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Relative Performance of Some Selected Clones of Ginger (*Zingiber Officinale* Roscoe) With Reference to Rate And Time of Application of Nitrogen

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ABSTRACT

Performance of 12 clones of ginger was studied in a field experiment under 2 rates (0 and 60 kg N/ha) and 3 times of application of nitrogen at the Horticultural Research Station, Ambalavayal. Considerable variation was observed among the clones and their response to N treatments. Average weight of rhizome was more in the clone *Rio-de-Janeiro* which gave the lowest percentage of dry ginger. The highest yield of green ginger was obtained from the clone *Mananthody* though it was on par with the clones, *Assam*, *Rio-de-Janeiro* and *Thingpuri*. Nitrogen @ 60 kg/ha increased the yield of green ginger of all the clones except *Himachal Pradesh* and *Thinladium* irrespective of the time of application.

INTRODUCTION

Ginger is one of the most important spice crops for which India is the largest producer and exporter, earning foreign exchange worth Rs. 2.8 crores (1971-72) annually. Thomas (1966) compared 18 clones and reported the suitability of the clone *Rio-de-Janeiro*. Muralidharan (1972) studied 12 clones and reported considerable variation among them. There is general agreement among previous authors on the nitrogen requirement of ginger through chemical fertilizers which is around 60 kg/ha under Kerala conditions but differ on the best time for applying the the same (Nair, 1969; Paulose, 1972; Muralidharan, 1973). Lack of response to fertillizer nitrogen was also observed in previous studies (Muralidharan and Kamalam, 1973). An experiment was therefore undertaken to study the relative performance of 12 clones of ginger under no nitrogen and 60 kg N/ha applied at different stages of the crop.

MATERIALS AND METHODS

The experiment was laid out at the Horticultural Research Station, Ambalavayal during the year 1972-73, in a split-plot design with 3 replications, on moderately fertile clay-loam soil having 0.38 per cent total N, 0.09 per cent total P_2O_5, 0.17 per cent total K_2O (low in available P_2O_5 and K_2O) and pH 5.5. The main plot treatments consisted the 12 selected clones (Table 1) of ginger. The sub plot treatments were

S_1 – 30 Kg basal + 30 Kg at 60 days after planting

S_2 – 20 Kg basal + 20 Kg at 60 days + 20 Kg at 120 days after planting

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S_3 – 0 Kg basal + 30 Kg at 60 days + 30 Kg at 120 days after planting

S_4 – NO

Raised beds of 6 X 1 m were taken in the sub-plots for planting. A uniform basal dose of 60 Kg P_2O_5 (as super phosphate), 60 Kg K_2O (as muriate of potash) and 20 tonnes farm yard manure/ha was applied. A second dose of 60 Kg K_2O/ha was top dressed at 120 days after planting. Planting was done at a spacing of 25 X 20 cm (120 seed rhizomes / sub-plot) on 3—5—1972 with a seed rate of 1800 kg/ha and immediately mulched with green leaf @ 15 tonnes/ha. A second mulching with green leaf @ 10 tonnes/ha was also done 60 days after planting. Ammonium sulphate was the source of N applied. Altogether 3 weeding, 2 earthing up and one spraying with dimecron (against stem borer) were given. Sprouting and incidence of soft-rot disease were recorded on total count basis while other plant characters were studied on random plants. The crop was harvested on 11—1—1973. Samples were sun-dried after hand peeling, to constant weight for estimating the recovery of dry ginger.

RESULTS AND DISCUSSION

The data on various plant characters and yield of rhizome are furnished in Table 1. The average number of tillers / clump was significantly varied from 5.14 in the clone *Maran* to 8.39 in *Sira-Leon* but this variation had no relation to the yield of rhizome. Treatment S_2 (20+20+20 Kg N/ha) produced the minimum number of tillers (6.0 / clump) which was significantly lower to the treatments S_3 and S_4.

Data on incidence of soft-rot disease revealed that all the clones were susceptible to the disease. The intensity of attack was significantly higher in the clone *Mysore* (3.83) and lower in the clones *Rio-de-Janeiro* and *Mananthody* (1.0 only). Application of N, irrespective of its time and rate, had no significant effect on the occurence of the disease.

Yield of Green Ginger: There was a significant difference between the clones and rate of N on the yield of green ginger. The maximum yield was produced by the clone *Mananthody* (24.06 Kg/sub-plot) which was on par with *Assam*, *Rio-de-Janeiro* and *Thingpuri*. The lower yield of green ginger under *Rio-de-Janeiro* in the present study inspite of its heavier rhizome/clump might be due to the poor germination and crop stand. Of the nitrogen treatments S_3 (0 basal+30 Kg N/ha at 60 day+30 Kg N/ha at 120 days of planting) alone was significantly superior to NO control (S_4) which was on par with the other treatments. Six clones (*Rio-de-Janeiro*, *Tura*, *Assam*, *Thingpuri* and *Mananthody*) had better response under treatment S_3 (O basal+30 Kg N/ha at 60 days+30 Kg N/ha at 120 days). Clones *Maran*, *Nadia*, *Sira-Leon* and *Mysore* performed better under the treatment S_1 (30 Kg N basal+30 Kg N/ha at 60 days) while *Himachal Pradesh* and *Thinladium* did not show any response to N. This indicates that the response to N is a clonal character controlled by genetic factors.

TABLE 1. Yield of rhizome and other plant characters

Treatment No.	Details of clones/N treatments	Average No. of tillers/clump	No. of plants infected by soft rot (after $\sqrt{X+1}$)	yield of green ginger (kg/plot)	Recovery of dry ginger (%)
V_1	Maran	5.14	3.50	19.38	20.77
V_2	Himachal pradesh	5.67	2.23	15.39	22.12
V_3	Jorhat	6.11	1.61	15.40	20.45
V_4	Thinladium	7.11	1.90	18.30	21.77
V_5	Rio-de-Janeiro	6.69	1.00	21.68	16.20
V_6	Tura	5.83	3.68	13.91	22.93
V_7	Assam	7.97	1.16	23.51	17.01
V_8	Nadia	5.44	3.58	19.07	23.30
V_9	Sira-Leon	8.39	1.38	16.03	21.66
V_{10}	Mysore	6.39	3.83	18.09	19.00
V_{11}	Thingpuri	6.17	1.27	21.31	18.54
V_{12}	Mananthody	6.69	1.00	24.06	17.57
	CD (0.05)	1.61	1.67	3.89	0.52
S_1	30+30+ 0 Kg N/ha*	6.46	1.92	18.99	19.71
S_2	20+20+20 ,, ,,	6.00	2.27	18.65	20.61
S_3	0+30+30 ,, ,,	6.79	1.93	20.01	20.34
S_4	No nitrogen	6.62	2.61	17.71	19.44
	CD (0.05)	0.49	NS.	1.40	0.39

*Applied at planting, 60 days and 120 days respectively after planting.

NS = Not significant.

Recovery of Dry Ginger : Significantly higher recovery of dry ginger was obtained from the clones *Nadia* (23.3 per cent) and *Tura* (22.93 per cent). *Rio-de-Janeiro* was significantly inferior to all other clones with the lowest recovery (16.2 per cent) of dry ginger. *Maran* and *Thinladium* combined a relatively higher percentage recovery (20.7 and 21.77 per cent) of dry ginger and moderately higher yield of green ginger indicating their superiority for the production of dry ginger. *Mananthody*, *Assam* and *Rio-de-Janeiro* were better clones for the production of green ginger. In general treatment with three application of N each at 20 Kg N/ha at planting, 60th and 120th day of planting recorded higher yield of dry ginger.

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