

## EFFECT OF SPACING ON CONCENTRATION AND UPTAKE OF NUTRIENTS BY PIGEONPEA CULTIVARS

A.M. PUSTE AND P.K. JANA

Department of Agronomy  
Bidhan Chandra Krishi Viswavidyalaya, Kalyani-741235, Nadia (W.B.)

The grain legume pigeonpea [*Cojanus cajan* (L.) Millsp] maintains soil fertility but also utilizes more phosphorus from the applied source. There is practically no information available on the nutrient concentration and uptake by winter pigeonpea. Such studies are required to develop an efficient fertilizer schedule for winter season pigeonpea.

The investigation was carried out at the University farm, Kalyani during winter seasons of 1980-81 1981-82 and 1982-83. The soil was sandy-loam, containing 0.07% total nitrogen, 36.0 kg/ha available  $P_2O_5$ , 112.0 kg/ha available  $K_2O$  and pH 7.4. The experiment was laid out in a Randomised Block Design with three replications. The treatments consisted of 12 combinations of four spacings (row to row X plant to plant) and three cultivars of pigeonpea in 1980-81 and 1981-82. During 1982-83, treatments consisted of sixteen combinations of four spacings (20 x 15, 30 x 15, 40 x 10 and 40 x 15 cm) and four cultivars viz. 5(124), 20(105), Bahar and HY 3C. Pigeonpea was sown from 30 September to 4 October and harvested from 29 March to 9 April. Basal application of 20 kg nitrogen as urea, 50 kg  $P_2O_5$  as single super phosphate and 30 kg  $K_2O$  as muriate of potash per hectare was made. Nitrogen (N) and phosphorus (P) in seed were determined by modified Macro-Kjeldahl and Olsen's method, respectively. Uptake of N and P was calculated by multiplying N and P content of seed to the seed yield.

### Nutrient content

The bold seeded cultivar 20(105) had maximum N content while it was minimum in the seeds of HY 3C (Table 1). The close spacing (20 x 15 cm) caused significantly lower N content than wider spacings (Table 2) which may be attributed to higher interplant competition for nutrient absorption due to increased plant population.

Phosphorus content of cv Bahar was maximum which was statistically at par with cv 20(105) (Table 1). The P content of seed was significantly higher under wider spacing (40 x 15 cm) as compared to closer spacings (Table 2). The close spacing of 20 x 15 cm recorded least P content of seed due to competition among the plants for nutrients.

Table 1. Contents (%) in seeds and uptake (kg/ha) of nitrogen and phosphorus by pigeonpea cultivars

Cultivars	N content			P content			N uptake			P uptake		
	1980-81	1981-82	1982-83	1980-81	1981-82	1982-83	1980-82	1981-82	1982-82	1980-81	1981-82	1982-83
	5(124)	3.47	—	3.45	0.40	—	0.42	42.11	—	46.27	5.00	—
20(105)	3.48	3.47	3.57	0.42	0.46	0.45	54.00	57.60	56.20	6.48	7.47	7.17
Bahar	3.45	3.46	3.41	0.44	0.46	0.45	47.91	49.69	46.27	6.10	6.58	6.06
HY3C	—	3.44	3.41	—	0.41	0.41	—	46.85	49.18	—	5.62	6.01
CD(5%)	0.015	0.015	0.013	0.013	0.012	0.012	3.55	2.90	3.56	0.45	0.42	0.51

Table 2. Effect of spacings on the content (%) in seeds and uptake (kg/ha) of nitrogen and phosphorus by pigeonpea cultivars

Spacing (cm)	N content			P content			N uptake			P uptake		
	1980-81	1981-82	1982-83	1980-81	1981-82	1982-83	1980-81	1981-82	1982-83	1980-81	1981-82	1982-83
	20 x 15	3.43	3.41	3.39	0.38	0.39	0.38	55.79	58.66	59.14	6.26	6.69
30 x 15	3.47	3.46	3.40	0.40	0.43	0.41	53.38	54.68	54.24	6.13	6.83	6.82
40 x 10	3.48	3.47	3.47	0.43	0.47	0.46	44.31	47.92	45.06	5.57	6.57	5.98
40 x 15	3.48	3.49	3.49	0.47	0.48	0.48	40.61	44.08	39.62	5.67	6.13	5.40
CD (5%)	0.017	0.018	0.013	0.015	0.014	0.012	3.35	3.56	0.52	0.491	0.513	0.513

**Nutrient uptake**

Cultivar 20(105) recorded significantly higher uptake of N of seeds than others because of its higher seed yield and N content of seeds (Table 1). Wider spacing of 40 x 15 cm gave significantly lower uptake of N (39.62 - 44.08 kg/ha) compared to closer spacings (55.79-59.14 kg/ha) due to lower seed yield at 40 x 15 cm spacing (Table 2).

Maximum P content was recorded with cv 20(105) which gave significantly higher yield over other cultivars. Wide spacing of 40 x 15 cm recorded the lowest uptake of P because of its significantly lower seed yield compared to other spacings.