1.6. Miscellaneous

This major area had been divided into 5 sub areas. The training needs were assessed.

It could be observed that 3 out of 5 areas were found to have exceeded the overall mean score value. The AOs wanted to acquire knowledge on biotechnology, producton and use of bio-fertilizer and use of bio-pesticides. The other areas were seed production technology and agricultural engineering, for which they attached less importance.

Conclusion

The Agricultural Officers indicated first references for training in subject matter areas of allied enterprises, crop husbandry and agronomical aspects, particularly in the following areas, such as management, administration and supervision, programme planning and project formation, pomology, olericulture, agro forestry, pisciculture, dairying, plant protection measures, seeds and sowing, integrated pest management, biological control of pests and diseases, biotechnology and production and use of bio-fertiliser.

REFERENCES

GANESAN, R. (1978). "A study on Training Needs of Gramsevaks with Special Reference to Agriculture". Unpub. M.Sc. (Ag.) Thesis, TNAU, Coimbatore.

MENON, K. RADHAKRISHNA and R. ANNAMALAI. (1975). "An Analysis of Training Needs of Village Level Workers". Madras Agric. J., 62 (10-12) : 812-827.

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PLANT SPACING AND PHOSPHORUS FERTILISATION ON SEED PRODUCTION OF *CROTALARIA JUNCEA*

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ABSTRACT

Field experiments were conducted to study the effect of different spacings and phosphorus levels in *Crotalaria juncea* seed production. The results revealed that the seed crop can be grown with a spacing of 60 x 15 cm along with application of phosphorus at 50 kg/ha to get good yield with assured quality.

KEY WORDS : *Crotalaria juncea*, Seed production, Spacing, Phosphorus

Nitrogen fixing *in-situ* leguminous green manures are gaining importance in the context of more emphasis on low external input sustainable agriculture. Among the different organic manures, green manures have been playing an important role in supplying the nutrients and enhancing the physical, chemical and biological properties of the soil.

Although the value and importance of green manure incorporation are well known to the peasants, it has not been regularly and widely adopted by them owing to several factors. One of the foremost factors is non-availability of quality seeds on time (Palaniappan and Budhar 1992). Therefore, the present study was undertaken to evolve suitable agrotechniques for quality seed production in *Crotalaria juncea* which is commonly grown both in wet and gardenland agroecosystems. Also, it is one of the common *in-situ* green manue crops grown extensively in India, Indonesia, Asia, Philippines and Senegal.

MATERIALS AND METHODS

Field experiments were conducted during summer 1993 and 1994 at Tamil Nadu Agricultural University, Coimbatore in clay loam soil. The experiment was laid out in factorial randomised block design with three replications. The treatments consisted of three spacings (30 x 15, 60 x 15 and 90 x 15 cm) and three phosphorus levels (0, 25, 50 kg P_2O_5 per ha.). The soil of the experimental site is deep clay loam, moderately well

drained, low in available N, medium in available P and high in available K. The seeds were treated with peat based multistrain rhizobial culture and phosphorus was applied basally as per treatment schedule. The duration of the seed crop was around 90 to 100 days. Observations were recorded on various growth and yield components and the data were statistically analysed.

RESULTS AND DISCUSSION

Growth attributes : Closer spacing of 30 x 15 cm led to taller plants as compared to wider spacings of 60 x 15 and 90 x 15 cm. This might be due to competition for sunlight in the plant cummunity leading to etiolation of internodes for maximum interception of available light energy. Accommodation of more number of plants per unit are (22.2 plants/M^2) also favoured higher biomass and dry matter produciton possibly due to increased growth through taller plants and more number of leaves. On the contrary, wider spacing (90 x 15 cm) resulted in more number of effective root nodules and this might be due to lesser competition among plants for space, light, nutrients, water and other growth factors (Table 1).

In general, phosphorus application increased the plant height, effective root nodules, biomass and dry matter production as it had a salutary effect in enhancing the growth and nodulation of green manue crops. Depande and Bathkal (1965) have also obtained similar results.

Yield attributes : The number of flowers and pods per plant increased progressively with increased land area available to the individual plant. Reducing the density by 33 per cent increased the flower production by 50 per cent. The flower shedding was, however higher in closer spacing (Table 2) leading to lesser number of pods. This was mainly due to severe competition among plants for growth resources resulting in abortion of reproductive organs. Providing more land area (90 x 15 cm) to the plant produced 9.6 g seed yield per plant and it was 36.4% higher than closer spacing of 30 x 15 cm. The plant density manipulation had significant impact on seed yield. 60 x 15 cm spacing produced seed yield of 1089 Kg ha^{-1} and they were 29% higher than 30 x 15 cm spacing. The increased production of fruit bearing secondary branches and subsequent increase in the pod number led to increased pod and seed yield with less population. Reduced seed yield at very high plant population per unit area might be due to greater competition among plant community leading to reduction in the values of yield components. It is in consonance with the work of Akinola and Whiteman (1976) on legumes.

Fertilisation with phosphorus significantly increased the plant height, effective root nodule

Table 1. Effect of spacing and phosphorus fertilisation on growth attributes of *Crotalaria juncea*

Treatments	Plant height (cm)	Effective root nodule number	Biomass production (t/ha)	Dry matter production (t/ha)
Plant				
Spacing (cm)				
30x15	168.00	23.70	11.08	3.53
60x15	160.80	29.20	9.15	2.97
90x15	148.70	33.20	7.97	2.53
Phosphorus				
level (Kg/ha)				
0	155.20	27.40	9.16	2.92
25	158.70	28.50	9.38	2.99
50	163.10	30.50	9.65	3.12
SE_d1.10	0.64	0.08	0.06	
CD (p=0.05)	2.46	1.34	0.17	0.133

Table 2. Effect of spacing and phosphorus fertilisation on yield and yield attributes of *Crotalaria juncea*

Treatments	Total number of flowers formed	Pods/ plant	Flower shedding (%)	Pod length	Number of seed per pod	Seed wt per plant (g)	Seed yield per ha (Kg)
Plant Spacing (cm)							
30x15	50.20	17.11	65.80	2.40	7.40	6.10	844
60x15	70.80	26.00	63.40	2.80	9.80	8.40	1089
90x15	103.00	41.40	60.10	3.10	13.10	9.60	1019
Phosphorus level (Kg/ha)							
0	70.90	26.00	64.20	2.50	9.40	7.70	858
25	73.50	28.30	62.00	2.80	10.00	8.10	1000
50	79.40	30.30	62.60	2.80	10.90	8.40	1094
SE_d 0.89	0.79	1.09	0.06	0.13	0.11	3.98	
CD (p=0.05)	1.89	1.66	2.30	0.12	0.27	0.24	11.92

number and biomass and dry matter production. This was mainly due to changes in cell division, differentiation and proliferation. Singh (1972) also similarly reported that phosphorus significantly increased the growth and foliage of legume plants. Number of flowers, number of pods and seed yield had also increased due to the application of phosphorus. High level of phosphorus augmented the plant to produce more number of pods as a consequence of high sink availability from increased dry matter production and better growth of reproductive structures. The increases in seed yield was due to increase in number of fruit bearing, secondary branches. The influence of phosphorus on seed yield of green manure species has been well documented (Singh 1972 ; TNAU 1981). Applied phosphorus favoured the growth of roots which inturn increased the uptake of nutrients and subsequent nodulation, greater amount of atmospheric N fixation which were all in an integrated and cumulative manner led to more number of pods per plant, seeds per pod and seed yield per plant. The results are in accordance with the observation made by TNAU, 1989.

Thus for better seed yield, a spacing of 60 x 15 cm and phosphorus at 50 Kg ha^{-1} was found optimum in *Crotalaria juricea*.

REFERENCES

AKINOLA, J.O. and P.C. WHITEMAN. (1976). Agronomic studies on pigeonpea (*Cajanus cajan* (L.). Mill sp.) 2. Responses to sowing density. **Aust. J. agri. Res.**, 26(1) : 57-66.

DESPANDE, A.M. and B.G. BATHKAL. (1965). Effect of phosphorus and mung (*Phaseolus aureus* Roxb.) **Indian J. Agron.**, 10: 271-8.

PALANIAPPAN, SP. and M.N. BUDHAR. (1992). Seed production, crop establishment and incorporation practices as agronomic constraints in green manure production systems. Centre for Soil and Crop Management, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India.

SINGH, R.S. (1972). Effects of phosphate and boron on growth, nodulation and seed yield of dhaincha. **Indian J. agric. Sci.**, 42(2) : 139-144.

TNAU, (1981). Final report of scheme for studies on the production processing and storage of seeds of fodder, forage and green manure crops. *1979-81*, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

TNAU. (1989). Technological integration for agricultural development. Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India. XIV. Convocation. Feb 16. 1989.

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