International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
IJCS 2019; 7(2): 1673-1674

Received: 22-01-2019
Accepted: 24-02-2019

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Performance of capegoosberry (*Physalis peruviana* L.) genotypes for growth and yield parameters

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Abstract
An experiment was conducted to performance of different genotypes for growth and production of capegoosberry (*Physalis peruviana* L.) in the department of Fruit Science, College of Horticulture and Forestry, Jhalarapatan, Jhalawar during 2017-18. The experiment was laid out in Factorial Randomized Block Design with five genotypes as treatments replicated three. The result revealed that, Plant spread E-W (72.92 cm) and N-S (77.07 cm), Total chlorophyll content of leaves (2.93 mg/g), Leaf perimeter (40.56 cm), Minimum days to fruit set (60.85), Minimum days taken to first harvest (118.90) and Duration of harvest (32.88) were recorded in Amb. Sel.-3. Plant height (99.69 cm), The Minimum days taken to flower initiation (53.40), Number of picking (6.82), Number of fruit per plant (66.21), Fruit yield per plant (501.51 g) and estimated yield/ha (136.73) were recorded in Amb. Sel.-4.

Keywords: Capegoosberry, chlorophyll, fruit, TSS, picking

Introduction
Capegooseberry *(Physalis peruviana* L.) is a plant species of the genus *physalis*, native of Peru. It is a member of the plant family solanaceae and somatic chromosome number, 2n=24. It is the only important annual herbaccous, minor tropical fruit crop of India. The fruit is a smooth berry, resembling a miniature, spherical, yellow tomato. The fruit remains enclosed in removed from it's a bladder-like calyx, is about the size of a marble, about 1-2 cm in diameter. Like a tomato, it contains numerous small seeds. It is bright yellow to orange in colour, and sweet when ripe, with a characteristic, mildly tart flavour, making it ideal for snacks, pickles, or jams. It is relished in salads and fruits salads, sometimes combined with avocado. Also, because of the fruit's decorative appearance, popular in restaurants as an exotic garnish for desserts. (Morton, 1987) [5].
The fruit of capegoosberry is berry. It's nutrient value in a 100g serving of Capegooseberriesis 222 KJ (53 K cal) calories. The fruit contain 11.2 per cent carbohydrate, 0.7 per cent fat, 1.9 per cent protein, 5 per cent vitamin, 10 per cent thiamine, 3 per cent riboflavin, 19 per cent niacin, and 13 per cent vitamin C. The analyses of oil from different berry components, primarily its seeds, showed that linoleic acid and oleic acid were the main fatty acids, Beta-sitosterol and Campesterol as principal phytosterols, and the oil contained vitamin K and Beta-carotene.

Material and Method
The experiment was conducted at Instructional Farm of the Department of Fruit Science, Collage of Horticulture & Forestry, Jhalrapatan, Jhalawar, Agriculture University, Kota (Rajasthan), during the year 2017-2018. The experiment was laid out in factorial randomized block design with three replications. Five capegoosberry genotypes Amb. Sel.-1, Amb. Sel.-2, Amb. Sel.-3, Amb. Sel.-4 and Amb. Sel.-5 were selected for this experiment. Seeds are sown in nursery beds and 45 days old seedlings were transplanted in main field at spacing of 60 X 60 cm (plant to plant and row to row). The recommended dosage of N, P_2O_5 and K_2O (100:80:60 kg per hectare) and FYM (15 ton ha^{-1}) with applied at the time of transplanting.

Result and Discussion
Growth parameters
A perusal of the data reveals that genotype had significant effect on plant height. The genotype Amb. Sel.-4 had significantly taller plants (99.69 cm) and shortest plants were (80.89 cm) recorded in Amb.

Sel.-5. A keen observation of the data reveals that effect of genotypes on plant spread East-West (E-W) and North-South (N-S) was significant. Amongst all the genotypes maximum plant spread (E-W) was noted in Amb. Sel.-3 (72.92 cm) and plant spread (N-S) was highest in Amb. Sel.-3 (77.07 cm). The minimum plant spread (E-W) (61.49 cm) was recorded in Amb. Sel.-5 and the maximum plant spread (N-S) (64.42 cm) in Amb. Sel.-5. Among the different genotypes Amb. Sel.-3 recorded significantly higher chlorophyll content (2.93 mg/g) of leaves and minimum chlorophyll content (2.42 mg/g) of leaves was noted in Amb.Sel.-4 as compared to other genotypes. A keen observation of the data reveals that genotypes significantly influenced leaf perimeter. The genotype Amb.Sel.-3 had significantly maximum leaf perimeter (40.56 cm) and minimum leaf perimeter (34.44 cm) was recorded in Amb.Sel.-5.

The variation among genotypes with respect to the growth parameters could be designated to the genetic attributes of respective genotypes. Climatic factors like temperature, humidity, rainfall and photoperiod might had their influence on vegetative growth as reported by Kour *et al.* (2009) [2] in gladiolus and Lakshmi *et al.* (2014) in marigold.

Production parameters

A perusal observation of the data reveals that genotype showed significant differences for days to first flower initiation. Amb. Sel.-4 took the minimum number of days (53.40 days) to 1st flower initiation which was statistically significant over other genotypes while the maximum number of days (61.19 days) to first flower initiation was recorded in Amb. Sel.-1 as compared to other genotypes. Amb. Sel.-3 took the minimum number of days (60.85 days) to first fruit set and maximum number of days (69.56 days) to first fruit set was recorded in Amb. Sel.-1 as compared to other genotypes. The Amb. Sel. -4 took the minimum number of days (118.90 days) taken to first harvest and the maximum number of days (131.41 days) taken to first harvest was recorded in Amb. Sel.-1as compared to other genotypes. The Amb. Sel.-3 had the minimum (32.88 days) duration of harvesting and the maximum duration of harvesting (42.37 days) was recorded in Amb.Sel-5. The Amb. Sel.-4 had significantly highest (6.82) number of picking and the lowest number of picking (3.92) was recorded in Amb.Sel.-5. The number of fruits per plant were significantly maximum (66.21) in the Amb. Sel.-4 and the minimum number of fruits per plant (44.26) were recorded in Amb. Sel.-5. The Amb. Sel.-4 had significantly highest fruit yield per plant (501.51g) while, the lowest fruit yield (268.84 g) was recorded in Amb. Sel-5. The Amb. Sel.-4 had significantly highest estimated yield (136.73 q/ha) while, the lowest fruit yield (73.92 q/ha) was recorded in Amb. Sel.-5

The maximum production of Amb. Sel.-4 might be due to genetic makeup of the genotype. Better availability of nutrients, light, soil moisture and favourable growing condition with genotype, perhaps favoring better carbon assimilation might had been the cause of for maximum production in this genotype. Kumar *et al.* (2011) [4] reported little influence of environmental traits on some of the characters like number of fruits set per shoot, number of fruit per plant, fruit weight, fruit diameter and yield per plant. Sharma and Peshin (1996) [6] advocated the role of prevalence of suitable temperature and climatic condition during the crop growth and development behind maximum number of fruits per plant and consequently higher yield in capsicum.

Table 1: Growth parameter of five genotype of capegoosberry

Genotype	Plant height (cm)	Plant spread (cm)		Chlorophyll Content (mg/g)	Leaf perimeter
		E-W	N-S		
Amb. Sel.-1	96.36	70.20	64.50	2.59	38.54
Amb. Sel.-2	87.90	67.30	66.97	2.47	38.45
Amb. Sel.-3	98.82	72.92	77.07	2.93	40.56
Amb. Sel.-4	99.69	71.27	76.63	2.42	39.51
Amb. Sel.5	80.87	61.49	64.42	2.49	34.44
C.D. (5%)	5.25	4.01	4.01	0.16	2.52
S Em±	2.07	1.51	1.50	0.06	0.94

Table 2: Production parameter of five genotype of capegoosberry

Genotype	Days to first flower initiation	Days taken to fruit set	Days taken to first harvest	Duration of harvest	Number of picking	Number of fruit per plant	Fruits yield per plant (g)	Estimated yield/ha (q/ha)
Amb. Sel.-1	61.19	69.56	131.16	41.50	3.98	64.20	481.61	132.46
Amb. Sel.-2	55.83	64.31	123.71	37.58	4.11	56.54	419.00	115.65
Amb. Sel.-3	54.96	60.85	120.11	32.88	4.80	45.69	334.50	92.73
Amb. Sel.-4	53.40	62.08	118.90	35.36	6.82	66.21	501.51	136.73
Amb. Sel.5	56.30	66.00	127.44	42.37	3.92	44.26	268.84	73.92
C.D. (5%)	1.32	4.04	7.12	2.92	0.30	2.14	12.80	4.12
S Em±	0.53	1.54	2.65	1.09	0.12	0.81	4.72	1.52

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