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Genetic variability studies and scope of improvement in Cape gooseberry genotypes in Chhattisgarh

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Abstract
12 genotypes of cape gooseberry were evaluated for 8 qualatative and quantative character to study the genetic variability and association of the traints. The analysis of variance revealed considerable genetic variability in the evaluated genotypes. The GCV and PCV estimates were high for fruit yield/plant, shelf life of fruits (days) indicating better scope for improvement through simple selection. These characters also depicted high estimates for heritability and genetic gain indicating additive type of gene action. Fruit yield/plant showed positive and significant association with number of fruits/plant and fruit weight. Among the genotypes tested for performance studies, IGCG (Sel.-3) and IGCG (Sel-9) recorded the highest fruit yield potential under Chhattisgarh.

Keywords: Cape gooseberry, genetic variability.

Introduction
Cape gooseberry (***Physalis peruviana* L.)** is an annual fruit as well as perennial herb characterized by their persistent calyx which completely encloses the golden yellow color fruit. Cape gooseberry is a member of family Solanceae with chromosome number 2n = 24.The crop is said to be native of Peru and Chile and reportedly cultivated in South Africa, Kenya, India, Egypt, New Zealand, The Caribbean, South East Asia, California, Columbia and Hawaii (Legge, 1974; Klinac, 1986; Chattopadhyay, 1996) [2, 3]. The species peruviana produce edible fruits commonly known as Golden berry and Winter cherry. In India, it is a minor fruit which fetches very high price in market. The chief source of commercial supply of fruits is reported from Uttar Pradesh, Punjab, Andhra Pradesh, West Bengal and Madhya Pradesh, Rajasthan especially from peri-urban areas. The ripe fruits are eaten fresh or can be used for preparation of excellent quality of jam for which it is also called the 'Jam Fruit of India' (Majumdar, 1979). Cape gooseberry is used in folk medicine for treating diseases such as malaria, asthma, hepatitis, dermatitis, diuresis and rheumatism (Wu, Ng, Chen, *et al*., 2004; Wu, Ng, Lin, *et al.*, 2004). In addition to have a future as a fresh fruit, the fruit can be consumed in many ways as an ingredient in salads, cooked dishes, dessert, jam, natural snack and preservers. Its extract can also be used for preparing a health drink (Popenoe *et al*., 1990; Rehm & Espig, 1991) [6, 5]. Evaluation of genotypes to assess the existing variability is considered as preliminary step in any crop improvement programme. In order to pursue an effective breeding programme, the present investigation was carried out to gather information on genetic variability, heritability, correlation and path analysis for different characteristics of Cape gooseberry.

Materials and methods
Location of experiment
The genotype were sown using randomized block design with three replication at PFDC (Precision Farming Development Center), Department of Fruit science, Collage of Agriculture, Raipur, Chhattisgarh(India) during kharif season, 2016-17.

Plant materials and source
The present investigation comprised 12 genotypes of Cape gooseberry collected from various parts of Chhattisgarh states.

Observations

Observations on five randomly selected plants from each replication were recorded for plant height (cm), initiation of flowering (days), number of branches per plant, number of fruits per plant, fruit weight per plant (gm.), fruit yield per plant (kg), total soluble solid (%), shelf-life of fruits(days), and fruit yield (t/ha).

Results and Discussion

A wide range of phenotypic variability was observed for all the character, among genotypes studied. The analysis of variance for 8 characters indicated highly significant of PCV were greater than the GCV for all the traits which is suggested the role of environmental in the expression of the characters. High phenotypic and genotypic of variation were observed for Fruit yield per plant (32.34 and 30.84), Plant height (10.05 and 10.04), Number of fruits per plant (10.8 and 10) and Shelf-life of fruits (13.12 and 9.84). Low phenotypic and genotypic of variation was observed for days of flower initiation (2.9 and 2.81) and Fruit weight (gm.)/plant (4.03and 2.61). Among the characters studied, highest heritability estimate was recorded for Plant height (0.99), days of flower initiation (0.94), Number of fruits per plant (0.85), and Number of branches per plant (0.79) Whereas, low heritability estimates was observed for Fruit yield per plant (0.9) and TSS (0.7). The highest estimate of genetic advance was recorded for Plant height (26.27) Followed by Number of fruits per plant (15.99) and Days of flower initiation (3.71). Fruit weight per plant (0.34) had lower genetic advance values.

Conclusions

The analysis of variance indicated that mean sum of square due to genotypes were significant for all the characters. The phenotypic coefficient of variation was in general higher than the genotypic coefficient of variation for all the characters, which may be due to environmental effect. High phenotypic and genotypic of variation were observed for Fruit yield per plant, Plant height, Number of fruits per plant and Shelf life of fruits. The Plant height Followed by Number of fruits per plant and Days of flower initiation showed high heritability coupled with high genetic advance.

Table 1: Genetic parameter of variation for fruit yield and its components in Cape gooseberry

S. No	Parameters	Range			Cofficient of Variation (%)		h2 (b) (%)	Genetic Advance	G.A.as % of mean
	Character	Minimum	Maximum	Mean	GCV	PCV			
1	days of flower initiation	63.33	70	65.82	2.81	2.9	0.94	3.71	5.63
2	plant height (cm)	98.88	144.77	127.18	10.04	10.05	0.99	26.27	20.65
3	no of branches/plant	10	13.11	11.58	8.5	9.55	0.79	1.81	15.63
4	no of fruits/plant	70.59	94.37	83.79	10	10.8	0.85	15.99	19.08
5	fruit weight (gm.)/plant	9.22	10.27	9.66	2.61	4.03	0.42	0.34	3.51
6	TSS	11.22	14	12.46	6.53	7.76	0.7	1.41	11.31
7	shelf life of fruits(days)	6.22	9.11	7.62	9.84	13.12	0.56	1.61	21.12
8	fruit yield/plant	1.5	3.9	2.52	30.84	32.34	0.9	1.53	39.23

References

1. Legge AP. Notes on the history, cultivation and uses of (*P.peruviana* L.) J Royal Hort. Soc. 1974; 99(7):310-314.
2. Klinac DJ. Cape gooseberry (*Physalis Peruviana*) production systems. New Zeeland J Exp. Agric. 1986; 14:425-430.
3. Chattopadhyay TK. A Text Book of Pomology. Kalyani Publishers, New Delhi (India), 1996, Vol.-II.
4. Wu SJ, Tsai JY, Chang SP, Lin DL, Wang SS, Huang SN and Ng LT. Supercritical carbon dioxide extract exhibits enhanced antioxidant and anti-inflammatory activities of Physalis peruviana. Journal of Ethnopharmacology. 2006; 108:407-413.
5. Rehm S, Espig G. "Fruit". In *The Cultivated Plants of the Topics and Subtropics, Cultivation, Economic Value, Utilization*, Edited by: Sigmund, R. and Gustav, E. Germany: Verlag Josef Margraf: Weikersheim. 1991, 169-245.
6. Popenoe H, King SR, Leon J, Kalinowski LS. "Goldenber ry (Cape Gooseberry)". In *Lost Crops of the Incas, Little-known Plants of the Andes with Promise for Worldwide Cultivation*, Edited by: National Research Council. Washington, DC: National Academy Press, 1990, 241-252.