

IMPACT OF INTEGRATED AGRONOMIC PRACTICES ON RAYA AND GRAM PRODUCTION UNDER RAINFED CONDITIONS

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ABSTRACT

Improved varieties, improved management (sowing with ridger seeder and proper hoeing and weeding) and recommended dose of N and P fertilizers (40 Kg N + 20 Kg P₂O₅/ ha for raya and 20 Kg N + 40 kg P₂O₅/ ha for gram) gave maximum average yield of raya (18.3 q/ha) and gram (20.1 q/ha). Improved varieties of raya (Prakash) and gram (H-208) alone gave 50 and 92 per cent higher yield, respectively, over local varieties. The yields of raya and gram with improved management practices were 40 and 51 per cent higher, respectively, than conventional management. In both the management practices, the recommended dose of fertilizers gave significantly higher yield over one-third but was at par to two-third of the recommended dose.

INTRODUCTION

Raya (*Brassica juncea* L.) and gram (*Cicer arietinum* L.) are the most important rabi season crops grown on conserved moisture in arid and semi-arid regions of north-western India. The grain yields of these crops at farmers fields are very low because of poor crop stand, on account of receding soil moisture in upper layer, and partial or non-adoption of improved agronomic practices. Improved agronomic practices if adopted in the form of integrated approach may interact favourably and produce potential yields. The present study was, therefore, conducted to study the impact of integrated agronomic practices on raya and gram production under rainfed conditions.

MATERIAL AND METHODS

A field experiment was conducted during rabi seasons of 1980-81, 1981-82 and 1982-83 at the Regional Research Station, Bawal, Haryana Agricultural University. The experiment was laid out in a randomised block design with four replications. The details of treatments are given in Table 1.

Local as well as improved varieties of raya (Prakash) and gram (H-208) were sown in rows 45 cm apart on 23, 15 and 16 October in first, second and third year, respectively. The harvesting of raya was done on 25, 29 and 30 March and that of gram on 3, 6 and 9 April in the first, second and third year, respectively. The rainfall

Table 1. Yield of raya and gram as influenced by agronomic treatments

Treatments	Grain yield (q/ha)							
	Raya			Gram				
	1980-81	1981-82	1982-83	Mean	1980-81	1981-82	1982-83	Mean
T ₁ —Local variety sown with desi plough	7.4	6.2	4.0	5.9	4.5	4.2	4.3	4.3
T ₂ —Improved variety sown with desi plough	10.4	8.7	7.3	8.8	8.6	7.9	8.6	8.4
T ₃ —Improved variety sown with ridger seeder + proper hoeing and weeding	12.9	12.8	11.0	12.4	14.0	11.5	12.4	12.6
T ₄ —T ₂ +1/3 of recommended N and P	11.5	11.3	10.2	11.0	14.1	10.3	11.6	12.0
T ₅ —T ₂ + 2/3 of recommended N and P	14.0	13.0	12.6	13.2	15.8	12.7	13.6	14.0
T ₆ —T ₂ + recommended N and P	16.4	14.3	14.0	14.9	16.9	12.8	15.1	14.9
T ₇ —T ₂ + 1/3 of recommended N and P	13.8	15.4	13.6	14.3	15.1	15.8	14.8	15.2
T ₈ —T ₃ + 2/3 of recommended N and P	15.6	18.5	16.5	16.9	17.7	18.9	17.8	18.1
T ₉ —T ₃ + recommended N and P	17.7	19.8	17.9	18.3	19.8	20.6	19.9	20.1
CD 5%	2.9	1.6	1.4	2.2	3.0	2.4	2.3	2.6

Recommended dose : Raya — 40 kg N + 20 kg P₂O₅/ha Gram — 20 kg N + 40 kg P₂O₅/ha

received during growing period of crops was 72.2, 176.4 and 36 mm in first, second and third year, respectively.

RESULTS AND DISCUSSION

The data reported in table 1 indicated that adoption of improved varieties, improved management (sowing with ridger seeder and proper hoeing and weeding) and recommended dose of N and P fertilizers in integrated form (T₉) gave 211 and 107 per cent higher grain yield in raya and 360 and 139 percent in gram over local (T₁) and improved varieties (T₂) grown with conventional management (desi plough) sowing, respectively.

Improved varieties of both the crops gave significantly higher yield over local varieties. On an average, yield of raya and gram increased to the extent of 50 and 92 per cent, respectively.

The yields of both the crops under improved management were significantly higher than conventional management in all the years except raya in 1980-81. The higher yields of raya (40 per cent) and gram (51 per cent) under improved management over traditional were attributed to better crop stand by placing the seed in the moist zone with minimum soil cover by sowing with ridger seeder. Also, the-in-situ moisture conservation of winter rainfall in the ridge-furrow system might have contributed towards the increase in yields. Similar results were reported by Kataria and Batra (1977). In addition, proper hoeing and weeding under improved management, controlled the weeds properly and helped the crops to utilize the moisture and nutrients more efficiently. Beneficial effects of hoeing and weeding were also reported by Panwar and Pandey (1977) and Saxena (1979) in gram and Mehrotra *et al.* (1972) in raya crops.

Fertilizer application under improved management resulted in higher yields than conventional management. The average yields obtained under improved management with two-third and one-third of recommended dose were higher as compared to recommended and two-third of recommended under conventional management, respectively. In both the management practices the recommended and two-third of recommended doses were statistically at par but produced significantly higher yields of raya (31 and 19 per cent) and gram (28 and 18 per cent) over one-third dose. Similar beneficial effects of fertilizers were reported under rainfed conditions by Manjhi and Chowdhary (1971), Chundawat *et al.* (1976), and Panwar *et al.* (1977) in gram and Shekhawat *et al.* (1972), Chundawat *et al.* (1975) and Patel *et al.* (1980) in raya.

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