

## COMPARATIVE GENETIC VARIABILITY WITHIN THE OPEN-POLLINATED SEEDLINGS OF CERTAIN VARIETIES OF BLACK PEPPER

(*PIPER NIGRUM* L.)

Efficiency of selection in crop plants depends on the amount of inherent variability present in them. Variability expressed by the open-pollinated progenies of pepper is being exploited in the improvement of the crop. Even though allogamy is almost absent in pepper under open-pollination, the heterozygosity of the plant yields considerable variation in the progenies. The present investigation is intended to estimate and compare the amount of variability shown by the open-pollinated progenies of certain varieties of pepper for seedling characters.

The data utilized for this study were generated from the open-pollinated seedlings of certain pepper varieties, recorded on the seedling characters viz., number of leaves, plant height and internodal length (topmost internode), at the Pepper Research Station, Panniyur during 1982. The seedlings were two months old and constituted 50 numbers each of varieties Uthirenkotta, Arakkulam Munda, Munda, Karimundi, Kalluvally (Ptb) and Panniyur 1. The mean, variance and coefficient of variation were computed by routine methods. Heterogeneity of variances of the varieties for each character was tested by the following formula :

$$X^2 = \left[ (\sum k_r) \log_e \bar{S}^2 - \sum k_r \log_e s_r^2 \right] / \left[ 1 + \frac{1}{3(n-1)} \left[ \sum \frac{1}{k_r} - \frac{1}{\sum k_r} \right] \right]$$

where  $k_r$  is the degrees of freedom for the variances,  $S_r^2$  the estimates of variances,  $s^2$  the pooled estimate of variances and  $n$  the number of varieties. The resultant value is referred to  $X^2$  tables with  $n-1$  degrees of freedom for testing heterogeneity.

The mean values, variances and coefficients of variation were worked out for varieties and characters (Table 1). The number of leaves ranged from 2.98 in Arakkulam Munda to 4.33 in Munda. Of the varieties, Arakkulam Munda showed maximum coefficient of variation (42.06%). In general, coefficients of variation differed only moderately among varieties for this character. The expression for plant height was maximum in Uthirenkotta (9.39 cm) and minimum in Karimundi (3.47 cm). Coefficients of variation varied between 23.23% and 38.15% for the varieties. Internodal length was the highest for Uthirenkotta and the least for Panniyur 1. It may be noted that open-pollinated seedlings of Panniyur 1 produced internodes considerably shorter than the seedlings of other varieties under study. It may be recalled that one particular demerit of Panniyur 1 is its long internodal length. The considerable reduction observed in the size of internode was possibly due to the predominant expression of the internode character of variety Cheriakaniakadan, in the segregating generation of Panniyur 1. Cheriakaniakadan was the male parent of Panniyur 1, and endowed with remarkably short internodes.

The internodal length in pepper is of economic interest as the shorter internode tends to increase the total number of spikes. The observation that the

Table 1  
Mean and dispersion values for various characters

Variety	Number of leaves			Plant height (cm)			Internodal length (cm)		
	Mean	Variance	Coefficient of variation (%)	Mean	Variance	Coefficient of variation (%)	Mean	Variance	Coefficient of variation (%)
Uthirenkotta	4.32	2.66	37.78	9.39	7.97	30.06	1.19	0.46	57.36
Arakkulam Munda	2.98	1.57	42.06	6.41	4.80	34.20	0.86	0.16	46.18
Munda	4.33	2.86	39.07	4.02	2.35	38.12	0.96	0.05	21.92
Karimundi	3.89	2.54	40.97	3.47	1.73	38.15	0.88	0.07	29.19
Karuvally (Pt)	3.72	1.90	37.10	3.66	1.50	33.43	0.85	0.08	34.02
Panniyur 1	4.24	2.02	33.54	4.42	1.05	23.23	0.41	0.08	66.91

seedlings of Panniyur 1 showed very short internode coupled with the high coefficient of variation (66.91 %), enhances the possibility of incorporating this desirable trait into the genetic constitution of Panniyur 1. Therefore, selection for high yielding types from among the segregating population of Panniyur 1 would be remunerative, if the internodal length expressed in the seedling stage has some bearing on the internode of mature vine also.

The variances for the characters, plant height and internodal length were highly heterogeneous ( $P < 0.01$ ) whereas number of leaves showed homogeneity. The extent of contribution of environment to the observed variability was uniform for the varieties, since the different varieties were in compact space under uniform conditions. Therefore, the observed variability can be considered as rough estimates of the relative magnitude of genetic variability within various varieties. The variety Panniyur 1 showed the most variability for internodal length, as well as the least variability for plant height. When variety Munda was found to possess the least amount of variability for internodal length, it has shown very high variability with respect to plant height. In general, the internodal length varied within the varieties more than other characters. Variability studies attempted here are based only on the seedling characters. However, it may be assumed to be an index of the overall heterozygosity present in the crop.

#### സംഗ്രഹം

പന്നിയൂർ കുരുമുളക് ഗവേഷണ കേന്ദ്രത്തിൽ, ചില ഇനം കുരുമുളകുകളുടെ തുറന്ന പരാഗണരീതിയിൽ (open-pollination) ഉൽപ്പാദിപ്പിക്കപ്പെടുന്ന സന്തതികളുടെ സ്വഭാവങ്ങളിലുള്ള വ്യതിയാനത്തിന്റെ അളവുകൾ താരതമ്യപ്പെടുത്തുകയുണ്ടായി. മുട്ടുകൾ തമ്മിലുള്ള ദൈർഘ്യം (internodal length), ചെടിയുടെ ഉയരം എന്നീ സ്വഭാവങ്ങളിലുള്ള വ്യതിയാനം തോത്, വിവിധ ഇനങ്ങളിൽ പ്രകടമായി വ്യത്യാസപ്പെട്ടിരിക്കുന്നതായി കണ്ടു. പന്നിയൂർ 1 എന്ന ഇനത്തിന്റെ സന്തതികളിൽ മുട്ടുകൾ തമ്മിലുള്ള ദൈർഘ്യം വളരെ കുറവായും അതേസമയം, വ്യതിയാന അളവ് വളരെ കൂടുതലായും കണ്ടു. അതിനാൽ പന്നിയൂർ 1 ന്റെ ഇപ്രകാരമുള്ള സന്തതികളിൽ മുട്ടുകൾ തമ്മിലുള്ള ചെറിയ ദൈർഘ്യം ഉള്ള ഇനങ്ങൾക്ക് വേണ്ടിയുള്ള നിർധാരണചരം വളരെ കാര്യക്ഷമമായിരിക്കുന്നതാണ്.

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