

## **A HIGH YIELDING SELECTION OF BLACK PEPPER VARIETY : KOTTANADAN**

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A critical survey was undertaken in 1982 in the main Kottanadan growing areas of Quilon and Trivandrum districts in Kerala. Based on the general vigour and yield performance, 100 vines were selected preliminarily. Detailed observations were recorded on morphological characters, spike characters as well as filling percentage. The best 49 selections among the above were multiplied and planted in a completely randomised design (CRD) with two controls viz Panniyur-1 (released variety) and local Kottanadan, with eight replications. The trial was conducted for six years. Among the 49 selections evaluated, selection number 2559 recorded the maximum yield potential of 15200 kg as against 10432 kg by Panniyur-1 and 5552 kg by local Kottanadan green pepper/hectare/year. It also recorded 4.8% essential oil, 15.4% oleoresin and 3.0% piperine content. Considering the high yield potential and better quality, this selection 2559 (PLD-2) was recommended for release in Trivandrum and Quilon districts of Kerala during 1995.

### **INTRODUCTION**

Indian spices are recognised for their quality, pungency and flavour and hence they are the most preferred in the world market. Black pepper (*Piper nigrum L.*) is the most commonly used spice. At present India contributes about 20% of the world production of pepper. But the national productivity in India has not been on par with the other major pepper producing countries. The major constraint is the non-availability of high yielding varieties. Till 1990 only three high yielding varieties viz., Panniyur-1, Subhakara (KS 14) and Sreekara (KS 27) have been released.

\* Kottanadan is a variety preferred by the pepper farmers in the southern districts of Kerala. It is a regular bearing variety and comes up very

well in open as well as shade conditions. This variety is characterised by its medium to long spikes with a very high setting percentage and high oleoresin content. Hence attempts were made to evolve improved lines by exploiting this locally adopted variety.

### **MATERIALS AND METHODS**

A preliminary survey was undertaken in Kollam and Thiruvananthapuram districts of Kerala State during 1982. Eighteen gardens were visited and 100 high yielding healthy vines selected in the age group of 10 to 15 years. Based on the yield characters such as the number of primaries per standard, number of spikes and number of laterals with and without spikes in one metre band width at manageable height, number of spikes per 100 nodes selected at ran-

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dom, spike length of 25 spikes selected at random and filling percentage of the above 25 spikes recorded at the time of preliminary survey, 49 superior lines were selected and an yield evaluation trial was laid out during 1983 at Central Plantation Crops Research Institute (Research Centre), Palode in a completely randomised design with two controls (Panniyur-1 - released variety and Kottanadan - bulk) and eight replications. The vines were trained on *Glyricidia* and grown under rainfed conditions. The trial was conducted for eight years and the data on yield characters collected for six years from 1986 to 1991, were analysed. The quality parameters such as piperine content, oleoresin and essential oil were also estimated for all the above lines.

## RESULTS AND DISCUSSION

The results of the yield characters recorded at the time of preliminary survey are

summarised and presented (Table 1). As the number of primary vines trained to a standard varied from 1 to 6, to get uniform values for a realistic comparison, adjusted values for a single vine were arrived at for number of spikes, number of laterals with and without spikes in a band width of one metre at manageable height and four number of spikes in 100 nodes selected at random. From the data it could be seen that the variability of the characters observed were very high. Hence all the vines which yielded above the population mean were selected for the preliminary yield evaluation trial.

It was observed that among the 49 selections, 19 lines including one control (Panniyur-1) yielded above 1.91 kg of green pepper per vine per year - the mean yield of all the selections for six years. Among the 19 selections, selection number 2559 yielded consistently better during all the six years with a mean

Table 1. Variation in morphological characters observed during the initial survey

Characters studied	Range	Mean	S.D.	CV %
Number of primaries per standard	1 - 6	3.00	-	-
Number of spikes in one metre band*	23.00 - 522.00	108.92	82.848	76.063
Number of laterals with spikes in 1 metre band*	4.50 - 87.00	11.93	9.407	78.852
Number of laterals without spikes in 1 metre band*	0.00 - 11.00	2.39	2.294	95.983
Number of spikes per 100 nodes selected at random*	5.80 - 71.00	25.96	14.808	57.042
Spike length (cm)	3.20 - 14.50	9.86	2.477	25.134
Filling percentage	40.73 - 82.57	62.72	9.440	15.052

\* Adjusted values for a single primary vine

Table 2. Yield of Kottanadan pepper selections

Variety	Average fresh pepper yield / vine (kg.)						Average
	1986	1987	1988	1989	1990	1991	
2559	2.25**	3.28*	5.33**	5.41*	5.79*	7.78**	4.97**
Panniyur-1 (Control-1)	2.46	3.03	2.76	1.80	2.56	1.88	2.42
Kottanadan bulk (Control-2)	1.35	0.86	0.74	0.93	0.61	0.27	0.79
Population mean	0.88	1.62	1.80	2.22	2.56	2.35	1.91
Std. deviation	0.50	1.01	1.60	1.66	1.97	2.27	1.36
C. V.	56.82	62.35	68.89	74.77	76.95	96.60	71.58

\* Above population mean + 1 S.D.

\*\* Above population mean + 2 S.D.

yield of 4.97 kg of green pepper per vine as against 2.42 kg in Panniyur-1 and 0.79 kg in bulk Kottanadan (Table 2). The results of the quality parameters estimated shows that selection number 2559 yielded 3% piperine content, 15.4% oleoresin and 4.8% essential oil which are much higher than the values obtained for both the controls (Table 3).

**Table 3. Quality parameters**

Selections	Piperine content (%)	Oleoresin (%)	Essential oil (%)
Selection 2559	3.0	15.4	4.8
Panniyur-1 (Control-1)	2.0	13.7	3.3
Kottanadan-bulk (Control-2)	1.8	12.0	2.8

The estimated yield per ha was worked out based on the cumulative average yield, at the rate of 1600 vines per ha and the yield potential worked out based on the highest yield recorded in a single vine (Table 4). It is evident from the table that selection number 2559 could produce an yield of 7952 kg of green pepper per ha as against 3872 kg by Panniyur-1 and 1264 kg by bulk Kottanadan. Similarly this selection possesses an yield potential of 15200 kg green pep-

per per ha which is about 5000 kg more than Panniyur-1 and about 10,000 kg more than bulk Kottanadan.

**Table 4. Estimated average yield and yield potential**

Selection	Average* yield (kg /ha)	Yield** potential (kg /ha)
2559	7,952	15,200
Panniyur-1	3,872	10,432
Kottanadan bulk	1,264	5,552

\* Based on cumulative average at the rate of 1,600 vines/ha

\*\* Based on highest yield recorded from a single vine

The yield and quality attributes of this selection were compared with seven released varieties (Table 5). Among the eight cultivars compared, selection number 2559 ranks fourth in estimated yield and third in yield potential. In the case of quality attributes it is the best in oleoresin having the maximum value of 15.4 per cent.

Some of the important morphological features of this selection were also recorded (Table 6). Considering the high yield potential and quality parameters, this Kottanadan selection (selection no. 2559) was recommended for release for general cultivation at the thirteenth

**Table 5. Quality attributes of released varieties and selection - 2559**

Variety	Dry yield (kg /ha)		Quality attributes		
	Estimated	Potential	Piperine content (%)	Oleoresin (%)	Essential oil (%)
Panniyur-1(1971)*	1242	8800	5.30	11.80	3.50
Panniyur-2(1989)	2570	3313	6.60	10.90	—
Panniyur-3(1989)	1953	3269	5.20	12.70	—
Panniyur-4(1989)	1277	2443	—	9.20	—
Subhakara (1990)	2352	4487	3.40	12.40	6.00
Sreekara (1990)	2677	4200	5.10	13.00	7.00
Panchami (1991)	2828	6528	4.70	12.50	3.40
Selection no.2559	2363	4731	3.00	15.40	4.80

Source : National Research Centre for Spices (1991)

\* Figures in brackets indicate the year of release

**Table 6. Morphological features of selection-2559**

Morphological characters	Observations
Leaf length (cm)	15.48
Leaf breadth (cm)	8.43
No. of flowers per spike	61.10
Spike composition (%)	
Bisexual flowers	95.10
Female flowers	4.30
Male flowers	0.60
Fruit set (%)	87.70
Berry size (volume of 1000 berries-ml)	122.70
Berry weight(weight of 1000 berries-gm)	122.30
Yield per vine (green pepper, kg)	
Average for six years	4.97
Maximum	9.50
Crop duration (flowering to maturity in days)	180 - 200
Dry recovery (%)	31.13
Reaction to pests and diseases	
Pollu beetle	susceptible
<i>Phytophthora capsici</i>	susceptible
Root knot nematode	susceptible
Burrowing nematode	susceptible

biennial group meeting of spices research workers held at Jaipur during 1995. This selection would result in a drastic boost in pepper production especially in Thiruvananthapuram and Kollam districts of Kerala state.

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