

Research Article

Evaluation of Capegooseberry (*Physalis peruviana* L.) Under Humid Agro-climatic condition of Jhalawar

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Abstract

A field trial was conducted during 2015-2016, to evaluate the performance of 10 Capegooseberry genotypes under humid Agro-climatic condition of Jhalawar. Capegooseberry genotypes, viz., Amb. Selection-1, Amb. Selection-2, Amb. Selection-3, Amb. Selection-4, Amb. Selection-5, Amb. Selection-6, Amb. Selection-7, Selection-7, Selection-9 and Selection-21 were planted on raised beds at a spacing of 60cm × 30cm during 3rd week of November in a randomized block design with three replications. The result revealed that the maximum plant spread in E-W (146.67cm) as well as N-S (147.0cm) in Selection-9 followed by Selection-7 was recorded. Maximum number of branches per plant was observed in Selection-21 (55.0). The range of leaf perimeter was from 15.11 to 39.93cm in different genotypes. The minimum days taken to first flower initiation was noted in Selection-9 followed by Selection-7 respectively. The genotype Selection-7 was recorded highest fruit weight (21.75g).

The highest estimated fruit yield 119.31q/ha was observed in Selection-7. However, the better quality fruits with respect to highest Total soluble solids, Vitamin-C and Sensory score was observed in Amb. Selection-3. Amb. Selection-3 and Selection-7 can be used as elite selection for the humid Agro-climatic condition of Jhalawar.

Keywords: Capegooseberry, humid, genotypes, fruit yield and quality

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Introduction

Introduction and adaptations of new crops contribute to an increase in diversity of agricultural systems and to offering new alternatives to farmers and markets, with crops that may have a high value and for which generally there is no over production [1]. There are many new crops for tropical and subtropical region that can present desirable attributes to be introduced as new crops in Jhalawar region.

Capegooseberry (*Physalis peruviana* L.) is a member of Solanaceae family. It is indigenous to South America but was cultivated in South Africa in the region of the Cape of Good Hope during the 19th century. Its somatic chromosome number; 2n=24. It is the only important annual herbaceous, minor tropical fruit crop of India. The crop has potential for use as nutraceutical [2].

Fruits of capegooseberry are small with 1-3.5cm in diameter. They are very juicy, aromatic yellow orange in colour and round in shape at maturity; fruit contains many tiny seeds and is covered by large acresent papery epicalyx [3].

Capegooseberry (*Physalis peruviana* L.) has high significance for diversification of fruit bowl in market. It is usually cultivated as a short cycle (3-4 months), annual crop but in absence of frost it can be perennial [4]. In a region of origin it is grown in a wide altitude range from sea level to 3200m, with an intense solar radiation to humid and cloudy environment [5].

In India capegooseberry is mainly grown in Uttar Pradesh, Punjab and Rajasthan. It can be successfully grown and set fruit without problems if the minimum temperature is above 50°C [3].

It contains 2380IU vitamin- A and 49mg vitamin- C, and produces 55 calories energy per 100g of fruits. [6]. Major bioactive compounds of *Physalis* spp., physalins (B, D and F) and glycosides (Myricetin-3-Oneohesperidoside), have been shown to possess anticancer activities. Many medicinal properties have been attributed to Capegooseberry, including antiasthmatic, [7], [8]. Therefore, the present investigation was aim to find out the suitability of newly evolved genotypes of Capegooseberry for humid Agro-climatic condition of Jhalawar region.

Materials and Methods

The present investigation entitled 'Evaluation of Capegooseberry (*Physalis peruviana* L.) Under Humid Agro-climatic condition of Jhalawar' was conducted during the year 2015-16 at Protected Cultivation Unit, College of Horticulture and Forestry, Jhalrapatan City, Jhalawar. Jhalawar falls at 23°45'20" to 24°52'17"N latitude and 75°27'35" to 76°56'46"E longitude in South-Eastern Rajasthan. The district receives on an average 954.7mm rainfall. Maximum temperature range in the summer is 43° – 48°C and minimum 1° - 2.6°C during winter. Capegooseberry genotypes Selection-7, Selection - 9 and Selection-21 were arranged from College of Horticulture, Narsarai, Nalanda (Bihar) and those of Amb. Selection-1, Amb. Selection-2, Amb. Selection-3, Amb. Selection-4, Amb. Selection-5, Amb. Selection-6, Amb. Selection-7, from Bhimrao Ambedkar University, Lucknow (UP).

Capegooseberry is raised by seeds. Seeds were sown in the month of October. The seed germinated within 1 to 2 week. Seedlings were planted on raised beds at a spacing of 60cm × 30cm during third week of November in a randomized block design with three replications.

Data on growth attributes were recorded at culmination stage and fruits and biochemical attributes were recorded at appropriate maturity stage of fruits. The uniform cultural practices were followed in each beds during the course of investigation. For recording data five plants in each replication of the treatment were selected randomly and tagged. As per requirement their various parameters were studied to record data. The various characteristic, viz., plant spread E-W as well as N-S measured with the help of measuring scale, no. of branches by counting the number of branches, leaf perimeter were measured with the help of Vernier calliper. Days taken to fruit set was recorded when the swelling of ovary took place and it attained the size equal to fly head. Days taken to first flower initiation was recorded as the period between the date of planting and the date of first anthesis [9]. Fruit weight of ten randomly selected fruits was determined and the average was worked out. The ripe fruits were harvested at maturity stage. The weight of entire fruits harvested from each bed was recorded for each genotype and accordingly, the yield per hectare was worked out. The chemical constituents like total soluble solids were determined with the help of a hand refractometer, Vitamin -C were analyzed by using standard method suggested by [10] and sensory score are decided through judging committee. The data obtained from the present investigation were subjected to statistical analysis in accordance to [11].

Results and Discussion

The perusal of data value of plant spread E-W as well as N-S, no. of branches per plant and leaf perimeter is presented in **Table 1**. Minimum days taken to first flower initiation, fruit weight, estimated yield, total soluble solids, Vitamin-C and sensory score is presented in **Table 2**. The plant spread in E-W (146.67cm) as well as N-S (147.0cm) was found maximum in Selection-9 followed by Selection-7 while plant spread E-W minimum in Amb. Selection-2 and Amb. Selection-4 (60.77cm) and Plant spread N-S in Amb. Selection-6 (61.78cm). The highest no. of branches per plant was registered in Selection-21 (55.0) followed by Selection-7 (50.67), Selection-9 (50.33) and Amb. Sel.-1(47.0) while, minimum was there in Amb. Sel.-4 (32.67) and Amb. Sel.-5 (32.67). The leaf perimeter was recorded highest in Amb. Sel.-6 (39.93cm) followed by Amb. Sel.-3 (39.47cm), Amb. Sel.-1 (38.70cm) and Amb. Sel.-5 (38.54cm) whereas, Selection-21 (15.11cm) had the minimum leaf perimeter. The variation among genotypes with respect to the growth attributes could be designated to the genetic attributes of respective genotypes [12]. Such types of reason have also been assigned [13] in Capegooseberry and [14] in Guava.

The genotype Selection-9 (30.11 days) had the earliest flower initiation; it was statistically at par with Selection-7, Selection-21, while Amb. Sel.-2 were late to flower. The maximum fruit weight was recorded in Selection-7 (21.75g) and minimum in Amb. Selection-4 (5.63g). The maximum estimated yield was found in Selection-7 (119.31q/ha) and minimum in Amb. Selection-4 (13.53q/ha). The maximum flowering had significant relation to fruits harvest but the total yield may vary due to fruit weight [15]. The genotype Amb. Sel.-3 (15.73 per cent) followed by Amb. Sel.-4 (15.60 per cent) and Amb. Sel.-5 (15.36 per cent) had the highest TSS content. The highest Vitamin-C was recorded in genotype Amb. Selection-3 (32.24mg/100g) while minimum in Selection-21 (22.69mg/100g). Among the Capegooseberry genotypes Amb. Selection-3 (8.25) recorded the highest sensory score. Such variation may be due to environmental condition particularly during the peak growth and development of fruits or due to varietal differences as reported by [13] and [16]. This attributes has also been closely conformity by [17], [18].

However, further studies are required for these selections by devising complete package of practices before recommending superior selection for commercial cultivation in Jhalawar region.

Table 1 Growth attributes of different genotypes of Capegooseberry

Treatments	Plant spread (cm)		No. of branches per plant	Leaf perimeter (cm)
	E-W	N-S		
Amb. Sel.-1	66.72	76.61	47.00	38.70
Amb. Sel.-2	60.77	67.33	44.33	38.51
Amb. Sel.-3	63.00	70.22	33.33	39.47
Amb. Sel.-4	60.77	65.78	32.67	33.51
Amb. Sel.-5	63.11	67.33	32.67	38.54
Amb. Sel.-6	63.33	61.78	40.33	39.93
Amb. Sel.-7	63.44	72.55	33.67	35.51
Selection-7	118.67	117.67	50.67	22.13
Selection-9	146.67	147.00	50.33	24.50
Selection-21	111.33	116.33	55.00	15.11
Mean	81.78	86.26	42.0	32.59
CD at 5%	26.83	23.09	9.98	4.37
SEm±	9.03	7.77	3.36	1.47

Significant at 5% level of significance

Table 2 Production and Quality attributes of different genotypes of Capegooseberry

Treatments	Days taken to first flower initiation	Fruit weight(g)	Estimated yield (q/ha)	Total soluble solids (B ⁰)	Vitamin-C (mg/100g)	Sensory score
Amb. Sel.-1	59.89	6.93	19.10	14.02	31.12	8.00
Amb. Sel.-2	60.55	7.07	14.24	13.83	30.58	7.33
Amb. Sel.-3	57.22	7.40	20.40	15.73	32.24	8.25
Amb. Sel.-4	55.11	5.63	13.53	15.60	26.10	6.58
Amb. Sel.-5	55.65	6.07	16.18	15.36	28.66	6.58
Amb. Sel.-6	58.39	6.53	20.76	14.92	29.02	7.00
Amb. Sel.-7	56.44	6.50	17.06	13.15	29.78	7.75
Selection-7	31.28	21.75	119.31	5.88	23.16	5.83
Selection-9	30.11	17.35	103.71	5.60	25.53	5.83
Selection-21	31.66	11.88	69.97	5.07	22.69	4.75
Mean	49.63	9.71	41.43	11.92	27.89	6.79
CD at 5%	2.53	3	24.62	1.74	4.22	1.38
SEm±	0.85	1	8.29	0.59	1.42	0.46

* Variation being less, not subjected to angular transformation
Significant at 5% level of significance

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