

Research Notes

**HETEROSIS IN PANNIYUR 1 BLACK PEPPER (*PIPER NIGRUM* L.)**

The variety Panniyur 1 in black pepper was evolved at the Pepper Research Station, Panniyur, Kerala as a cross between 'Uthirenkotta' and 'Cheriakaniakadan'. Information on the extent of heterosis in the hybrid variety for various characters is still lacking.

Fifteen plant and berry characters were studied. Sample size taken for all the characters except yield was 25. The yield was based on the performance of eight vines in each cultivar for ten years. Heterosis was assessed over the better parent (heterobeltiosis) (Fonseca and Patterson, 1968) and the mid-parental value. The significant differences between the mean values were tested by 't' test.

Hybrid variety showed positive and significant heterosis ( $P < 0.01$ ) over better parent for most of the characters (Table 1). In the case of internode length, such superiority could be seen only in comparison to mid-parental value. A negative and significant heterosis over mid-parental value was seen only for under-developed berries per spike. Berry characters, 1000 green berry volume, 1000 green berry weight and 1000 dried berry weight were all intermediate and not significantly different from the mid-parental value.

Panniyur 1 showed positive heterosis for length of spike, developed berries and bisexual flowers per spike as well as for yield. Among the productive characters, only berry characters were found to be intermediate. Internode length in the hybrid was greater than the parents and showed significant difference compared to mid-parental value. Internode length is thought to be inversely related to the yield. Further, relationship of foliar characters, length of leaf, breadth of leaf, area of leaf and length of petiole with the yield is not yet clear. However, it might be assumed that the luxuriant nature of these vegetative characters reflect the general vigorous nature of the hybrid variety.

The magnitude of heterosis for yield observed in this instance was very high in comparison to that in other crops as seen compiled by Rai (1979). The expression of heterosis in a particular hybrid is sometimes taken as a measure of genetic diversity present. In this case, parents chosen were very divergent and found to belong to two distinct groups as seen by study using discriminant function (Ibrahim *et al.* 1984). Sprague (1966) reported that the existence of heterosis in a hybrid usually demonstrates that some degree of genetic diversity is existing. The high heterosis seen for yield in this case is chiefly attributable to the overall combination of the favourable cumulative effects of a number of componental characters.

Table 1  
Heterosis of various characters in Panniyur-1

Characters	Uthiren- kotta	Cheria- kania- kadan	Panni- yur 1	M. P.	Heterosis over	
					BP (%)	MP (%)
Length of internode (cm)	8.07	7.59	10.63	7.83	31.72	25.76*
Length of leaf (cm)	11.89	12.24	14.86	12.07	21.41**	
Breadth of leaf (cm)	6.03	6.18	10.82	6.10	75.08**	
Area of leaf (cm <sup>2</sup> )	84.7	67.3	113.2	76.0	33.65**	
Length of petiole (cm)	2.0	2.2	3.2	2.1	45.45**	
Developedberries/spike	5.02	14.62	125.47	9.82	758.21**	
Underdevelopedberries/spike	3.56	10.77	4.72	7.17	—	—34.11**
Male flowers/spike	0.03	0.07	0.02	0.05	-20.00	-60.00
Bisexualflowers/spike	0.01	36.83	129.18	18.47	250.75**	
Femaleflowers/spike	95.57	5.90	0.08	50.76	—98.73**	
Length of spike (cm)	12.27	7.95	17.09	10.11	39.28**	
1000 green berries volume (cc)	185	110	145	147.5	—	-1.69
1000 green berry weight (g)	206	123	155	164.5	—	—5.78
1000 dried berry weight(g)	71.00	33.76	54.72	52.38	—	4.47
Green spike yield per vine (g)	715	2212	6125	1463.5	176.90**	

BP = Better Parent

\* Significant at P < 0.05

MP = Mid-parental value

\*\* Significant at P < 0.01

Panniyur 1, the first artificial hybrid to be produced in black pepper, showed considerable superiority in yield as well as certain component characters. The present study indicated that there is good scope in exploiting heterosis in black pepper. The great genetic diversity present in the crop can especially be made use of in obtaining high yielding cultivars, through planned breeding programmes. Once such cultivars are evolved, they can be maintained by means of a sexual propagation easily.

Pepper Research Station  
Panniyur, Taliparamba 670141. India

V. Sukumara Pillai  
K. K Ibrahim  
S. Sasikumaran

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