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PERFORMANCE OF SOYBEAN VARIETIES AS INTERCROP IN COCONUT GARDEN

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ABSTRACT

Various annual and perennial crops having different stature, canopy shape and size and rooting habit have been reported to perform well in association with coconut. Soybean is one such crop having great potential both as a source of protein and oil. With the increased gap in demand and suply of both oil and protein source, this crop has tremendous future and needs encouragement. With a view to finding out the suitable soybean variety to grow as intercrop in coconut garden, a study was undertaken at Central Plantation Crops Research Institute, Kasaragod. Among the twelve varieties tried, cv PK-472 gave higher yield (980 kg/ha) and net returns (Rs. 3190 kg/ha) followed by MACS-58 (827 kg/ha and Rs. 2272/ha respectively). Thus it has great potential to be grown as intercrop with coconut when sown preferably from the last week of January to first week of March in the Malabar region of Kerala.

INTRODUCTION

Various annual, biennial and perennial crops have been found to perform well in association with coconut. Evolving location or region specific profitable and feasible intercropping systems involving different annual oilseeds as intercrop to step up aggregate monetary returns from rainfed and irrigated areas is one of the important thrust areas. Soybean is an important crop as it is a rich source of protein and oil. Soya meal having numerous uses is a valuable export commodity. Consequent to the development of soya processing facilities its cultivation will bring better returns to the growers, more oil to the country and nutritious protein rich food to the poor. Soybean is reported to be an ideal crop for intercropping in coconut garden (Gautam and Labana, 1988; Christopher Lourduraj *et al.*, 1992). Keeping in view the above facts a study on intercropping of soybean varieties in coconut garden was undertaken, the main objective being to find out suitable varieties of Soybean and their performance as intercrop in association with coconut.

MATERIALS AND METHODS

This trial was undertaken at the research farm of Central Plantation Crops Research Institute, Kasaragod during the summer seasons of 1989 and 1991 in a coconut garden having West Coast Tall (WCT) palms of 30 years age planted at a spacing of 7.5 m x 7.5 m. The soil of the experimental site was red sandy loam with a pH of 5.6.

Twelve varieties of soybean as given in Table I supplied by National Research Centre for Soybean , Indore, were sown on 22nd February during both the years. They were sown in a plot size of 4m x 1.8 m at a spacing of 45 cm x 5 cm in a randomized block design replicated thrice. A circular basin area of 1.8 m radius around the coconut palms was left free. The crop was given a fertilizer dose of 20 Kg N, 60 Kg P_2O_5 and 40 Kg K_2O per hectare. Half the dose of nitrogen and full doses of phosphorus and potassium were applied as basal and the remaining nitrogen was applied 30 days after sowing. The sources of fertilizers were urea, single superphosphate and muriate of potash. Irrigations at the rate of 20 mm water were given at weekly intervals through perfo sprays till the physiological maturity. Growth and yield observations in respect of days to 50% flowering, dry weight per plant, number of pods per plant, test weight of seeds and seed yield per plot were recorded. All the data in respect of inputs and outputs were recorded. The pre-experimental (1985-1988) and the experimental period coconut yield was also recorded.

RESULTS AND DISCUSSION

Seed yield recorded for 1989 and 1991 seasons is presented in Table I. The data revealed that during both the years variety PK-472 gave significantly higher yield (938 and 1023 kg per ha during 1989 and 1991 respectively), than other varieties except during 1989, when it was on par with cv MACS -13 (857 kg/ha). Though the highest realised yield of 980 kg/ha in this trial is far below the maximum yields of 20.8 and 21.9 q/ha under pure cropping as reported by Singh and Bajpai (1990) and Shah *et al.* (1991) respectively, but it is comparable with the yield (6.5 to 12.1 q/ha) obtained under maize + soybean intercropping (Shah *et al.*, 1991) and yield of 342 to 750 kg/ha as reported by Christopher Lourduraj *et al.*, (1992) in coconut + soybean intercropping. During 1989 cv PK-462 (452 kg/ha) and during 1991 cv PK-327 (500 kg/ha) registered lowest seed yields.

Table I. Seed yield (kg/ha) of various soybean varieties

Varieties	1989	1991	Mean
Punjab 1	626	532	579
Bragg	589	830	699
MACS-58	829	825	827
Hardee	573	701	637
JS-80-21	823	631	727
PK-262	452	587	519
PK-327	486	500	493
Durga	819	684	751
MACS-13	857	654	755
PK-472	938	1023	980
MACS-57	591	630	613
Gaurav	823	767	795
SE/Plot	56.75	110.47	
CD (0.05)	96.10	187.07	

The data on growth and yield components of soybean varieties is given in Table II. The data revealed that among the various characters studied, dry weight per plant and number of pods per plant varied significantly among the varieties, whereas test weight of seeds and days to 50 percent flowering were non-significant. Although in the case of cv PK-472 dry weight per plant was lowest (13.64 g) but due to significantly higher number of pods per plant (28.1) and higher test weight of seeds (10.92 g) resulted in higher seed yields. Varieties PK-262 and PK-327 registered lowest dry weight per plant and number of pods per plant resulting in lowest seed yields. Although days to 50 percent flowering did not differ significantly and it ranged from 37 to 44 days in various varieties, cv PK-472 was found to be early (37 days) and MACS -13 and MACS-58 were late (44 days).

Data on economics of soybean intercropping presented in Table III, indicated that the cost of cultivation of soybean intercropping was about Rs. 2690/- per hectare. Gross returns ranged from Rs. 2958/- to Rs. 5880/- per hectare. Net average productivity of coconut in the plot was 98.1 nuts/palm/year.

The results of this study clearly indicated that soybean has good potential to grow as intercrop in coconut gardens. The planting of the

Table II. Growth and yield parameter of soybean varieties

Varieties	Dry weight of plant g/plant	No. of pods per plant	100 seed weight	Days to 50% flowering
Punjab-1	13.14	12.4	8.14	42
Bragg	18.62	24.8	9.46	39
MACS-58	21.23	19.0	8.61	44
Hardee	14.82	13.1	7.82	38
JS-80-21	17.90	16.2	8.60	38
PK-327	12.90	9.8	8.74	37
Durga	19.10	14.1	8.91	40
MACS-13	18.64	14.9	9.10	44
PK-472	13.64	28.1	10.92	37
MACS-57	18.16	16.8	8.91	44
Gaurav	17.92	17.0	7.96	39
CD (0.05)	3.82	10.61	NS	NS

Table III. Economic analysis of soybean intercropping in coconut garden (average of two seasons

Name of variety	Cost of cultivation Rs/ha	Gross returns Rs/ha	Net returns Rs/ha
Punjab 1	2690	3474	784
Bragg	2690	4194	1504
MACS-58	2690	4902	2272
Hardee	2690	3822	1132
JS-80-21	2690	4362	1672
PK-262	2690	3114	424
PK-327	2690	2958	268
Durga	2690	4506	1846
MACS-13	2690	4530	1840
PK-472	2690	5880	3190
MACS-57	2690	3678	988
Gaurav	2690	4770	2080

Price of soybean : Rs. 6 per kg.

crop should be done after the south-west monsoon preferably from the last week of January to first week of March in the Malabar region of Kerala. Ability of soybean in enhancing soil fertility through nitrogen fixation by rhizobium in the root nodules has already been established. Enrichment of organic matter through leaf shedding at maturity stage is an added advantage. Besides soybean being short duration crop it fits well in existing cropping pattern or to incorporate in any contingency programmes.

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