

BLACK PEPPER CULTIVARS SUITABLE FOR VARIOUS REGIONS

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Black pepper of commerce is the dried mature fruit of the perennial climber, *Piper nigrum* L. The moist evergreen forests of Western Ghats in India is considered to be the centre of diversity of black pepper. Large population of black pepper in its wild form still thrives well in these forest areas. The cultivated black pepper might have originated from the wild ones as a result of continuous selection followed by vegetative propagation. This process of domestication and selection might have started independently in many centres eventually resulting in the evolution of a large number of cultivars. Every traditional pepper growing area has its own popular cultivar which were usually named after the locality, or based on a typical plant character or named after an individual. More than seventy cultivars are recognised in Kerala alone. In recent years the majority of the old and poor yielding cultivars are being rapidly replaced by better yielding ones.

Pepper can be grown from sea level to an altitude of about 1200 m above MSL. The submontaneous tracts of Western Ghats at an elevational range of 400 to 1000 m above MSL are ideal for the cultivation of black pepper. The crop tolerates temperatures between 10-40°C. A well distributed rainfall with high temperature is ideal for the cultivation of black pepper.

More than 99% of black pepper cultivation in India is confined to the states of Kerala and Karnataka. The pepper growing areas in these states fall in the following groups.

- (1) Coastal and midland areas where pepper is grown in almost every house compound as a 'home stead' crop;
- (2) Slopes and valleys of the Western Ghats where pepper is grown on a plantation scale either as a monocrop or as a pepper based mixed cropping system;
- (3) At higher altitudes where pepper is grown as an intercrop in coffee and cardamom plantations;
- (4) In the plains and valleys as a mixed crop in the arecanut gardens especially in the Karnataka state.
- (5) In the Malnad areas of Karnataka where pepper is grown as a mixed crop along with areca, with or without other crops such as cocoa and cardamom and other miscellaneous crops.

It is apparent that different cultivars behave differently in different agroclimatic conditions. If we are to maximise the pepper yields in any area it is important to identify the cultivars suitable for that particular area. An effort has been made in this paper to identify some of the promising cultivars suitable for the different pepper growing areas. The suggestions that follow are not the result of any experimental trials but based mainly on the observations made during the germplasm collection surveys conducted by the authors in various pepper growing areas.

Cultivars suitable for different agroecological regions

- (1) Coastal and midland areas where pepper is grown as a homestead crop. Panniyur 1, Karimunda, Arakkulam Munda, Kalluvally, Kuthiravally, Kottanadan, Aimpiriyam, Narayakkodi.
- (2) Hilly regions of Western Ghats. Karimunda, Panniyur-1, Kottanadan, Aimpiriyam, Kalluvally, Neelamundi, Kuthiravally, Vellanamban.
- (3) At high altitudes as an inter crop in coffee & cardamom plantations. Karimunda, Jeerakamundi, Panniyur-1, Kottanadan, Kalluvally, Neelamundi.
- (4) In areca gardens in the plains as a mixed crop. Panniyur 1, Karimunda, Kottanadan, Kalluvally, Aimpiriyam, Kuthiravally.
- (5) Malnad areas of Karnataka. Panniyur 1, Uddakere, Malligesara, Karimunda, Kottanadan, Aimpiriyam, Kuthiravally.

Under the multiple cropping system prevalent in Uttakra Kannada and Shimoga districts of Karnataka where pepper is grown as a mixed crop with arecanut and often with cocoa and cardamom also incorporated, the suitability of Panniyur 1 is to be confirmed because of the heavy shade. The performance of pepper in general is found to be very poor under the areca-cocoa-pepper mixed cropping system. No cultivar is available at present which performs well under excessive shade prevalent under the coffee, cardamom, and areca-cocoa fields.

Brief notes on some of the more important cultivars mentioned in the list above are given here.

Karimunda

This is the traditional cultivar of the Meenachal Taluk of the erstwhile Travancore state. This cultivar is popular throughout Kerala, the settlers have taken it from its original home to various areas as they moved into the hilly areas in search of land and food. It is a good and regular yielder, characterised by small more or less ovate to elliptical leaves, with short to medium long spikes and high setting. It performs well from plains to higher elevations, both under monocropping and mixed cropping. Karimunda is relatively more shade tolerant than most other pepper cultivars, as it is performing well under the shade conditions prevailing in the coffee and cardamom estates. This cultivar is also relatively more tolerant to water stress as we observed during our surveys. The cultivar is susceptible to the quick wilt organism as well as to the burrowing nematode causing the slow wilt symptoms. Considerable variability was met within this cultivar and a selection programme is in progress at the National Research Centre for Spices at Calicut to evolve high yielding uniform lines. Karimunda is a medium quality cultivar having 11% oleoresin, 4.4% piperine and 4% essential oil.

Kottanadan

Kottanadan is the traditional cultivar of the Nedumangad Taluk of the Trivandrum district. It is a good yielder and is one of the best in terms of quality with 17.8% oleoresin, 6.6% piperine and 2.5% essential oil. It is a vigorous vine with ovate leaves and medium long spikes having good filling. The dry pepper recovery from the cultivar also is high. It performs well in the plains of the South Kerala and also in the areca gardens of Nedumangad Taluk as an intercrop. It is found giving very good yield in the hilly tracts of Nagercoil at an elevation of about 650-750 m when intercropped with cloves. It is worthwhile to introduce this cultivar in the areca based multiple cropping system prevalent in the Karnataka state. A selection work in Kottanadan has been initiated at the NRCS for selecting high yielding Kottanadan lines for popularisation.

Kuthiravally

A South Kerala cultivar not as common as Karimunda or Kottanadan. This is often grown mixed with other cultivars in many gardens in Calicut, Wynad and Idukki Districts. The studies of the Pepper Research Station, Panniyur indicated that Kuthiravally is the most consistent yielder when compared to Panniyur 1 or Karimunda. Some farmers reported an alternate bearing habit for this cultivar. It is a vigorous vine with ovate to widely ovate leaves, long spikes, medium sized berries and having high dryage. It is also a high quality cultivar having 15% oleoresin, 6% piperine and 4.5% essential oil. The cultivar is also known by the name 'Thommankodi' in some area in the Calicut District. This cultivar was found to perform well in certain areas of Wynad and Idukki districts, indicating its adaptiveness to high elevations. Excellent bearing was noticed in vines trailed on arecanut trees in a few areca gardens in Calicut district.

Narayakkodi

Originally Narayakkodi is a cultivar of the Central Travancore area (Kottayam Dist). This is still a popular cultivar in many areas in Kottayam district and in many other places it is grown along with various other cultivars. It is a moderate yielder, but is considered a sturdy one. The cultivar has characteristic wavy margined leaf, short spikes and thick setting as a result of which the spikes often assume a characteristic twisting. Berries are small having high dry pepper recovery. Its performance under high shade conditions is not clearly known. It comes up well at various elevations from sea level to the high elevations of Idukki District. It is a medium quality cultivar having 10.85% oleoresin, 5.4% piperine and 4.0% essential oil. Narayakkodi is relatively tolerant to *Phytophthora*, the organism causing the quick wilt.

Aimpiriyam

This cultivar is grown mainly in the Pulpelly areas of Wynad Dist. It is a good yielder and produce pepper of high quality having an oleoresin of 15.0%, piperine 4.7% and essential oil 2.6%. The leaves are large, spikes medium to long with thick setting, as a result of which the 5-rowed arrangement of the berries become very distinct, and hence the name Aimpiriyam. This cultivar was found to give excellent yield in the Pulpelly areas of Wynad district and also in certain areas in the Kodagu district where it is known as Pirimunda. Its performance under the mixed cropping system prevalent in the Malnad areas of Karnataka is not known but as a high yielding cultivar having good quality this needs to be popularised in the various pepper growing areas.

Panniyur 1

A hybrid cultivar and a high yielder under ideal conditions. In plains under light shade it performs best. It was found giving excellent yield under the high elevations of Idukki, Wynad and Kodagu districts but the yield declines under heavy shade and is less suitable for multiple cropping. The cultivar was found to give high yield in the maidan areas of Karnataka when mixed with areca palms. But in such cases there should be sufficient light penetration for good bearing. Hence older plantations where areca palms are widely spaced are more suitable. Where spacing is less pepper may be planted only in the alternate rows. Panniyur-1 was found to give excellent yield when trailed over coconut palms of about 30 years or more. It is a vigorous climber with large leaves, long spikes, and good setting. The pepper is of medium quality having the following composition: Oleoresin 9.52%, Piperine 3.6% and essential oil 3.5%.

Malligesara

It is very popular cultivar in all over the maidan areas of Karnataka where ever pepper is grown. Its performance was found to be less satisfactory in the plains. It produces medium large leaves and spikes with good setting. The pepper is of medium quality. As the traditional cultivar of the maidan areas it was found giving good yield as a mixed crop in areca

gardens, though more recently this cultivar has been replaced with other better yielders.

Uddakere

A popular good yielder which is a traditional cultivar in the Sirsi taluk of Uttara Kannada district. This cultivar seems to be adapted for the mixed cropping system prevalent in this area and is often the choice of farmers to grow in areca gardens. It has medium long to long spikes having good setting. But in the areca-cocoa-pepper mixed cropping system its yield was found to decline probably due to the high intensity of shade. It is a good quality pepper having oleoresin of 14.6%, piperine 2.6% and essential oil of 2.4%.

Vellanamban

It is a moderate yielder, originally from the central Kerala areas, but now cultivated mainly in the Idukki district. The farmers have reported good yield for

this cultivar as a monocrop. Farmers are also of the opinion that this is less affected by the drought compared to Panniyur-1.

Conclusions

An attempt has been made here to identify promising and adaptable cultivars suitable for various pepper growing areas in Kerala and Karnataka. The suggestions included in this have come mainly from the surveys conducted by the authors. In the absence of any definite data from well laid out experiments in the different pepper tracts it is always worthwhile to include four or five high yielding cultivars in the cropping system. This will give better assurance against the varied agroecological conditions as well as against the incidence of pests and diseases. A combination of Panniyur-1, Karimunda, Kottanadan and Kuthiravally seems to be the ideal combination for most of the pepper growing areas and under most of the cropping systems prevalent in the Kerala and Karnataka states.

PEPPER VARIETIES RECOMMENDED FOR DIFFERENT REGIONS IN KERALA & KARNATAKA

The Group Meeting on Strategy for Production of Planting Materials held at the Central Plantation Crops Research Institute, Kasaragod on January 1988 under the Chairmanship of Dr. K.L. Chadha, Deputy Director General (Horticulture), Indian Council of Agricultural Research after critically examining the performance of different varieties of pepper grown in Kerala and Karnataka has made the following recommendations in respect of the varieties suitable for cultivation.

KERALA

Variety	North Kerala	Central Kerala	South Kerala
Aimpiriyam	✓
Kalluvally	✓
Karimunda	✓	✓	..
Kottanadan	✓
Kottanadan selections (CPCRI—R.S. Palode)	✓
Kuthiravally	✓	✓	..
Neelamundi	..	✓	..
Vellanamban	..	✓	..

The hybrid variety Panniyur-I and Karimunda selections are being cultivated in almost all the districts in the state. However, the yield of Panniyur-I is less when it is grown under shade or as mixed crop.

KARNATAKA

Variety	Uttara Kannada	Dakshina Kannada	Kodagu
Karimunda	..	✓	✓
Kalluvally	..	✓	✓
Malligesara	✓
Uddarage	✓	..	✓

The variety Panniyur-I is recommended for cultivation in the entire pepper growing areas in Karnataka, although its yield is less under shade.

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