Himachal Journal of Agricultural Research 35 (1):24-26, 2009

Performance of ginger and maize under pure stand and intercropping systems

Purushottam Kumar*, Manoj Gupta and D. K. Singh **
CSK Himachal Pradesh Krishi Vishvavidyalya
Hill Agricultural Research and Extension Centre, Dhaulkuan-173 001, India.

Abstract

An experiment was conducted at Research Farm of Hill Agricultural Research and Extension Centre, Dhaulakuan continuously for three years (2002-03, 2003-04 and 2004-05) to find out the suitable row proportion of ginger and maize under intercropping system. T_8 (Paired maize at 30 cm/90 cm + ginger in 2:3 ratio) resulted in highest mean ginger equivalent yield (112.5 q/ha) and LER (2.0). Lowest ginger equivalent yield (13.8 q/ha) was recorded with the pure stand of maize at normal planting (T_1).

Key words: Ginger, maize, intercropping, ginger equivalent yield.

Introduction

Ginger (*Zingiber officinale* Rose.) and maize (*Zea mays* L.) are important cash crops for the small and marginal farmers of low and mid hill areas of Himachal Pradesh. Sirmaur district alone contribute about two third of total ginger production in the state. The need for highly intensive cropping system is being recognized to meet the burgoing demand of ever increasing population. Maize being a widely spaced crop, provides ample opportunities to grow the intercrop between the rows of main crop. Ginger is one of the various crops which are being intercropped in between the rows of maize. Although intercropping of ginger is being practiced over the large area, but the information is meager in terms of effect of different sowing pattern or row arrangement on productivity of the system. Therefore, the present experiment was devised to study the relative performance of ginger as intercrop in maize under different intercropping systems.

Material and Methods

The present investigation was conducted at Research Farm of Hill Agricultural Research and Extension Centre, Dhaulakuan continuously for three consecutive years *i.e.* 2002-03, 2003-04 and 2004-05. Nine treatments as indicated in table 1 were evaluated in randomized block design with three replications. Maize var. Kanchan and ginger cv. Sirmour Local was used for sowing. The sowing was done in the 1st week of June every year. Planting of ginger was done at 30 cm x 20 cm and maize as per the treatment with recommended package of practices. Crop of ginger was harvested during 1st week of February while maize was harvested after maturity. The soil of the experimental field was sandy-loam in texture with a pH value of 6.8 having medium in available N (279 kg/ha), high in available phosphorus (28 kg P_2O_5/ha) and low in available potassium (185 kg K_2O/ha).

Results and Discussion

Paired maize at 30cm/90cm + ginger in 2:3 ratio (T_8) resulted in highest ginger equivalent yield (q/ha) during all the years followed by maize + ginger in 1:2 ratio (T_4) during 1st Year and third year and pure ginger (T_2) during second year (Table1). However, during 1st Year there was no significant difference between T_8 and T_9 (paired maize at 45cm/75cm + ginger in 2:2 ratios). T_9 produced significantly higher ginger equivalent yield as compared to T_5 (maize + ginger in 2:1 ratio) and T_6 (maize + ginger in 2:2 ratio) during all the years. T_7 (paired maize at 30cm/90cm + ginger in 2:2 ratio) resulted in significantly higher ginger equivalent yield compared to T_6 and T_5 during all the years except during second year where the difference between T_7 and T_6 was not found significant. T_6 resulted in significantly higher ginger equivalent yield compared to T_5 during all the years. T_5 resulted in lowest ginger equivalent yield among the intercropped treatments.

*GBPUA&T, Horticulture Research and Extension Center, Srinagar, Pauri, Uttarakhand
**GBPUA&T, Horticulture Research and Extension Center, Dhakrani, Dehradun, Uttarakhand

Table 1. Effect of various treatments on ginger equivalent yield and land equivalent ratio

Treatment	Yield of crops (q/ha)			Ginger equivalent yield (q/ha)			Mean ginger equivalent yield (q/ha)	Land equivalent ratio			Mean
	2002-03	2003-04	2004-05	2002-03	2003-04	2004-05		2002-03	2003-04	2004-05	
T_1 (Pure maize at 60 cm)	52.4	40.9	41.0	17.5	13.6	10.3	13.8	-	-	-	-
T_2 (Pure ginger at 30 cm)	84.8	114.0	102.1	84.8	114.0	102.1	100.3	-	-	-	-
T_3 (maize + ginger in 1:1 ratio)	56.1+56.5	48.9+71.9	45.5+79.5	75.2	88.1	91.3	84.9	1.74	1.82	1.87	1.80
T_4 (maize + ginger in 1:2 ratio)	54.0+67.0	47.4+93.7	46.8+92.7	85.0	109.5	104.4	99.6	1.82	1.98	2.04	1.90
T_5 (maize + ginger in 2:1 ratio)	56.2+39.8	47.6+47.4	46.6+47.9	58.6	63.3	59.4	60.4	1.53	1.57	1.60	1.56
T_6 (maize + ginger in 2:2 ratio)	57.7+56.7	49.0+68.9	48.8+59.3	76.0	85.2	71.5	77.6	1.77	1.80	1.77	1.78
T_7 (Paired maize at 30 cm/90 cm + ginger 2:2 ratio)	49.1+68.2	42.2+74.6	40.2+66.2	84.6	87.0	76.3	82.6	1.74	1.68	1.62	1.68
T_8 (Paired maize at 30 cm/90 cm + ginger 2:3 ratio)	49.5+76.4	40.5+112.9	40.0+108.3	92.8	126.4	118.3	112.5	1.84	1.98	2.04	2.00
T_9 (Paired maize at 45 cm/75 cm + ginger 2:2 ratio)	53.7+72.7	43.9+80.4	41.0+80.5	90.6	94.6	90.8	92.0	1.87	1.78	1.79	1.81
CD (P=0.05)	-	-	-	4.9	10.7	3.4	-	-	-	-	-

However, it was produced significantly higher ginger equivalent yield compared to T_1 (pure maize). On an average, T_8 resulted in significantly higher ginger equivalent yield i.e. 112.5q/ha compared to other intercropping systems. It may be due to the higher number of rhizomes/plant, rhizome yield/plant in this cropping system (Table 2). Similarly on an average, T_8 resulted in maximum LER i.e. 2.0 compared to other intercropping systems (Table 1). Highest monetary return (Rs 1,28,000/ha) were recorded with T_8 Kumar *et al.* (2006), Singh *et al.* (1995) and Choudhary (1999) also reported the similar results

.Table 2. Effect of various treatments on yield contributing characters of ginger and maize

Treatment	Ginger		Maize		Monetary returns (Rs/ha)
	Mean number of rhizomes/ plant	Mean rhizome yield / plant (g)	Mean number of cobs/plant	Mean 1000 grain weight (g)	
T_1 (Pure maize at 60 cm	-	-	1.3	224	20600
T_2 (Pure ginger at 30 cm	9.1	102	-	-	110600
T_3 (maize + ginger in 1:1 ratio)	7.7	104	1.3	227	126800
T_4 (maize + ginger in 1:2 ratio)	8.2	107	1.3	227	120200
T_5 (maize + ginger in 2:1 ratio)	6.0	93	1.3	227	95800
T_6 (maize + ginger in 2:2 ratio)	7.1	105	1.3	230	112200
T_7 (Paired maize 30 cm/90 cm + ginger in 2:2 ratio)	7.5	104	1.2	225	86200
T_8 (Paired maize 30 cm/90 cm + ginger in 2:3 ratio)	9.8	110	1.3	224	128000
T_9 (Paired maize at 45 cm/75 cm + ginger in 2:2 ratio)	8.0	105	1.3	225	105000

Conclusion

Results of three year study clearly indicated that planting of ginger as an intercrop in maize was beneficial than sole maize in all the intercropping systems, however paired maize 30 cm/90 cm in 2:3 ratio intercropping with ginger was only beneficial compared to sole ginger and other intercropping systems were not beneficial.

References

Singh A, Awasthi RP, Singh RD and Arya RL 1995. Effect of inorganic fertilizers in maize (*Zea mays*) + ginger (*Zingiber officinale*) intercropping system in humid hilly soils. Indian J. Agron. **40** (4): 549-52.

Chaudhary PC 1999. Intercropping short duration summer crops with ginger in Darjeeling hills. Indian Farmg. **37** (11): 4-5.

Kumar Purushottam, Basandrai AK and Thakur HL 2006. Effect of different shading crops on growth, yield and economics of ginger (*Zingiber officinale* Rose.). Him. J. Agric. Res. **32** (2): 29-32.