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Effect of light intensity and vermicompost on yield of ginger (*Zingiber officinale* Rosc)

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Abstract

An experiment was conducted during the year 1998-99 to study the effect of light intensity and vermicompost on yield and yield attributing characters of ginger under transitional tract of Karnataka. Significant effect due to light intensity and vermicompost was seen on yield components, fresh rhizome yield and cured rhizome yield of ginger. Highest fresh rhizome yields (11.54 t/ha) and cured rhizome yield (3.64 t/ha) was recorded under normal light condition as compared to reduced light condition. 25% RDF + 75% vermicompost recorded the higher fresh rhizome yield of 9.16 t/ha. However the on par fresh rhizome yields of 10.2 t/ha was recorded with RDF application. The highest cured rhizome yield of 3.12 t/ha was recorded with vermicompost application.

Keywords: Ginger, light intensity, vermicompost, growth, intercropping, yield

Introduction

Ginger (*Zingiber officinale*) an important spice, which finds its place in culinary preparations, naturotherapy and herbal prescription since Vedic period is believed to have its origin in India. India is the largest producer of this important spice in the world accounting for 50 per cent of world production. Ginger is known to be grown as an intercrop in coconut and arecanut plantations under reduced light (Kerala, Meghalaya, Orissa, and West Bengal and to some extent in Karnataka) as well as pure crop (A. P., Tamilnadu and also in some parts of North Karnataka). Since the area is fast increasing under pure crop particularly in Karnataka because of better profitability, the high productivity could be expected by providing the favourable conditions and better management. Knowing the soil related problems by the use of inorganic manures and the exhaustive nature of the crop, the role and use of organic manures comes into focus. Hence, an attempt was made to compare the effect of light conditions and replacement of inorganic manures with organic manures in relation to crop yield and other economic traits.

Material and methods

The experiment was carried out at the Main Research Station, University of Agricultural Sciences, Dharwad during the year 1998-99 on medium black soil with pH 7.7. The trial was laid out in split plot design with open (L_1) and reduced light situation (L_2) and five manure levels replicated three times. The manure levels were recommended dose of fertilizer alone (RDF-100: 50:50 kg/ha), 75% RDF + 25% vermicompost, 50% RDF + 50% vermicompost, 25% RDF + 75% vermicompost, vermicompost alone (8 t^{-1}ha), as per the recommendation of the University of Agricultural Sciences, Dharwad. 'Bidar local" a cultivar of Ginger was sown at a spacing of 45 x 15 cm. Reduced light (shading) was created by growing dwarf castor cultivar "Aruna" as an intercrop at the spacing of 90 x 30 cm. Light intensity was measured by using Luxmeter and it was maintained at 40-50% throughout the growing period by pruning the side branches.

Results and discussion

The data pertaining to the effect of light intensity and vermicompost on yield and yield attributing characters of ginger is presented in Table 1 and 2. The data clearly indicate that fresh rhizome yield differed significantly due to light intensity, vermicompost and their interactions. Significantly higher fresh yield of 11.54 t/ha was recorded under normal light conditions than under reduced light conditions (6.40t/ha). Same trend was observed by Jayachandran *et al.* (1991) and Wilson and Ovid (1993). Significant differences in the number and size of primary and secondary rhizomes was obtained as a result of reduction in light intensity which may also be the cause for such a difference noticed in rhizome yield. This may be due to competition for light, source and sink relationship in plant and mobilisation of assimilates from the source to primary rhizomes and further to secondary rhizomes. Similar trend was observed in turmeric (Singh and Kar, 1991). Among the manure treatments, RDF alone recorded the highest fresh rhizome yield of 10.21 t/ha. This may be due to development of efficient photosynthesis enabling the plant to intercept the higher amount of radiant energy, which in turn increased the dry matter production. The treatment with 75% RDF + 25% vermicompost also produced almost equivalent results of 9.16 t/ha. This indicates the additional advantage of vermicompost particularly under reduced fertilizer application (Kale *et al*., 1991).

The interaction effect between light intensity and vermicompost on fresh rhizome yield of ginger was found significant. The highest fresh rhizome yield of 12.64 t/ha was recorded due to combined effect of normal light and RDF alone. However, vermicompost alone also under normal light conditions yielded 12.03 t/ha which was at par with the yield of RDF alone.

Curing percentage was higher in the treatment RDF alone

Table 1. Effect of light intensity and vermicompost on yield attributes of ginger

Treatments	Number of primary rhizomes /plant						Number of secondary rhizomes / plant					
	M1	M2	M3	M4	M5	Mean	M1	M2	M3	M4	M5	Mean
L1	4.40	5.43	5.43	5.26	6.00	5.30	4.16	10.00	8.40	1.48	10.40	6.89L2
2.73	3.30	2.90	3.16	2.50	2.92	4.26	4.10	5.20	1.73	3.60	3.78	Mean
3.56	4.16	4.36	4.21	4.25	4.11	4.21	7.05	6.80	1.61	7.00	5.33	

	S.Em±	CD (*p*=0.05)	S.Em±	CD (*p*=0.05)
L	0.013	0.07	0.015	0.45
M	0.077	0.23	0.089	0.26
M at same L	0.11	0.32	0.125	0.37
L at same or different M	0.099	0.29	0.135	0.40

Treatments	Circumferance of primary rhizomes						Circumferance of Secondary rhizomes					
	M1	M2	M3	M4	M5	Mean	M1	M2	M3	M4	M5	Mean
L1	6.18	16.5	16.7	6.73	6.86	10.61	5.00	5.64	4.24	5.42	5.61	5.18
L2	5.22	9.97	9.34	6.54	5.44	7.30	4.82	5.25	4.00	5.31	5.40	4.95
Mean	5.70	13.3	13	6.63	6.15	8.95	4.91	5.44	4.12	5.36	5.50	5.07

	S.Em±	CD (*p*=0.05)	S.Em±	CD (*p*=0.05)
L	0.050	0.30	0.018	0.10
M	0.150	0.44	0.025	0.07
M at same L	0.212	0.63	0.035	0.10
L at same or different M	0.196	0.58	0.036	0.1

Table 2. Fresh rhizome yield, curing percentage and cured rhizome yield of ginger as influnced by light intensity and vermicompost

Treatments	Fresh rhizome yield (t/ha)						Curing Percentage(%)						Cured rhizome yield(t/ha)					
	M1	M2	M3	M4	M5	Mean	M1	M2	M3	M4	M5	Mean	M1	M2	M3	M4	M5	Mean
L1	12.64	11.1	10.6	11.3	12.03	11.54	18.13	17.05	16.31	17.6	17.90	17.90	3.81	4.03	2.76	3.47	4.11	3.63
L2	7.78	4.78	6.35	7.02	6.05	6.40	15.33	14.65	16.04	15.7	14.04	15.14	1.64	1.46	1.41	1.83	2.13	1.58
Mean	10.21	7.96	8.48	9.16	9.04	8.97	16.73	15.85	16.18	16.6	15.97	16.27	2.73	2.75	2.09	2.38	3.12	2.61

	S.Em±	CD (*p*=0.05)	S.Em±	CD (*p*=0.05)	S.Em±	CD (*p*=0.05)
L	0.142	0.865	0.004	0.02	0.022	0.13
M	0.151	0.451	0.017	0.05	0.081	0.24
M at same L	0.213	0.639	0.024	0.07	0.114	0.34
L at sameor different M	0.238	0.712	0.022	0.06	0.105	0.31

L = Light intensity, M = Manures, M1 = RDF alone, M2 = 75% RDF+25% Vermicompost, M3 = 50 % RDF+50% Vermicompost , M4 = 25% RDF+75% Vermicompost, M5 = Vermicompost alone,L1 = Reduced light, L2 = Normal light

(16.73%) which was on par with 75% RDF + 25% vermicompost (16.61%) treatment. This may be due to less moisture and higher lignification in rhizomes.

The cured rhizome yield also differed significantly due to light intensity and vermicompost. Highest cured rhizome yield (3.64 t/ha) was recorded under normal light condition compared to reduced light conditions. This may be due to higher curing percentage and also highest fresh rhizome yield. Among different manure treatments vermicompost alone recorded the highest yield of 3.12 t/ha. The difference in cured rhizome yield may be due to the difference in curing percentage.

Thus to get higher fresh rhizome yields, ginger can be grown under normal light condition with RDF alone. However, applying vermicompost alone under normal light conditions can also be recommended.

References

Jayachandran, B.K., M.M. Bai, M.A. Salam, M.K. Mammen and K.P. Mathew, 1991. Performance of ginger under shade and open condition. *Indian Cocoa, Arecanut and Spices Journal*, 15:40-41.

Kale, R.D., K. Bano and G.P. Satyavati, 1991. Influence of vermicompost application on growth and yield of cereals, vegetables and ornamental plants. Final report of KSCST project NO. 67-04/verm/ 34 B (3478), Bangalore, p.87.

Singh, V.B. and P.L. Kar, 1991. Effect of planting materials on the productivity of turmeric variety Lakadong. *Indian Cocoa, Arecanut and Spice Journal*, 14:153-154.

Wilson, H. and A. Ovid, 1993. Growth and yield responses of ginger (*Zingiber officinale* R.) as affected by shade and fertilizer applications. *Journal of Plant Nutrition*, 16:1539-1545.