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A Note on the Nutrient Composition of Fruiting Branches of Black Pepper *(Piper nigrum* L.)

Black pepper (*Piper nigrum* L.,) is an important cash crop of India, cultivated mostly in Kerala State. Dewaard (1964) and Sim (1971, 1974) from Malaysia have reported the nutrient composition of the black pepper. However, information on the nutrient composition of the plant under South Indian conditions is scanty. This note reports the results of preliminary investigation on this aspect.

Typical samples of lateral fruiting shoots of one year growth were collected from well maintained and mature pepper vines of Panniyur I, a hybrid and Kalluvally, a typical local variety grown in laterite soils. The dry matter of the samples was determined on oven-dry basis and they were analysed for N, P, K, Ca and Mg according to Jackson (1967). The results are presented in Fig. I and Table 1.

The results, in general, indicate that K is maximum in the stem, followed by leaf and fruit spike; N is more or less equal in the leaf and fruit spike but higher than the stem; P in all the components is almost equal and least of all the constituents; and Ca and Mg contents are maximum in the leaf and least in the fruit spike. Panniyur I, a promising hybrid appears to be more nutrient exhausting than the typical local variety, Kalluvally for N, P, K, Ca and Mg. On the assumption that the lateral fruiting shoots would form the greatest part of the bearing vine (Sim, 1971) the data in the Table I seem to afford a

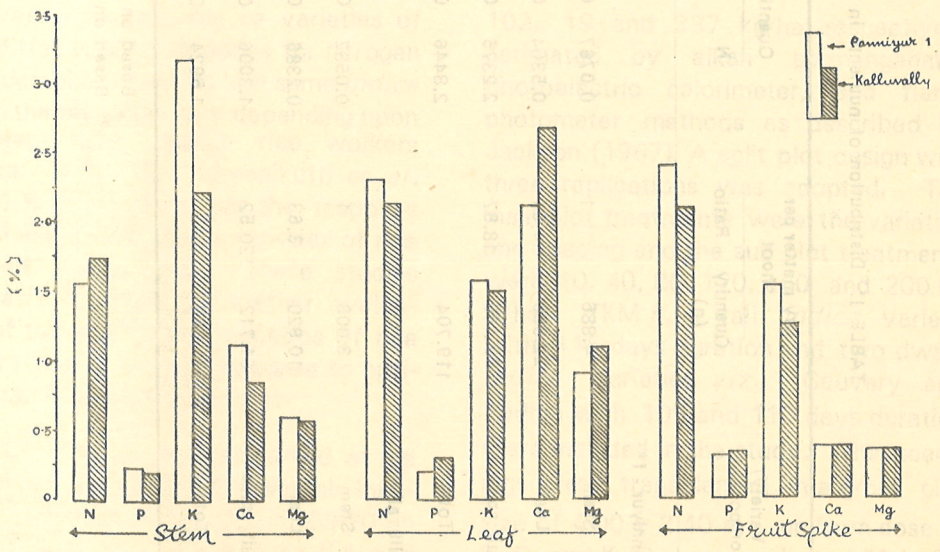

Fig. 1. N, P, K, Ca and Mg contents of stem, leaf and fruit spike.

TABLE 1. Distribution of nutrients in the lateral fruiting shoots (one-year growth) of black pepper.

Variety/ Component	Dry matter per shoot		Quantity of nutrients in dry matter (g)					Sequence of distribution of nutrients.
	Quantity (g)	Ratio	N	P	K	Ca	Mg	
Panniyur - I*								
Stem	4.886	1	0.0767	0.0110	0.1574	0.0562	0.0311	K > N > Ca > Mg > P
Leaf	22.669	4.64	0.5304	0.0469	0.3649	0.4859	0.2048	N > Ca > K > Mg > P
Fruit spike	92.149	18.87	2.2375	0.2737	1.3998	0.3231	0.3047	N > K > Ca > Mg > P
Total	119.704		2.8446	0.3316	1.9221	0.8652	0.5406	N > K > Ca > Mg > P
Kalluvally**								
Stem	3.008	1	0.0532	0.0063	0.0677	0.0263	0.0184	K > N > Ca > Mg > P
Leaf	10.920	3.63	0.2386	0.0317	0.1666	0.2956	0.1196	Ca > N > K > Mg > P
Fruit spike	61.712	20.52	1.3006	0.1959	0.7869	0.2103	0.2026	N > K > Ca > Mg > P
Total	75.640		1.5924	0.2339	1.0212	0.5322	0.3406	N > K > Ca > Mg > P

* Based on the analysis of 15 samples.
** Based on the analysis of 5 samples.

preliminary idea for a more realistic approach to manure the crop, provided the number of lateral fruiting shoots produced per vine per year is known. Further, in the course of nutrition and growth of pepper, the order of contents of nutrients removed appears to be: N> K> Ca> Mg> P.

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M. NAGARAJAN
N. G. PILLAI

Division of Chemistry,
Central Plantation Crops Research
Institute, Kasaragod-670 124.

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Studies on the Comparative Response of Nitrogen on Tall and Dwarf Indica Varieties of Rice

Japonica and *Indica* varieties of rice differ in their response for nitrogen considerably. Even in the same *indica* group the response vary depending upon the plant type. Earlier rice workers (Lenka, 1969, and Kalyanikutti *et al.* 1969) have reported that the response of tall and dwarf indica varieties of rice differed significantly. These studies emphasize the need for further evaluation of tall and dwarf varieties of rice with reference to their response to optimum application of fertilizers.

A field trial was conducted at the Agricultural College and Research Institute Farm, Madurai during 1969-70 on a sandy loam soil with a pH of 7.4 and available N, P_2O_5 and K_2O levels of 102, 19 and 337 kg/ha respectively estimated by alkali permanganate, photoelectric calorimeter, and flame photometer methods as described by Jackson (1967). A split plot design with three replications was adopted. The main plot treatments were the varieties and spacing and the sub plot treatments were (0, 40, 80, 120, 160 and 200 kg N/ha). TKM 6, a tall *indica* variety with 115 days duration and two dwarf *indica* varieties *viz.*, Cauvery and Padma with 105 and 110 days duration were included in the study. The seedlings were transplanted in a gross plot size of 4.00 x 2.40 m. uniform dose of P_2O_5 and K_2O were applied at 80 kg/ha to all plots. Nitrogen was applied in two

split doses, half at transplanting and the other half 21 days after transplanting. The crop was harvested at maturity.

The results in Table 1 clearly brought out the differential varietal behaviour with reference to their response to N. A maximum grain yield in TKM 6 obtained with N_{80} level which was significantly superior to all the other levels of nitrogen. The higher levels of nitrogen registered lower yields than N_{80}. Lenka and Behera (1967) stated the grain yield response of long strawed local varieties was confined to 80 kg N/ha level. Kalyanikutty (1970) also reported that TKM 6 responded upto 80 kg N/ha and that the present finding confirm the previous findings.

TABLE 1. Influence of nitrogen on grain and straw yield of tall and dwarf indica rice varieties

Treatments (N levels Kg/ha)	Yield (Kg/ha) Grain	Straw
a) T K M 6 (tall indica)		
N_0	2438	3158
N_{40}	3644	4233
N_{80}	4078	4642
N_{120}	3810	4819
N_{160}	3557	4984
N_{200}	3351	5042
b) Cauvery (dwarf indica)		
N_0	2487	2562
N_{40}	3409	2998
N_{80}	4337	3357
N_{120}	4715	3883
N_{160}	5455	4291
N_{200}	5290	4391
c) Padma (dwarf indica)		
N_0	2909	2723
N_{40}	3837	3567
N_{80}	4300	4132
N_{120}	4807	4442
N_{160}	5550	5012
N_{200}	5213	5053
S. E	17.7	31.0
C. D.)P=0.05)	50.0	83.0

It is also evident that both the dwarf varieties, Cauvery and Padma responded similarly to nitrogen application. The increase in yield was also sequential with respect to the graded levels of nitrogen and a maximum yield was obtained with N_{160} levels in both the varieties.

The straw yield was influenced by increased doses of nitrogen in all the three varieties but the rate of response was not identical. In the case of TKM 6 when nitrogen levels increased from N_0 to N_{160} there was an increase of 57.8 per cent of straw over N_0. In the case of Cauvery and Padma it was in the order of 67.4 and 85.6 per cent respectively there by indicating that the varietal traits had contributed for higher straw yield in tall *indica* variety while in dwraf *indicas* the grain yield was high due to narrow grain/straw ratio.

P. RETHINAM
S. KOLANDAISAMY
S. SANKARAN

Department of Agronomy
Tamil Nadu Agricultural University
Coimbatore-641003.

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A List of Insect Pests Infesting Barley and Oats in Karnataka

Barley (*Hordeum vulgare* Linn.) and oats (*Avena sativa* Linn.) are the minor cereal food crops of considerable importance in Northern part of India. Barley occupied an area of 2.43 million hectares with a production of 2.50 million tonnes during 1970-71 in the country. Though it was grown in a area of 2.6 thousand hectares with a production of 1.7 thousand tonnes during 1970-71 (Anon 1972) in Karnataka State, barley is an introduced crop to the Southern part of India along with oats and several varieties are under trial at the Main Research Station, Hebbal. A few reports are available indicating the occurrence of *Odontotermes obesus* R. (Mehta and Verma, 1968), *Sesamia inferens* Wlk. *Toxoptera graminum* R. and *Tanymecus indicus* Fst. on barley (Pradhan; 1969) from Northern States of the country. The crops of barley and oats are subject to the attack of several insect pests and no information is available about the species that attack these crops in Karnataka State. During the cropping seasons of 1971 and 1972 field observations were made on the incidence of pests occurring on barley and oats and their nature of damage.

The following species of insect pests on barley and oats were observed:

I. Order : Orthoptera

Family: Acrididae

1. *Chrotogonus* sp.

2. *Acrida* sp.

3. *Pyrgomorpha bispinosa* Wlk.

Nymphs and adults were found to feed on the crop along the margin of leaves and to nibble the tender ears.