

Papaya and summer groundnut an eco-friendly system of agro-forestry

R.A. SINGH, V.K. SHARMA, P.V. SINGH AND M.K. SINGH

Accepted : January, 2010

See end of the article for authors' affiliations

Correspondence to:

R.A. SINGH

FPARP on Water /Water Harvesting, Directorate of Extension, C.S. Azad University of Agriculture and Technology, KANPUR (U.P.) INDIA

A field experiment was conducted during 2002-03 at Zonal Agricultural Research Station, Mainpuri, C.S. Azad University of Agriculture and Technology, Kanpur. The four summer season genotypes of groundnut *i.e.* D₄D₈-10, D₄D₈-6, D₄D₈-14 (Dh 86) and ICGV 93468 were sown in the interspaces of papaya S-1. The recommended doses of manure and fertilizer were applied to papaya. A uniform dose of N₁₅+P₃₀+K₄₅+gypsum @ 300 kg/ha was given to groundnut at sowing in association of 50 q/ha and 100 q/ha FYM. The pods of summer groundnut harvested by 20.33 q/ha from the interspaces of papaya. Similarly, papaya gave fruits by 102.32 t/ha from the companionship of summer groundnut. The papaya cultivar S-1 and summer groundnut genotype D₄D₈-10 (20.88 q/ha) and D₄D₈-14 or Dh 86 (21.27 q/ha) displayed the better companionship on Gangetic alluvial soils of U.P.

Key words : Melon tree, Interspaces, Association, Companionship, Summer groundnut

Papaya occupies a small area yet its cultivation is spread throughout the South-Western-Semi-Arid-Zone-IV of U.P. because it needs warm climate. It cannot tolerate low temperature. Even though it is adapted to a wide range of soils, it grows best in a loamy group soils. Generally, papaya is planted at 2.5 to 3 meter apart in rows. At younger stage of papaya much place is left unsown between rows. The unplanted place can be used for growing of companion crops. The technology of summer groundnut cultivation was developed and diffused in South-Western-Semi-Arid-Zone-IV of U.P. Varieties of groundnut developed by International Crops Research Institute for the Semi-Arid Tropics, Patancheru, Hyderabad and University of Agricultural Sciences, Dharwad, Karnataka under moisture stress condition were tried under two tier system of agro-forestry with papaya at Zonal Agricultural Research Station, Mainpuri during lean months of summer season. Both enterprises grown under companionship proved remunerative. The main objective of this trial was to increase the area of summer groundnut in conjunction with papaya as a remunerative enterprise on loamy sand and sandy loam soils of catchment area of Ison, Kali and Ganga rivers.

MATERIALS AND METHODS

A field experiment was conducted during 2002-2003 at Zonal Agricultural Research Station, Mainpuri, C.S. Azad University of Agriculture and Technology, Kanpur. The soil of the experimental site was sandy loam having pH 8.6, organic carbon 0.13%, total nitrogen 0.01% available phosphorus 9.0 kg/ha and available potash 291 kg/ha, therefore, the fertility status of experimental

site was low. The four genotypes of groundnut *i.e.* D₄D₈-10, D₄D₈-6, D₄D₈-14 (Dh 86) and ICGV 93468 were sown in the interspaces of papaya S-1. The recommended doses of manure and fertilizer were applied to papaya. A uniform dose of N₁₅+P₃₀+K₄₅+ gypsum @ 300 kg/ha was given to groundnut at sowing with 50 q/ha and 100 q/ha FYM while 150 kg gypsum/ha applied at planting and 150 kg gypsum/ha broadcasted between the flowering and pegging stage of groundnut. The FYM were applied one month before the seeding of summer groundnut. Papaya was planted in the month of October at the spacing of 2.5 x 2.5 M in rows. The sowing of summer groundnut was done on 15th March at 30 cm apart in the interspaces of papaya. Experiment was carried out in three-replicated randomized block design. Under agro-forestry system the plant stand of companion crop of groundnut was adjusted by 72 per cent. The four irrigations were given to summer groundnut. Summer groundnut was harvested on 12th June. Groundnut pods dried in tree shade to escape from vulnerable sunrays of hot season. After digging of groundnut a good and deep inter-cultivation was done for papaya and field was sanitized. The important cultural practices were done in papaya as and when required. Papaya fruits plucked when they showed the sign of maturity.

RESULTS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been summarised under following heads:

Performance of summer groundnut genotypes:

The different varieties of summer groundnut gave

Table 1 : Pod yield of summer groundnut and fruit yield of papaya under agri-horti system.

Sr. No.	Agri-horti system	Yield					
		Integration with 50 q/ha FYM		Integration with 100 q/ha FYM		Average	
		Papaya (t/ha)	Groundnut (q/ha)	Papaya (t/ha)	Groundnut (q/ha)	Papaya (t/ha)	Groundnut (q/ha)
1.	Papaya +Dh 86	100.00	18.90	106.70	23.64	103.35	21.27
2.	Papaya +D ₄ D ₈ -10	100.00	18.87	105.00	22.89	102.80	20.88
3.	Papaya + D ₄ D ₈ -6	97.00	18.75	103.40	21.53	100.20	21.14
4.	Papaya +ICGV 93468	100.41	18.50	105.45	21.16	102.93	19.83
	Average	99.50	18.75	105.13	22.30	102.32	20.33

very good pod yield in companionship of papaya. Among all the tested groundnut varieties, cultivar Dh 86 gave higher pod yield (21.27 q/ha) closely followed by D₄D₈-10 (20.88 q/ha) as a filler crop. The slight reduction was recorded in ICGV 93468 (Table 1).

The higher yield of Dh 86 was due to its better performance under moisture stress condition and resistant to high thermal condition. The differences in pod yield in various genotypes were due to their genetic potentiality. These results are in accordance with those of Singh *et al.* (1998).

Effect of filler cropping of summer groundnut on papaya:

The fruit yield of papaya was not affected due to filler cropping of summer groundnut. Almost equal yield of papaya fruits plucked from the different treatment combinations (100.20 t/ha to 103.35 t/ha). Thus, the synergistic effect of filler cropping of summer groundnut was found on the fruit yield of papaya (Table 1).

Response of FYM on fruit yield of papaya and pod yield of groundnut:

The integration of FYM @ 100 q/ha with recommended dose of NPK and gypsum pushed up the yield by 3.55 q/ha or 18.93% of summer groundnut and

5.63 t/ha or 5.63% of papaya in comparison to FYM @ 50 q/ha. These results confirm the findings of Singh (2000).

Authors' affiliations:

V.K. SHARMA, P.V. SINGH AND M.K. SINGH,
Directorate of Extension, C.S. Azad University of
Agriculture and Technology, KANPUR (M.S.) INDIA

REFERENCES

Singh, R.A. (2000). Feasibility of vermin-farming in peanut (*Arachis hypogaea*) – vegetable pea (*Pisum sativum*) cropping system. *Indian J. Agron.*, **45** (2): 257-262.

Singh, R.A., Srivastava, S.K., Warsi, A.S., Mathur, Y.K., Nigam, S.N., Dwivedi, S.L. and Upadhyaya, H.D. (1998). Screening of summer groundnut genotypes against insect, pest and diseases with eco-friendly agro-technology. Paper presented in International Conference on Pest & Pesticides Management for Sustainable Agriculture, organized by SPMEP and CSAUAT, Kanpur on Dec., 11-13 : 65-66.
