

Original Research Article

<https://doi.org/10.20546/ijcmas.2018.705.440>

Effect of Propagation Methods on Yield Attributes and Economics of Ginger Production under Agro-Climatic Condition of Tripura

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ABSTRACT

Keywords

Ginger, Agro-climatic condition, Spice crop

Article Info

Accepted:

30 April 2018

Available Online:

10 May 2018

Ginger, an indigenous plant, is an important spice crop of the world. Traditionally ginger is propagated by using portions of mother rhizomes called as sets. Each healthy set of 2.5 to 5 cm long, weighing 20-25 g and having two or three buds each are directly sown in the main filed. Though transplanting in ginger is not conventional, it is found profitable. A transplanting technique in ginger by using single bud sprouts (about 5 g) has been standardized to produce good quality planting material with reduced cost. The yield level of ginger transplants is on-par with conventional planting system. Also it is observed that the requirement of seed material per ha is reduced to 600 kg in transplanting method in comparison with conventional methods which is 2000 kg/ha. The advantages of this technology are production of healthy planting materials and reduction in seed rhizome quantity and eventually reduced cost on seeds.

Introduction

Ginger, an indigenous plant, is an important spice crop of the world. It is valued in medicine as a carminative and stimulant of the gastro-intestinal tract. The botanical name of ginger is *Zingiber officinale* L. which belongs to the family Zingiberaceae. Ginger is a herbaceous perennial with underground rhizomes having serial leafy shoots of 0.5 to 0.75m height; leaves sheathy, alternately arranged, linear with 15 cm long and sessile flowers borne on a spike, condensed, oblong and cylindrical with numerous scar bracts; flowers numerous yellow in colour with dark purplish spots, bisexual, epigynous, stamens

only one, ovary inferior, three carpelled; fruit an oblong capsule, seeds glabrous and fairly large. India and accounts for 45 % of the worlds ginger production. Mainly grown in Kerala and on very small area in Karnataka, Tamil Nadu, West Bengal, Bihar, Himachal Pradesh, Uttar Pradesh and Maharashtra. Area under cultivation in India is about 63,000 ha. with total production of about 2 lakh tones. The average productivity is about 5 tones/ha. The North Eastern Region produces a variety of spices including chillies, ginger, turmeric, large cardamoms, black pepper, tejpatta etc. Ginger and turmeric are prominent among them and their cultivation is under taken as a cash crop mostly in jhum fields spread over

the hills and tribal areas of the entire region. The total area under ginger cultivation in Tripura is about 1.36 ('000 ha) with total production of about 5.45 thousand tones. Ginger is grown in almost all the states of the region but the leading states are Meghalaya, Mizoram, Arunachal Pradesh and Sikkim (Govind *et al.*, 1998). Apart from improved varieties like Nadia, China, Varada, etc., a number of local cultivars exist in northeastern region. But the area under ginger cultivation in Tripura is reducing day by day. Among Different constrains Non-availability of quality planting material is another important factor attributing to low productivity. Moreover, in case of Conventional propagation method (direct sowing) of ginger the cost planting material (seed) is approximately 70% of the total cultivation cost. So, to reduce the cost of planting material a technique has been developed by the Spice Board of India where ginger is propagated through raising seedlings. And such materials at low cost are technically feasible in slope areas and are eco-friendly substances. Considering the entire situation the experiment has been set to find the suitability of the technique in Tripura condition.

Materials and Methods

In the instructional farm of KVK, Khowai, "Tripura an experiment on "Effect of propagation methods on yield attributes and economics of Ginger production under agro-climatic condition of Tripura" has been conducted during the year 2013-14, 2014-15, 2015-16. And treatment comprises of T1: Single bud transplanting, T2: 20-25 g direct planting.

Propagation

Direct seeded /planting method (T1)
Transplanting method (T2)

Direct planting method

Traditionally ginger is propagated by using portions of mother rhizomes called as sets. Each healthy set of 2.5 to 5 cm long, weighing 20-25 g and having two or three buds each are directly sown in the main filed.

Before planting the seed rhizomes should be treated with Dithane M-45 @ 3 g per liter of water for 30 minutes, drained and then used for planting.

Transplanting technology

Though transplanting in ginger is not conventional, it is found profitable. A transplanting technique in ginger by using single bud sprouts (about 5 g) has been standardized to produce good quality planting material with reduced cost.

The technique involves raising transplants from single sprout seed rhizomes in the pro-tray and planted in the field after 30 days.

Selection of healthy rhizomes of ginger for seed purpose, Treat the selected rhizome with mancozeb (0.3%) and quinalphos (0.075%) for 30 min and store in well ventilated place till planting. At the commencement of season, cut the single buds with small piece of rhizomes weighing 4- 6 g. Treat the single bud sprouts (mancozeb 0.3%, 3 g/L of water for 30 min) before planting.

Fill the pro-trays (98 well) with nursery medium containing partially decomposed coir pith and vermicompost (75:25), enriched with PGPR/*Trichoderma* 10g/kg. If coir pith is not available farmer can use sand, soil, vermicompost @1:1:1 ratio to fill the pro-trays. Plant the ginger bud sprouts in pro-trays. Maintain the pro-trays under shade net house. Seedlings will be ready within 30-35 days for transplanting. (Prasath *et al.*, 2016).

Manures and Fertilizers

Sl. No.	Time of application	F.Y.M. (ton/ha)	N (kg/ha)	P ₂ O ₅ (kg/ha)	K ₂ O (kg/ha)
1.	Preparatory tillage	15	-	-	-
2.	At planting	15	60	50	50
3.	45 days after planting	-	50	-	-
4.	120 days after planting	-	40	-	-
	Total	30	150	50	50

Table.1 Fresh yield of ginger as affected by propagation technique

	Yield (fresh rhizomes) ('000 t)			
	2013/14	2014/15	2015-16	Mean
T1 (Single bud transplanting)	4.45	4.35	4.43	4.41
T2 (20-25 g direct planting)	4.51	4.53	4.46	4.50
CD (5%)	NS	0.95	0.84	
CV (%)	20.14	21.11	18.23	

Table.2 Economics of ginger cultivation

Cost of seedling production	Pro-tray nursery	Conventional planting
Temporary structure for shade (150 m ²)	7000.00 Rs.	-
Seedling production cost (~100000 seedling/ha; 1200 protrays, Rs.16/pro-tray, reusable @ Rs.8/tray, labour cost for raising seedling (15 nos @ Rs.300/ head)	14100.00 Rs.	-
Cost of growing media (cocopeat, vermicompost, trichoderma)	7000.00 Rs.	-
Cost of seed rhizome (600 kg @ Rs.80/kg) (2000 kg @ Rs.80/kg)	48000.00 Rs. -	160000.00 Rs.
Labour charges (For Field Preparation, Planting and maintenance 25 nos. @ Rs.300/ head)	7500.00 Rs.	7500.00 Rs.
Cost of Other inputs (Fertilizer, Plant protection chemicals, etc)	5000 Rs.	5000 Rs.
Gross Cost	88600 Rs.	172500 Rs.
Average yield /ha	4410 kg	4500 kg
Gross income	352800 Rs.	360000 Rs.
Net income	264200 Rs.	187500 Rs.
Benefit Cost Ratio	2.98	1.08

Results and Discussion

From the data presented in the above table 1 it is observed that in all the subsequent year the yield level of ginger transplants is on-par with conventional planting system. That is there is no significant difference in yield in case of both the treatment. This finding can be correlated with the finding of Jayashree *et al.*, (2015).

From the data presented in the above table 2 it can be revealed that the requirement of seed material per ha is reduced to 600 kg in transplanting method in comparison with conventional methods which is 2000 kg/ha. And that's make huge difference in the cost of cultivation and ultimately to the net income. From the above data we can calculated the cost of individual seedling is 0.69 paise.

So, we can conclude that the advantage of T1 (20-25 g direct planting) are production of

healthy planting materials and reduction in seed rhizome quantity, reduced cost on seeds and eventually increase the net profit as there no significant difference yield in both the treatment.

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How to cite this article:

Shil, S., D. Nath and Mondal, J. 2018. Effect of Propagation Methods on Yield Attributes and Economics of Ginger Production under Agro-Climatic Condition of Tripura. *Int.J.Curr.Microbiol.App.Sci*. 7(05): 3790-3793. doi: <https://doi.org/10.20546/ijcmas.2018.705.440>