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ORIGINAL ARTICLE

Mean Performance Of Major Morphological Characters In Varieties Of Capsicum Annuum And Capsicum Frutescens.

S.S.PHULARI

Principal
MSPM's SENIOR COLLEGE OF ARTS, SCIENCE, COMMERCE COLLEGE,
(D. G. TATKARE COLLEGE)
Mangaon 402 104-Raigad, Maharashtra, India.
mspmmangaonseniorcollege@gmail.com

Abstract:
Five varieties of Capsium annuum (Black short, Deonur Bydagi, Jwala, pant C-1 and Sankeshwari) and Lavangi variety of Capsicum frutescens shown wide differences in their genotypic constituents reflected by morphological status. Major characters of growth and yield such as plant height, plant spread, leaf area, days for flowering (50% bloom) fruit number per plant, fruit length, fruit breath, pedicel lenght, fruit size fresh wt of fruit, sundried fruit weight and seed weight are much influenced by genotype . These parameters may considered important by breeder while breeding for improved quality in Capsicum.

Variety Jwala appears to be a better parent, when breeding programme stresses improvement in fruit yield.

INTRODUCTION:-

Breeding for improved quality initially requires a definition of the major parameters that contribute to it. To understand the growth and yield, mean performance of major morphological characters in varieties of Capsicum annuum and Capsicum frutescens was carried out.

Growth of plant reveals its physical status in the environment. Phenotype of plant is specific to species to species and variety to variety. In Capsicum varieties, growth can be worked out by using number of important criteria like plant height, plant spread, leaf area, days for flowering (50% bloom), fruit number per plant, fruit length, fresh and dry weight of fruit per plant and seed weight per 100 g dry fruits. As Capsicum is an economically important plant, yield in terms of sundried red fruit weight per plant is most important criteria to study.

This information will be useful for plant Breeders, Physiologist and food Technologists.

MATERIALS AND METHODS :-

In kharip season varieties of Capsicum annuum viz. Black short, Deonur Byadagi, Jwala, Plant C-1 and Sankeshwari and C. frutescens variety Lavangi sown in experimental field to study growth and yield. Randomized Block Design was set. Three replications of each variety were made consisting of twenty plants. Plant to Plant and row to row distance was kept 50 cm and 70 cm respectively.

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Growth and yield was observed by following twelve characters viz. Plant height, plant spread, leaf area, days for floweing (50 % bloom), fruit number per plants, fruit length, pedicel length, fruit breadth, fruit size (lxb), fresh weight of fruit per plant, seed weight per 100 g dry chillies and yield per plant (in terms of weight of sundried fruits per plant). Five randomly selected plants were used recording the data in replication from each variety. Averages per plant basis were worked out to show the mean performance of each variety for each parameter.

RESULTS AND DISCUSSION:-

Mean performance of varieties of Capsicum annuum viz. Black short, Deonur Byadagi, Jwala, Plant C-1 and Sankeshwari and C. frutescens variety Lavangi for plant height, plant spread, leaf area, days for flowering (50 % bloom), fruit number, fruit length, pedicel length, fruit breadth, fruit size, fresh weight of fruits per plant, yield per plant i.e. sundried fruit weight per plant and seed weight per 100 g dry chillies has been depicted in Table I.

TABLE I
Mean performance of varieties of Capsicum annuum and C. frutescens

No	Characters	Capsicum annuum					C. frutescens
		Black short	Deonur Bydagi	Jwala	Pant C-1	Sank shwari	Lavangi
1	Plant height (cm)	55.06	62.53	44.86	46.72	65.8	53.8
2	Plant spread(cm)	132.23	173.66	112.18	160.10	156.30	162.95
3	Days of flower (50% bloom)	47	64	56	49	58	53
4	Leaf area (cm)	24.18	13.91	15.42	15.58	18.18	9.94
5	Fruit number	62	72	90	93	74	146
6	Fruit length (cm)	5.84	14.54	14.57	9.33	21.22	5.72
7	Pedicel length (cm)	2.44	3.36	3.14	2.94	3.76	2.1
8	Fruit breadth(cm)	4.67	3.84	2.51	3.31	2.76	2.62
9	Fruit size (cm^2)	27.27	55.83	36.42	30.88	58.56	14.98
10	Fresh wt of Fruit/plant (g)	150.38	227.47	212.50	215.62	195.30	161.07
11	Sundried fruit Wt/plant	39.18	58.53	61.49	59.44	52.52	45.04
12	Seed wt/100g Sundried fruit	53.05	39.17	45.17	47.42	40.21	52.23

1.PLANT HEIGHT-

Plant height is a good indicator of the process of growth and development (Strogonov, 1964). In present investigation variety Sankeshwari has maximum height (65.8cm), Black short (55.06cm), C. frutescens variety Lavangi (53.85cm) and Pant C-1 (46.72cm). The minimum height was observed in variety Jwala (44.86cm).

According to Hosmani (1982), there is a lot of variation in height of Capsicum plants. Our findings are also in conformatory with his findings. Hosmani (loc.Cit.) observed that C. Frutescens grow upto a height of 2 meter while all C.annuum varieties are less than one meter in height. In present investigation also varieties of C. annuum attains almost less than one meter height. But height of plants of C. frutescens variety Lavangi does not grow up to a height of two meter as ovserved by Hosmani(loc. Cit.)

2.PLANT SPREAD -

Plant spread is much influnced by genotype differences (Hosmani, loc. Cit.). High spread is preferred to prevent fruits coming in contact with soil surface and for easy cultural operations.
The plant spread in varieties of Capsicum under study is in the rang of 173.66 to 112.18 cm. Variety Deonur

Bydagi and variety Jwala showed highest and lowest plant spread respectively amongst of Capsicum under study. Capsicum fruitscens variety Lavangi (162.95cm), C. annuum varieties Pant C-1 (160.10 cm) Sankeshwari (150.30 cm) and Black short (132.33 cm) showed medium plant spread.

Variation in canopy structure affect the crop in two important ways : first and most obviously, through light interception and distribution and second, through correlated physiological, developmental and morphological changes (Evans, 1975). Consequently, canopy design not only has to consider potential biological yield, but also important on crop management and economic end product. The present investigation gives an idea about varietal variation in plant spread of Capsicum. It has been suggested that an erect canopy is likely to be more beneficial for crops with axillary inflorescence such as soyabeans, peas and cotton which bear fruit at many nodes. It is inreresting to note here that variety Deonur Byadagi has attained the peak in spread which can be exploited in breeding programme.

3.LEAFAREA -

Green leaf area of crop determines the percent of incident solar radiation intercepted by the crop canopy and there by influences canopy photosynthesis, evapotranspiration and final yield (Dale et al., 1980).

It is ovserved that (Table I) variety Black short has shown 24.18 sq. cm leaf area which is of higher magnitude and in variety Lavangi, it is of 9.94 sq. cm leaf area which is of lowest magnitude . Variety Sankeshwari has 18.18 sq.cm. leaf area, variety Jwalaand Pant C-1 has shown more or less equal leaf area of 15.42 sq.cm and 15.58 sq.cm respectively. 13.91 sq.cm leaf area is recorded in variety Deonur Byadagi.

Veerapa (1980) reported the total leaf area per plant varied between 1000 to 3000 sq. cm. In present work, average single leaf area was worked out and not the total leaf area of the plant. However, it indicates varietal difference in average leaf area.

Unit leaf area is of course a valid basis for assessing the effects of short term fluctuations in environmental varieables on photosynthesis. However, its use as a sole basis of comparing Pmax of genotypes can be misleading (Charles, Edwards and Luding, 1975). The most practical procedure might be to use several bases in addition to leaf area such as fresh and dry weight.

4.DAYS FOR FLOWERING (50% BLOOM) -

In present investigation the days for flowering (50% bloom) was observed after transplantation. It was found that variety Black short blosoms within 47 days, variety Pant C-1 required 49 days, Capsicum frutescens variety Lavangi flowers within 53 days, variety Jwala blooms after 56 days, variety Sankeshwari requires 58 days while variety Deonur Byadagi requires 64 days to flower after transplantation.

According to Veerapa (1980) days required to flowaring in chillie crop mainly depends on the variety. Hosmani (1982) was of same opinion. Veerapa (1980) recorded that the sweet pepper variety flowered at 27 days after transplanting while Ruby King took 43 days for flowering . In present study we also found varietal variation for days for flowering (50% bloom) in chillie crop. It is also revealed that variety Black Short is early while variety Deonur Byadagi is late flowering amongst the Capsicum varieties under study. However, the earliness is one of the important attribute to be included in crop improvement genetic programme.

5.FRUIT NUMBER PER PLANT -

The present investigation shows that fruit number per plant in varieties of Capsicum under study varies from 146 fruits per plant in variety Lavangi to 62 in variety Black short. It is followed by 93 fruits in Pant C-1, 90 fruit s in Jwala, 74 fruits in sankeshwari and 72 fruits per plant in variety Deonur Byadagi.

Thus, it is ultimate fact that there is varietal variation present in chillie crop under study. According to Sharma et al. (1981) small fruit size associated with more number of fruits and reverse is the relationship in large sized fruit variaties. Our observations are in agreement with the above findings. Capsicum annuum varieties set one fruit per axil, however, multiple fruitedness of Capsicum frutescens, if introduced, promises to increase the yield per plant.

6.FRUIT LENGTH -

In case of chillie fruits, length is having market value because normally medium to long fruits are preferred by customers (Hosmani, 1982). According to Pochord (1966) extra large fruit is undesirable because it is usually associated with lower productivity, irregular fruit shape and poor quality. It is observed from the

present investigations that variety Sankeshwari has highest fruit length which measures to 21.11 cm, while lowest fruit length recorded in variety Black short and Lavangi with value of 5.84 cm and 5.72 cm respectively. Variety Deonur Byadagi, Jwala and Pant C-1 having 14.54, 14.57 and 9.33 cm fruit length respectively.

Padda et al. (1970), Hosmani (1973) and Pillai and Bellukutty (1978) observed the varietal variation in fruit length in chillie crop. Our results have shown the varietal variation in said character in Capsicum varieties under study.

7.PENDICEL LENGTH -

A long slender pedicel is desirable for expansion of the developing fruit. In present investigation, the highest pedicel length is seen in variety Sankeshwari with value of 3.76 cm. It is then followed by 3.36 cm pedicel length in Deonur Byadagi, 3.14 cm in Jwala, 2.94cm in Pant C-1,
2.44 cm in Black short and 2.1 cm pedicel length in Lavangi.

It is interesting to note that the pedicel length shows the same pattern of variation as that of fruit length.

8.FRUIT BREADTH -

Fruit breadth and leaf area appears to provide a good selection index for fruit yield (Sharma et al. , 1981) . It is revealed from the observations (Table I) of fruit breadth of varieties of Capsicum that there is varietal variation. The range of variation is 4.67 in variety Black short to 2.5 cm in variety Jwala. Variety Deonur Byadagi, Pant C-1, Sankeshwari and Lavangi have shown 3.84, 3.31. 2.76 and 2.6cm fruit breadth respectively.
Veerapa (1980) studied varietal performances of bell pepper under Dharwad condition and recorded 3.1 to 5.2 cm varietial variation in fruit breadth.

9.FRUIT SIZE -

Tirumalachar et al. (1957), Legg and Lippart (1966), Nandan and Pandya (1980), Sharma et al. (1981) and Bavaji and Murty (1982) observed that fruit size is related with fruit yield.

In the present investingation fruit size of Capsicum varieties ranges in between 14.98 to 58.56 cm. The maximum fruit size has been recorded in variety Sankeshwari and minimum in that of variety Lavangi. According to Sharma et al. (1981) small fruit size associated with more number of fruits and reverse is the relationship in large sized fruit varieties . Our results are in agreement with their findings.

10.FRESH WEIGHT OF FRUITS PER PLANT -

In the present investigation fresh weight of fruits per plant varies from 150.38 to 227.47 g. The maximum fresh weight of fruit per plant has been recorded in variety Deonur Byadagi and minimum in that of variety Black short.

Padda et al. (1970) observed 113.7 to 399.8 g fresh weight of fruits per plant of chillie varieties in Punjab. Mathai et al. (1977) recorded 271 to 369 g fresh weight of fruits per plant of chillie selection during summer, 1975. Our results also indicate the varietal variation in fresh weight of fruits per plant in varieties of Capsicum under study.

11.YIELD (SUNDRIED FRUIT WEIGHT) PER PLANT -

Fruit yield is ecomimically important point while dealing with chillies. In the present investigation, yield per plant is in the range of 39.18 to 61.49 g in varieties of Capsicum under study. Variety Jwala and Black short were two extremes of highest and lowest yield respectively.
Yield is a complex character and depends on number of parameters. In present investigation yield per plant shows varietal variation in varieties of Capsicum.

12.SEED WEIGHT PER 100 G SUNDRIED FRUITS -

Rylski (1973) resported that seeds influences the shape and size of fruit.The seed weight per 100g sundried

fruits of varieties of Capsicum under study showed varietal variation in the range of 53.05 g in variety Black short to 39.17 g in variety Deonur Byadagi. Variety Lavangi, Pant C-1, Jwala and Sankeshwari contain 52.23, 47.44, 45.17 and 40.21 g seeds per 100 g sundried fruits respectively.

Hosmani (1982) recorded in some cultivars of Capsicum, seeds form 50% of the whole fruit. In present investigation the range of seed weight per 100 g sundried fruit is 39.17 to 53.05 g. In conclusion of overall evaluation of different growth parameters studied in these five varieties of Capsicum annuum and one variety of C. frutescens discussed above is made that they establish wide differences in their genotypic constituents reflected by morphological status. Variety Jwala appears to be a better parent, when breeding programme stresses improvement in fruit yield.

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