (3rd Nov., 2011) the seed germination was better and in December to January the seedlings were able to attain four leaf stage and were transferred to polybags before their growth became static. However, towards February to March upon return of congenial environmental conditions the seedling growth was revived and a significant improvement in the performance of the seedlings was observed. However, on the later dates of sowing (D₂ & D₃) the temperature being low in late November delayed seed germination and also the vegetative growth of seedling was poor until the return of congenial conditions when the growth was revived. Number of fruits per plant maximum (5.55 fruits/plant) in plants sown on 3rd Nov., 2011 and transplanted at 40 × 90cm followed by D₁S₃ (4.0 fruits) and D₁S₄ (3.55 fruits/plant).

There was a significant effect of sowing time on the performance of Cape gooseberry. The first date of sowing was found good for vegetative growth and development and flowering and fruiting, while second and third dates of sowing performed well in vegetative growth and development but not in flowering. On the other hand, there was no fruiting in second and third date of sowing until 60 DAT. The present investigation has further revealed that spacing did not had any significant effect on plant growth and development of Cape gooseberry. But this needs to be researched further for conclusive results.

Thus, it may be concluded that sowing of seeds on 3rd Nov., and transplanting at 45 X 90 cm spacing (D₁S₂) is best for the proper growth and development and fruiting performance of Cape gooseberry.

REFERENCES

1. Legge, A.P. (1974). Notes on history, cultivation and use of *Physalis peruviana* L. *J. Royal Hort. Soci. (UK)*, **99** : 310-314.

2. Moldoveanu, L. (1977). Space per plant and planting layout of early tomatoes grown without stakes. *Gradinarska i lozarska nauka, Bulgaria*, **14** (4):73-83
3. Morton, J.F. (1987). *Fruits of Warm Climates*. Edited by Morton, J.F. Winterville, NC: Creative Resource System Inc. pp. 430-434.
4. Panse, V.G. and Sukhatme, P.V. (1967). *Statistical Methods for Agricultural Workers*. Indian Council of Agricultural Research, New Delhi. India. 152-15.
5. Satpute, P., Bharad, S.G. and Korde, S. (2013). Effect of spacing and plant architecture on yield and economics of capsicum under net house conditions. *HortFlora Res. Spectrum*, **2** (2): 150-152.



Citation : Dwivedi D.H., Rao S., Gautam S.K. and Kumar P. (2015). Effect of sowing time and spacing on the performance of Cape gooseberry (*Physalis peruviana* L.) in Central Uttar Pradesh. *HortFlora Res. Spectrum*, **4**(1) : 67-69