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Effect of integrated nutrient management on yield and yield attribute of horsegram [*Macrotyloma uniflorum* (Lam.) Verdc.] in Chhattisgarh plain

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Abstract

A field experiment was carried out during at Barrister Thakur Chhedilal Collage of Agriculture and Research station, Bilaspur, Indira Gandhi Krishi Vishwavidyalya, Raipur, Chhattisgarh during post *kharif* season 2020-21 entitled with “Effect of integrated nutrient management on yield and yield attributes of horsegram [*Macrotyloma uniflorum* (Lam.) Verdc.] in Chhattisgarh plain” including organic and inorganic nutrients source with recommended dose of fertilizers (RDF) 20:40:20 NPK kg ha⁻¹ was layout at randomized block design (RBD) with nine treatments and three replications, taking variety of horsegram “Bilasa Kulthi”. Result revealed that between the different organic and inorganic treatments T₆ (100% RDF + *Rhizobium culture* + PSB) result indicated that the highest seed yield (865.24 kg ha⁻¹) was observed which was significantly superior over other treatments but it was at par with T₄ (100% RDF + *Rhizobium culture*) with seed yield (819.40 kg ha⁻¹) closely followed by the treatments of T₅ (75% RDF + 25% N through FYM + *Rhizobium culture*) with (743.24 kg ha⁻¹) and T₈ (50% RDF + 50% N through FYM + *Rhizobium culture* + PSB) with (661.50 kg ha⁻¹), straw yield and harvest index of horsegram is (1297.45 kg ha⁻¹) and 40.00%. The higher yield attributes characters under the T₆ has been affiliated with significantly superior is number of (29.88) pods plant⁻¹, (4.71 cm) pod length, (6.13) number of seeds pod⁻¹, (29.25 g) test weight (weight of 1000 seeds) and was observed under treatment T₆ (100% RDF + *Rhizobium culture* + PSB).

Keywords: Horsegram, yield attributes, organic and inorganic nutrients

Introduction

Pulses play important role in agriculture next to cereals. These are the major source of dietary protein, along with minerals and vitamins. It is the second rich source of dietary protein in vegetarian diet in our country and also in other developing countries. Among the pulses, horsegram is an important post-season *kharif* crop of the country commonly known as “Kulthi” belongs to the family fabaceae. It has diploid chromosome numbers of 2n = 20 (Cook *et al.*, 2005) [5]. Horsegram is grown with mixed crop. The crop duration of horsegram is 100 – 110 days. The average yield is about 350-800 kg ha⁻¹. It is known for its medicinal use and nutritional quality. It is consumed as a whole seed and as sprouts in India. Horsegram used traditionally as a medicinal crop famous for its medicinal uses because different parts of the plant are used for the treatment of asthma, bronchitis, urinary disorder, lowering cholesterol levels and kidney stones (Ghani, 2003) [8]. In India, horsegram occupies an area of 460.40 (000 ha) with a production of 181.29 (000 tonnes) with an average national productivity of 394 kg ha⁻¹ (Anonymous, 2018-19) [1]. Horsegram is important pulse crop mostly grown in Karnataka, Odisha, Chhattisgarh, Andhra Pradesh, Tamil Nadu and Maharashtra which together contributes about 89.23 per cent area and 86.10 per cent production. Higher productivity of horsegram is obtained in Bihar (1000 kg ha⁻¹). In Chhattisgarh, horsegram occupies an area of 40.15 (000 ha) with a production of 15.20 (000 tonnes) and average productivity of 379 kg ha⁻¹ (Anonymous, 2018-19). Horsegram is an important pulse crop of the state and mostly grown in Sarguja, Jagdalpur, Kanker, Korba and Jashpur which together contributes about 69.74 per cent area and 76.61 per cent production. However, the productivity of horsegram is highest in Janjgir (388 kg ha⁻¹).

Materials and Methods

The present research entitled “Effect of Integrated nutrient management on growth and yield of horsegram [*Macrotyloma uniflorum* (Lam.) Verdc.] in Chhattisgarh plain” was carried out during post *kharif* season 2020 at Instructional Farm, BTC College of Agriculture and

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Research Station, Bilaspur (C.G.), which was situated in dry moist, sub-humid region at an altitude of 292 m above mean sea level on 22.09°N latitude and 82.12°E longitude. The soil of the experimental site was sandy-clay in texture. The Horsegram (var. Bilasa kulthi) was grown and treatments were replicated three times in RBD. The experiment consists of nine treatments viz., T₁:- 100% RDF, T₂:- 75% RDF + 25% N through FYM, T₃:- 50% RDF + 50% N through FYM, T₄:- 100% RDF + *Rhizobium* culture, T₅:- 75% RDF + 25% N through FYM + *Rhizobium* culture, T₆:- 100% RDF + *Rhizobium* culture + PSB, T₇:- 50% RDF + 50% N through FYM + *Rhizobium* culture, T₈:- 50% RDF + 50% N through FYM + *Rhizobium* culture + PSB, T₉:- Control plot. The crop was sown on 11th September, 2020 and harvesting was done on 18th December, 2020.

Result and Discussion

Effect of INM on yield attributes and yields of Horsegram

Integrated nutrient management indicated significant effect on yield attributes and yield of Horsegram crop (Table 1). Number of pod plant⁻¹ had observed significantly higher (29.88) in T₆ (100% RDF + *Rhizobium* culture + PSB), which was found at par with T₄ (100% RDF + *Rhizobium* culture), is (28.89) while control plot (T₉) had found significantly lowest number of pod plant⁻¹ (19.63). Pod length (cm) had observed significantly higher (4.71) in T₆ (100% RDF + *Rhizobium* culture + PSB), which was found at par with T₄ (100% RDF + *Rhizobium* culture), is (4.65) while control plot (T₉) had found significantly lowest number of pod plant⁻¹

(4.09). Significantly higher number of seeds pod⁻¹ (6.13) had recorded in T₆ (100% RDF + *Rhizobium* culture + PSB), at par with T₄ (100% RDF + *Rhizobium* culture) (6.02) on the other hand significantly lowest number of seeds pod⁻¹ was found by control plot (T₉) (5.11). These types of results recorded by Rashid *et al.*, (2013) in gram. Test weight non-significant difference for test weight but the highest weight of 1000 seeds (29.25 g) was found in T₆ (100% RDF + *Rhizobium* culture + PSB), followed by T₄ (100% RDF + *Rhizobium* culture) (29.17 g). Among the various treatments the highest seed yield (865.24 kg ha⁻¹) was obtained from application of T₆ (100% RDF + *Rhizobium* culture + PSB), which was statistically at par with T₄ (100% RDF + *Rhizobium* culture) with seed yield (819.40 kg ha⁻¹) and T₅ (75% RDF + 25% N through FYM + *Rhizobium* culture) with seed yield is (743.24 kg ha⁻¹). The lowest seed yield (343.34 kg ha⁻¹) was recorded under treatment (T₉) control plot. the various treatments the highest straw yield (1297.45 kg ha⁻¹) was obtained from application of (100% RDF + *Rhizobium* culture + PSB) T₆ which was statistically at par with T₄ (100% RDF + *Rhizobium* culture) with straw yield (1239.31 kg ha⁻¹) and T₅ (75% RDF + 25% N through FYM + *Rhizobium* culture) with seed yield is (1060.41 kg ha⁻¹). The lowest straw yield (650.36 kg ha⁻¹) was recorded under treatment (T₉) control plot. The application of (100% RDF + *Rhizobium* culture + PSB) T₆, was recorded highest harvest index (40.00%) followed by T₄ (100% RDF + *Rhizobium* culture) harvest index is (39.80%)

Table 1: Effect of INM on yield attributes and yields of Horsegram

Treatments	Yield attributing characters						
	Number of pods plant ⁻¹	Pod length (cm)	Number of seeds pod ⁻¹	Test weight	Seed yield (kg ha ⁻¹)	Straw yield (kg ha ⁻¹)	Harvest index (%)
T ₁ 100% RDF	24.95	4.36	5.41	28.94	605.01	971.42	38.36
T ₂ 75%RDF + 25% N through FYM	25.08	4.41	5.59	29.01	630.78	999.92	38.68
T ₃ 50% RDF + 50% N through FYM	22.13	4.21	5.39	28.95	571.76	945.19	37.60
T ₄ 100% RDF + <i>Rhizobium</i> culture	28.90	4.65	6.03	29.17	819.40	1239.31	39.80
T ₅ 75% RDF + 25% N through FYM + <i>Rhizobium</i> culture	27.80	4.60	5.98	29.13	743.24	1160.41	39.60
T ₆ 100% RDF + <i>Rhizobium</i> culture + PSB	29.88	4.71	6.13	29.25	865.24	1297.45	40.00
T ₇ 50% RDF + 50% N through FYM + <i>Rhizobium</i> culture	25.75	4.29	5.63	29.05	645.45	1021.41	38.72
T ₈ 50% RDF + 50% N through FYM + <i>Rhizobium</i> culture + PSB	26.03	4.45	5.71	29.10	661.50	1040.43	38.86
T ₉ Control plot	19.63	4.09	5.11	28.90	343.34	650.36	34.56
S.Em ±	1.01	0.05	0.05	0.39	45.37	46.32	-
CD(0.05)	3.04	0.16	0.15	NS	136.01	138.85	-

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