



Panniyur-6 and Panniyur-7 — high yielding black pepper selections for Kerala

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Black pepper is one of the important foreign exchequer of spices produced and exported from India. Ninety six percent of the area under cultivation and production of black pepper is from Kerala. But the productivity in our country is very low owing to the lack of high yielding superior varieties. Clonal selection, selection from open pollinated progenies and exploitation of hybrid vigour are practiced in black pepper to locate superior genotypes.

A clonal material collected from the farmer's field of Taliparamba Taluk of Kannur district of Kerala was identified as outstanding in all the attributes based on the yield performance. This identified accession No. PRS 22, a type of Karimunda, designated as Karimunda III was evaluated and compared for yield performance with that of existing high yielding cultivars and varieties and released as Panniyur-6 in 2000 for cultivation in all black pepper growing tracts of Kerala (Table 1). Panniyur-6 (accession PRS 22) recorded the maximum green berry yield in four years from 1994-95 to 1998-99. This shows that the genotype Panniyur-6 is stable in mean green berry yield irrespective of the years and seasons.

Table 1. Yield performance of Panniyur-6 and other pepper genotypes at PRS Panniyur, Kerala over 5 years

Acc.No.	Name	Mean green berry yield (kg/vine)					Mean
		94/95	95/96	96/97	97/98	98/99	
PRS 6	Balankotta I	1.77	1.96	2.50	1.67	3.45	2.27
PRS 17	Kalluvallv IV	0.98	1.40	3.40	6.50	2.90	3.04
PRS 18	Kaniakadan	0.48	1.68	1.06	7.05	4.47	2.95
PRS 21	Karimunda II	1.29	1.91	2.03	5.40	4.56	3.04
PRS 22	Panniyur-6	2.17	4.40	4.08	10.20	5.10	5.19
	Karimunda III						
PRS 35	Munda	0.89	1.42	2.24	4.95	3.59	2.62
PRS 36	Mundi	0.19	4.9	6.9	2.20	5.71	2.66
PRS 61	Valli	0.08	0.44	3.75	4.50	7.05	3.16
PRS 44	Panniyur I	0.25	2.13	3.00	4.87	3.20	2.69
PRS 20	Karimunda	0.68	1.24	1.50	2.35	0.39	1.23
	CD (0.05)	0.52	1.50	2.18	3.50	3.14	

Variation occurring in a vegetatively propagated crop like black pepper is also through open pollinated progenies and with natural mutation. In open pollinated progenies, there will be abundant variation due to its heterozygosity and hybrid vigour can be exploited through selection from that population. The seedling progenies obtained from Kalluvally type IV, a popular cultivar of North Kerala were subjected to evaluation. Selection was based on the seedling vigour and short internodal length and such seedlings were transplanted to the main field. Observations on yield and other desirable characters like number of spikes per vine, spike length, number of berries per spike, 1000 berry weight and volume and dry recovery percentage were recorded regularly. The qualitative characters viz., percentage of oleoresin, piperine and volatile oil were also analysed. Data obtained from farmer's field is presented in Table 2. Based on above observation a seedling progeny of Kalluvally type IV designated as culture I558, found to be superior to other open pollinated progenies was released as Panniyur-7 in 2000. Black pepper a highly heterozygous vegetatively propagated crop is characterized by its high fertility and seed set. This unique feature offers a fair chance to identify high yielding superior genotypes by selecting from open pollinated progenies. High amount of genetic variability exists within open pollinated progenies of black pepper [1]. The seedling progenies of three different cultivars of black pepper exhibited considerable amount of variability [2]. The main morphological features of the above two selections Panniyur-6 and Panniyur-7 are presented in Table 3.

Panniyur-6 (PRS 22) is a high yielding clone coming under medium maturity group with an average yield of 6460 kg green pepper/ha and 2127 kg dry pepper/ha. The vine is vigorous in growth characterized by more number of spikes/vine (2073) with bold and medium sized berries. One of the attractive e of this

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Table 2. Yield performance of Panniyur-7 (culture 1558) over 3 years

Year	Mean green berry yield (kg/vine)	No. of spikes per vine	No. of berries per spike	Spike length (cm)	Dry (%)
1996/97	2.42	340.0	124	21.20	32.50
1997/98	5.32	685.0	135	18.50	34.08
1998/99	4.85	566.0	140	18.60	34.13
Mean	4.20	530.33	133	19.43	33.57

variety is the high setting percentage (99%) and compactly arranged berries of medium spike length (7.92 cm). In black pepper, the spike number, spike length and reproductive characters have direct effect on green berry yield [3]. Panniyur-6 can be identified by its ovate leaf from other genotypes of this cultivar and faint pink pigmentation of shoot tip. The dry recovery percentage is 32.93. The medium sized berries have 120cc volume and 130g weight per 1000 berries. Among the attributes like oleoresin, piperine and volatile oil, it has recorded 8.27%, 4.94% and 1.33% respectively. Panniyur-6 showed a field tolerance to the major diseases and pests of black pepper like, *Phytophthora* foot rot, fungal pollu and insect pollu. The mean number of vines affected by foot rot disease is 2.25 percent whereas the mean number of berries affected by fungal pollu and insect pollu are 0.42 and 2.35 per cent respectively.

The most distinguishing feature by which Panniyur-7 (culture 1558) can be identified is by the purple pigmentation of the shoot tip in contrast to the greenish yellow or faint pink coloured shoot tips of other cultures. It belongs to medium maturity group with vigorous growth of vine. It tolerates drought and adverse climatic conditions. The unique feature of this culture is that it has got a very long straight spike with mean spike length of 19.4cm. The arrangement of berries on the spike is very compact (133 berries/spike). Because of high productive bisexual flowers (98%) with a high setting percentage of 91.5%, the berries are compactly arranged on the spike. Longer spikes with heavier berries resulted in higher productivity in black pepper [4]. The mean number of spikes per vine is 530 with a mean dry recovery percentage of 33.57. The size of the berries is medium with 1000-berry weight of 150g and 1000 berry volume of 140cc. This culture has an average dry pepper yield of 1410 kg/ha with a potential yield of 2770 kg dry pepper/ ha. It showed a field tolerance to *Phytophthora* foot rot, fungal pollu and insect pollu (1.88, 0.34 and 9.58 percent). When the quality parameters were analysed, this culture is having high piperine content of 5.57 per cent. The

Table 3. Morphological attributes of Panniyur-6 and Panniyur-7

1.	Plant height	2.9m (range 2.0 to 4.5m)	5.30 m (range 3.5 to 6.5m)
2.	Leaf shape	Ovate	Roughly cordate
3.	Shoot tip colour	Faint pink pigmentation	Purple pigmentation
4.	Spike length	7.92 cm	19.40 cm
5.	Spike shape	Straight	Straight
6.	Spike composition		
	Bisexual flowers	99.00%	98.00%
	Female flowers	0.50%	1.50%
	Male flowers	0.50%	0.50%
7.	Setting percentage	99.00%	91.50%
8.	Berry size	Bold and medium	Medium
9.	No. of spikes/vine	2073	530
10.	No. of berries/spike	53	133
11.	1000 berry volume	120 cc	140 cc
12.	1000 berry weight	130g	150g
13.	Av. Yield (mean over 3 years)	6460 kg green pepper/ha 2127 kg dry pepper/ha	4200 kg green pepper/ha 1410 dry pepper/ha
14.	Potential yield	3359 kg dry pepper/ha	2770 kg dry pepper/ha
15.	Dry recovery %	32.93%	33.57%
16.	Oleoresin content	8.27%	10.61%
17.	Piperine content	4.94%	5.57%
18.	Volatile oil present	1.33%	1.5%
19.	% vines infected by foot rot	2.25	1.88
20.	% berries infected with fungal pollu	0.42	0.34
21.	% berries infected with insect pollu	2.35	9.58

volatile oil and oleoresin content were 1.5 and 10.61 per cent respectively. The elite clonal selection Panniyur-6 and Panniyur-7 are tolerant to adverse climatic conditions, major pests and diseases.

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