

EFFECT OF LEGUMES ON ASSOCIATED AND SUBSEQUENT CROPS

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WITH the development of intensive cropping of high yielding varieties under irrigation and fertiliser use the low yielding crops have lost ground, both as individual crops in rotation and as mixtures with cereals. However, with the recent country wide shortage of pulses, the major vegetable protein source, these are receiving some attention. Therefore, efforts are being directed towards the inclusion of short duration legumes as catch crops in cereal intensive rotation or to grow cereals and legumes in systematic mixtures.

Lately due to the short supply of fertiliser it has become expedient to try to exploit the nitrogen fixing potential of the pulses to produce better crops and cereals both in rotation and in mixtures. Recent findings of Akinola, Agbola and Fayami (1972) have shown that cowpea and green gram could fix 354 to 324 kg N/ha and 15 to 65 kg N/ha with and without inoculation respectively.

At Bhubaneswar in the research farm of the O.U.A.T. some field trials were undertaken in recent years where *Pusa Baisakhi* mung (*Phaseolus aureus*) and cowpea were used as one of the three or four crops in annual sequences of cropping under irrigated condition. *Mung* was also used as a mixture with long duration crops like cotton and *arhar* (*Cajanus cajan*). The common local mixtures of *arhar* and rice was also setup for comparison. The soil of the farm is lateritic loamy sand of poor fertility.

RESULTS AND DISCUSSION

It would be evident from the data in Table 1 that all the three types of land with 3 and 4 crops a year there was positive increase in the yield of rice where *mung* was taken as a preceding crop. The increase in the yield of rice grain was to the extent of 2-4 q/ha due to the crop sequence alone. The *mung* crop received very low level of manuring with 10-20-10 kg/ha of NPK as normally recommended. Akinola *et al.* (1972) recorded a fixation of as much as 325 kg N/ha. by *mung* when inoculated which could be enough for the succeeding crop of cereal.

The performance of legumes in mixed cropping has been presented in Table 2. The data indicated that the total production increased by about 50% when short-duration rice grown as intercrop with cotton and with *arhar*. But raising of *mung* in the interspace of these crops did not influence the total production except in case of cotton+mung in the second year. In both the cases

TABLE 1

Effect of legumes on subsequent cereal crops

Crop	1969-70	1970-71	1971-72
3 crop sequence in irrigated medium land.			
Rice	25.60	28.00	30.40
Maize	36.30	50.40	55.30
Mung	6.40	7.10	8.20
3 crop sequence in irrigated low land.			
Mung	10.67	10.25	11.63
Rice	21.36	25.21	19.31
Ragi	6.83	7.00	6.72
4 crop sequence in irrigated high land.			
Rice	36.00	38.00	39.00
Radish	200.00	213.00	223.00
Ragi	20.00	22.00	24.00
Mung	10.00	9.00	8.00

TABLE 2

Yield from different crops grown singly and mixture

Treatments	1972-73			1973-74		
	Main crop	Inter crop	Total	Main crop	Inter crop	Total
*Cotton	16.12	—	16.12	9.58	—	9.58
Arhar	13.0	—	13.0	17.0	—	17.0
Mung	8.0	—	8.0	7.86	—	7.86
Rice	26.27	—	26.27	25.66	—	25.66
Cotton + Mung	13.12	3.75	16.97	8.87	2.87	11.74
Cotton + Rice	7.62	20.75	28.37	3.2	22.58	25.78
Arhar + Mung	8.0	4.75	12.75	5.29	2.37	7.66
Arhar + Rice	8.0	17.75	25.75	8.0	18.54	26.54

*In 1972-73 the cotton variety was 'Badanwar' (long duration) and Arhar S-5. In 1973-74 the cotton variety was MCU-5 and Arhar R-60.

the yield of main crop was depressed upto 50% due to competition at the early stage of the crop. The depression of main crop was more in case of rice though the total production increased due to better yield of rice compared to mung.

The intercrop produced one half of the pure crop because it occupied about 50% of the land. There was practically no evidence of the benefit of the pulse crop to the companion crop.

The above findings would show that the legume crop would benefit the cereal crop and may help to substitute for some fertiliser need when grown in rotation than as a mixture. This must be due to availability of nutrient after decomposition of the root residues. The legumes may help the companion cereal crops if perhaps it would be grown in close proximity like seeding in the same row to achieve some interlocking of the roots. This aspect has been taken up for study currently.

SUMMARY

A number of field trials conducted during 3-4 years at the research farm of O.U.A.T. at Bhubaneswar on cropping sequences and mixed cropping with legumes on a loamy sand, acid lateritic soil indicated that the *mung* crop would benefit the following cereal crop in rotation and would increase the yield of latter by 2-4 q/ha. But it could not improve the production per unit area significantly when grown as a companion crop in cotton and *arhar*.

REFERENCES

- Akinola, A., Agbola and Fayami (1972). Mixed and inter cropping of legums in tropics. *Agron. J.* **64**: 409-15.