Journal of Pharmacognosy and Phytochemistry

Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
www.phytojournal.com
JPP 2020; 9(2): 1798-1800
Received: 07-01-2020
Accepted: 08-02-2020

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Study of fruiting and yield on different genotypes of custard apple

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Abstract
The present investigation was carried out to studies on fruiting and yield attribute characters of different genotypes of custard apple (*Annona squamosa* L.) during *Kharif* season. The results of the study indicated that, fruiting and yield attribute character studied among different genotypes maximum no. of fruits per shoot (32.74), fruit set per cent (21.37 %), fruit retention per cent (85.53 %), number of fruit per tree (198.38) and fruit yield (27.59 kg/tree) while minimum fruit drop per cent (14.48 %) was observed in GJCA-1. However, days to fruit set (3.80) and fruit weight (148.00 g) were recorded foremost in Sindhan.

Keywords: Fruting in custard apple, yield in custard apple

Introduction
Custard apple (*Annona squamosa L.*) is an arid fruit crop belonging to the Annonaceae family and hardy in nature requires dry climate with mild winter. It can grow successfully upto 100 m above the mean sea level. This family contains over 2000 members spread throughout the world. The other important features of annonaceous fruits are their wider adaptability to soil and climatic conditions and free from pests and diseases. Due to their hardy nature and escape from animal damage, they have become naturalized in many tropical and subtropical parts of the world along with a tremendous scope for further expansion. It is widely distributed through-out tropical South America and also grown commercially in Africa, Australia, China, India, Mexico, Southern United States, Philippine and Thailand. In Gujarat, it is cultivated in Junagadh and Bhavnagar district of saurastra region. Local cultivar Sindhan is most popular in Saurastra region among the growers. Area under custard apple is also increasing in other district like Ahmadabad, Sabarkantha, Banashkantha, Gandhinagar, Anand and Patan. Keeping this in view some important custard apple genotypes grown in the horticultural belt of Gujarat were explored to study the genetic and physio-chemical variability to access their possible use in crop improvement and export oriented production. Therefore, present study was conducted to study on floral biology and fruit setting of different genotypes of custard apple.

Materials and Methodology
Present investigation was carried out to Study on fruiting of different genotypes of custard apple (*Annona squamosa* L.) on 23 to 25 years old trees having uniform growth with spaced at 6 m x 6 m at Fruit Research Station, Madhadi Baugh, Department of Horticulture, College of Agriculture, Junagadh Agricultural University, Junagadh during *kharif* 2017. The experiment was laid out in Randomized Block Design (RBD) with three replications and eight different treatments. The treatment comprised of different Genotypes/Selections and Cultivars viz., Selection-7, Selection-11, Selection-15, Selection-20, Selection-21, Selection-22, GJCA-1 and Sindhan. All the cultural operations like weeding, interculturing and irrigation were adapted uniformly to all experimental plants. Observations of various fruiting parameters viz; days to fruit set, no. of fruits/shoot, fruit set (%), fruit drop (%), fruit retention (%), fruit weight (g), number of fruits/ tree and fruit yield (kg/tree) were recorded. The statistical analysis was done by standard statistical method suggested by Panse and Sukhatme, (1985) [11].

Results and Discussion.
Days to fruit set
There was little variation observed in the regarding days to fruit set in different genotypes of custard apple. It shows number of days require to fruit set after anthesis and among different genotypes, Sindhan took least days to fruit set (3.80). However, maximum days to fruit set was taken by Selection-11 (4.59). Similar result was observed by Walse (1984) [17]. He noted that the number of days required from anthesis to fruit set were almost same (4 days)

in all cultivars studied of annona. This was adjudged by dropping of sepals and petals and also change in colour from yellowish white to deep green colour in the event of fruit set.

No. of fruits/shoot

The observations recorded in the genotypes of custard apple for no. of fruits per shoot revealed that it was maximum in GJCA-1 (32.74) and minimum number of fruits per shoot was recorded in Selection-20 (17.41). Similar finding were observed by Nandkarni *et al*. (2015) [9] reported number of fruits per shoot varies from 11.47 to 28.33 when intercrop with different cover crop in custard apple.

Fruit set (%)

The data pertained of fruit set revealed that maximum fruit set percentage was observed in GJCA-1 (21.37 %) and minimum fruit set was observed in Selection-20 (12.55 %). The present investigation is in confirmation with the results obtained by George and Nissen (1988) [5] who observed that the flowering and fruit set were affected not only by the environmental conditions during flowering but also by vegetative flushing of the tree. George and Nissen (2002) [4] revealed that the overall fruit set was not adversely affected by drought. The low fruit set observed in species of the Annonaceae family is associated with aspects involving source of pollen grains and pollen grains viability (Saaveedra 1977, Rosell *et al*. 1999) [15, 14].

Fruit drop (%)

Among the different custard apple genotypes studied minimum fruit drop percent was recorded in GJCA-1 **(**14.48 %**)**, whereas maximum fruit drop percent was observed in Selection-20 (25.22 %). This results are in conformity with Belotto and Manica (1994) [2] reported cherimoya sensitive to dry winds, which can cause fruit loss. Kumari *et al*. (2016) [8] significant variation in per cent fruit drop was observed among different ber cultivars and it ranged from 52.12 percent to 68.04 percent. Narayan *et al.* (2017) [10] observed fruit drop ranges from 14.72 % to 66.18 % due to influence of temperature in different genotypes of litchi.

Fruit retention (%)

Significant variations were noticed in fruit retention per cent in all the genotypes of custard apple. The maximum (85.53 %) fruit retention recorded in GJCA-1, whereas the minimum fruit retention percentage was observed in Selection 20 (74.78 %). The present investigation is in confirmation with the results obtained by Hiwale (2002) [6] recorded 14.96 % of fruit retention percent in bhalanagar variety of custard apple. Narayan *et al.* (2017) [10] reported fruit retention varies from 22.46 % to 76.47 % among different genotypes of litchi.

Fruit weight (g)

As evident from the data, significant differences were observed with respect to fruit weight in different genotypes of custard apple. Maximum fruit weight was recorded in Sindhan (148.00 g) and lowest was in Selection-15 (130.44 g) The results showed a wide variability in the weight of fruits of different genotypes. Fruit weight seems to be governed by the genetic make up of the selected germplasm. Singh (1992) [16] revealed that the weight of fruits ranged from 120 to 330 g in sithaphal. (Continella *et al.,* 1996) [3] observed in *Annona cherimola* L. that fruit weight ranged from 202 to 310 g. Bankar (1991) [1] observed fruit weight ranged from 185.0 g to 300g.

Number of fruits / tree

The data pertained in regarding number of fruits / tree revealed that maximum number of fruits per tree was observed in GJCA-1 (198.38) and minimum fruits/tree were observed in Selection-20 (166.81). This results are in line with results of Prakash *et al.* (1982) [13] reported variation in number of fruits per tree in various cultivars in different years. Bankar (1991) [1] also reported that in number of fruits per tree, which ranged from 25 to150 in various locations of Rajasthan, Maharashtra and Andhra Pradesh during the survey.

Fruit yield (kg/tree)

Significant variations were noticed in fruit yield (kg per tree) in all the genotypes of custard apple. The maximum (27.59 kg/tree) fruit yield (kg per tree) was recorded in GJCA-1, whereas the minimum fruit yield (kg per tree) was observed in Selection 20 (15.89 kg/tree).

This result are in conformity with Jailkop and Kumar (1996) [7] revealed that six years old plant of Arka Sahan yields 17 kg fruits per plant, Pareek and Sharma (2017) [12] reported *Annona reticulata* yields upto 14.9 kg/tree.

Table 1: Fruiting and yield attributes in different genotypes of custard apple

Selections	Days to fruit set	No. of fruits /shoot	Fruit set (%)	Fruit drop (%)	Fruit retention (%)	Fruit weight (g)	No. of fruits /tree	Fruit yield kg/ tree
Selection-7	4.00	24.57	15.88	18.28	81.72	133.13	152.91	19.48
Selection-11	4.59	27.74	18.96	15.48	84.52	134.26	167.84	22.22
Selection-15	4.22	17.46	17.00	16.59	82.42	130.44	125.03	16.74
Selection-20	4.38	17.41	12.55	25.22	74.78	146.92	116.81	15.89
Selection-21	4.44	17.81	12.78	24.66	75.34	133.84	129.78	16.55
Selection-22	4.30	20.57	14.62	20.12	79.88	128.12	141.56	17.37
GJCA-1	4.00	32.74	21.37	14.48	85.53	139.92	198.38	27.59
Sindhan	3.80	28.36	20.63	15.91	84.10	148.00	173.59	25.66
S. Em. ±	0.11	0.77	0.87	0.94	0.81	2.75	5.20	0.82
C. D. at 5 %	0.34	2.33	2.65	2.86	2.47	8.33	15.78	2.50

Conclusion

The observations recorded from the present investigation revealed that, fruiting and yield attribute character studied among different genotypes maximum no. of fruits per shoot (32.74), fruit set per cent (21.37 %), fruit retention per cent (85.53 %), number of fruit per tree (198.38) and fruit yield (27.59 kg/tree) while minimum fruit drop per cent (14.48 %) was observed in GJCA-1. However, days to fruit set (3.80) and fruit weight (148.00 g) were recorded foremost in Sindhan.

References

1. Bankar GJ. Sitaphal (*A. squamosa* L.) in Rajasthan. Scientific Hort. 1991, 93-98.
2. Belotto FA, Manica I. Clima e Solo. (spainsh) In: Fruticulture-cultivo das Annonaceas (Ata-Cherimolia-Graviola). Edited by I. Manica, Porto Alegre. 1994; 3:13-17.
3. Continella G, Longo S, Zappia R. Fruit and flower biology of cherimoya (*Annona chermola* M.) clones. Italus Hortus. 1996; 3(6):32-38.
4. George AP, Nissen RJ. Effects of drought on fruit set, yield and quality of Custard apple Annona Spp. Hybrid 'African Pride' plants. J Hort. Sci. Biotech. 2002; 77(4):418-427.
5. George AP, Nissen RJ. The effects of temperature, vapor pressure deficit and soil moisture stress on growth, flowering and fruit set of custard apple (*Annona cherimola*, *Annona squamosa*) cv. African Pride. Sci. Hort. 1988; 34:183-192.
6. Hiwale SS. Annual report, Central Institute for Arid Hort., 2002, 12-13.
7. Jailkop SH, Kumar PS. Improvement of some semi-arid fruits through selections and hybridization. *Ann. Rep*. 1995-96, IIHR, Banglore, 1996, 32.
8. Kumari S, Bhatt DJ, Vali VK, Bakshi P, Kumar R. Studies on vegetative growth and floral biology of (*Zizyphus mauritiana* Lamk.) germplasm under rainfed conditions of Jammu, India. Eco. Env. & Cons. 2016; 22(2):641-646.
9. Nadkarni BH. Effect of agro techniques on pollen viability and fruit set in custard apple (*annona squamosa* l.) cv. Balanagar. M.Sc. Thesis, Maharashtra, India, 2015.
10. Narayan L, Kumar AG, Nath V. Fruit Retention in Different Litchi Germplasm Influenced by Temperature. Int. J Curr. Microbiol. App. Sci. 2017; 6(12):1189-1194.
11. Panse VG, Sukhamte PV. Statistical methods for agricultural workers. ICAR, New Delhi, 1985, 145-155.
12. Pareek OP, Sharma S. Systematic Pomology. 2017; 135:1-2.
13. Prakash GS, Reddy BMC, Das HC. Performance of different cultivars of Annona squamosa and some hybrids. Contrubution No. 1149 of Indian Inst. Of Hort. Res. Banglore, 1982, 255.
14. Rosell P, Herrero M, Galan Sauco V. Pollen germination of cherimoya (*Annona cherimola* Mill.). *In vivo* characterization and optimization of *in vitro* germination. Sci. Hort. 1999; 81:251-265.
15. Saavedra E. Influence of pollen grain stage at time of hand pollination as a factor on fruit set of cherimoya. Hort. Science. 1977; 12(2):117-118.
16. Singh SP. Fruit crop for wasteland. Scientific Publisher, Jodhpur, India, 1992.
17. Walse GD. The floral biology of annona (*Annona sqamosa* L.) cultivars under rahuri conditions. M.Sc. Thesis Mahatma Phule Agricultural University, Maharashtra, 1984.