

Performance of cultivars, population and manuring in rice under organic farming

P. BALASUBRAMANIYAN

Agrl. College and Research Institute, Tamil Nadu Agrl. University, Madurai, Tamil Nadu

Combined use of organics and inorganics is required for higher production in rice. Use of organics as green manuring had been an acceptable practice in India. Oil cakes are the form of concentrated organic manure, rich in N and also contain P & K. As such, non-edible cakes are used as manure. Oil cakes though insoluble in water, are quick acting organic manure, their nitrogen becoming quickly available to the plants. Oil cakes are more efficient in moist soil and in wet weather than in dry soil and in dry weather (Gaur *et al.* 1984). Now-a-days, organic farming concept has been well received in the context of sustainable production.

Choice of varieties, maintenance of optimum plant population and addition of organic manure such as green manure (GM), oilcake like neem cake (NC), biofertilizer may play vital role in achieving higher production in rice under organic farming without the use of inorganics. Hence, a field study was conducted to find out the influence of variety, plant population and organic manuring in rice under organic farming situation.

Field experiment was conducted at Agricultural College and Research Institute, Madurai, Tamil Nadu during 1995-96 in a split plot design with 3 replications. The soil of the experimental site was sandy clay loam classified as low in available N, medium P and high in K.

Main plot treatments constituted varieties (V_1 -IR 20, V_2 -Ponni) and plant population (P_1 -50, P_2 -66 hills/m²). The sub-plots consisted manuring (M_0 -No manuring, M_1 -125 kg N ha⁻¹), M_2 -GM 12.5 t ha⁻¹, M_3 -GM 6.25 t ha⁻¹ + NC 1250 kg ha⁻¹, M_4 -GM 9.0 t/ha + NC 625 kg ha⁻¹). Organics, GM and NC were applied

each to supply 62.5 kg N/ha in M_2 and 90 and 35 kg N ha⁻¹ respectively in M_3 . Green manure, dhaincha was applied at the required quantity to the concerned plot and allowed to decompose. Well-powdered neemcake was applied as basal. In the inorganic treatment (M_1), N, P_2O_5 , K_2O at 125-60-60 kg ha⁻¹ was adopted. Phosphorus as superphosphate was basally applied. Nitrogen and potash were applied at basal (50%), tillering (25%) and panicle initiation stages (25%). Planting was done at 20x10cm (50 hills/m²) in P_1 and 15x10cm (66 hills/m²) in P_2 . Growth and yield parameters were recorded at flowering and maturity phases respectively. Grain yield was assessed at 14% moisture. Post harvest N status was also assessed.

The experimental results revealed that among the two varieties, Ponni grew taller than IR 20. Tiller production and number of panicles were not significant between the varieties. However, panicle length, filled grains and grain filling percentage were significantly higher with the variety Ponni; while, 100 grain weight was much less with that variety. Among the plant production, yield parameters such as panicle length and filled grains vary. Higher population of 66 hills/m² favoured panicle length and filled grains/panicle. Among the manures, application of green manure (9.0 t ha⁻¹) and neemcake (625 kg ha⁻¹) (M_3) greatly influenced the plant height, tiller and panicle production. Panicle length, filled grains and grain filling percentage were also higher with this treatment (Table 1). The post harvest soil available N status was not affected due to varieties or population. Significant difference in the soil available N status was noticed due to manures. Application of green manure (9.0 t ha⁻¹) and neemcake (1250 kg/ha) recorded higher available N. Chaphale and Badole (1999) reported increase in organic carbon, total N, available NPK due to incorporation of green leaf manure in rice.

Table 1. Effect of varieties, population and manurial levels on the performance rice

Treatments	Plant height (cm)	Total tillers /hill	Productive tillers /hill	Panicle length (cm)	Spikelets/ panicle	100 grain wt. (g)	Soil available N (kg ha ⁻¹)
<i>Varieties</i>							
V1	98.0	13.2	10.0	22.1	93.0	2.23	243
V2	124.9	12.8	9.9	28.9	94.7	1.88	248
CD	NS	NS	NS	0.87	2.2	0.12	NS
(P=0.05)							
<i>Population</i>							
P1	114.1	13.1	10.1	25.1	93.3	2.06	247
P2	108.8	12.8	9.9	26.0	94.4	2.05	244
CD	NS	NS	NS	0.87	NS	NS	NS
(P=0.05)							
<i>Manures</i>							
M0	107.4	10.2	8.1	24.5	90.3	2.03	217
M1	109.4	12.0	9.5	25.1	93.2	2.05	246
M2	111.9	13.3	10.1	25.6	94.5	2.00	249
M3	113.2	14.0	10.7	26.0	95.2	2.08	261
M4	115.3	15.4	11.7	26.4	96.3	2.10	256
CD	1.4	1.0	0.64	0.20	1.37	NS	7.3
(P=0.05)							

Table 2. Effect of varieties, population and manurial levels on grain yield (kg/ha)

Variety/ Population		Manures					
		M0	M1	M2	M3	M4	Mean
V1	P1	3945	6108	5163	5050	5436	5141
	P2	4020	5313	5140	5298	5638	5082
	Mean	3983	5710	5152	5174	5538	5110
V2	P1	3080	3708	3410	3545	4123	3573
	P2	3467	3782	3487	3760	3415	3582
	Mean	3273	3745	3448	3653	3769	3578
	P1	3513	4908	4287	4297	4780	4357
	P2	3743	4548	4313	4529	4527	4332
	Mean	3628	4728	4300	4413	4653	-

CD (P=0.05) : V - 144

P - NS

M - 350

Interaction - NS

With respect to grain yield, variety IR20 yielded more (5110 kg ha⁻¹) than Ponni (3578 kg ha⁻¹). The difference in yield between the population was not appreciable. Eventhough

application of inorganics at 125:60:60 kg N, P₂O₅, K₂O ha⁻¹ recorded higher yield (4728 kg ha⁻¹), it was comparable with combined application of green manure and neemcake to

supply 75 and 25 per cent inorganic N respectively (4653 kg ha⁻¹). It was observed that fine grain rice, Ponni registered higher yield of 3769 kg ha⁻¹ with the combination of organic alone while variety IR20 yielded more (5710 kg ha⁻¹) with the application of inorganics alone (Table 2).

Hence, it is imperative that variety Ponni is highly suitable for organic farming situation. Increased population of 66 hills/m² did not give any yield advantage than 50 hills/m². Green manuring and neemcake can be used as an alternative source to chemical fertilizer.

References

- Gaur, A.C., Neelakantan, S. and Dargan, K.S. (1984). Organic manures. ICAR Publication, New Delhi, pp.159.
- Chaphale, S.D. and Badole, W.P. (1999). Effect of green manuring and NPK combinations on soil health and yield of rice. *Indian J. Agron.* 44: 448-451.

(Received: May 2002; Revised: December 2002)

Madras Agric. J. 90 (7-9): 532-533 July-September 2003

Research Notes

Influence of sulphur on yield and economics in irrigated sunflower (*Helianthus annuus* L.)

M.N. BUDHAR, N. TAMILSELVAN AND A.K. MANI

Regional Research Station, Tamil Nadu Agricultural University, Paiyur - 635 112, Tamil Nadu

Sulphur (S) is recognized as important secondary nutrient under the macro elements. It is essential for the growth and development of plant besides it stimulates seed formation and increase the oil content in oil seed crops. It's deficiency has been reported from several states of India and importance of sulphur application for increasing crop yield and quality is being increasingly recognized (Tandon, 1989). Poor seed setting has been one of the most commonly encountered problem in sunflower. The average seed setting in India is around 60 per cent and it may be reduced to 20 per cent in certain seasons and locations (Seetharam, 1976). Hence this problem demands greater attention due to its adverse effect on seed yield. There is very little information available regarding the effect of sulphur on sunflower. Therefore, the present investigation was undertaken with a view to study the effect of different levels of sulphur on yield and economics and to fix the optimum dose of sulphur application for irrigated sunflower.

A field experiment was conducted in red sandy loam soils at Regional Research Station,

Paiyur under irrigated condition during Rabi 2001 (Dec-Feb). Five levels of sulphur viz. 0,15,30,45 and 60 kg/ha combined with the recommended dose of NPK were tried in randomized block design with four replications. The recommended dose of NPK for irrigated sunflower was 40:20:20 kg/ha and the test variety was CO.3. The DAP and urea was used to supply N and P for treatment 1. The single super phosphate (16% 'P' and 12% 'S') @ 125 kg ha⁻¹ was applied to supply the recommended dose of P (20 kg ha⁻¹) and sulphur (15 kg ha⁻¹) for treatments 2 to 5. The additional dose of sulphur for treatments 3 to 5 was supplied through gypsum (15% 'S') as per the treatments. A common dose of potassium (20 kg ha⁻¹) was applied through muriate of potash to all treatments.

The plant height and diameter of capitulum were not significantly influenced by the application of different levels of sulphur. However, the yield attributes viz. number of grains/capitulum and test weight were significantly influenced by the levels of sulphur application. The number of grains and test weight were significantly