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Short communication

EFFECT OF NITROGEN SCHEDULING ON RABI MAIZE

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Maize (Zea mays) is traditionally grown in rainy season in eastern part of Uttar Pradesh. Its cultivation in winter season (October to April) has started in recent past year. It is third most important cereal crop after rice and wheat in eastern Uttar Pradesh. Being the exhaustive crop, maize requires large amount of nutrients particularly N for producing more yields (Meena et al 2011). The concept of balanced fertilizations paves the way for optimum plant nutritional supply to realize full yield potential of crop. Among the major nutrients nitrogen plays a important role in plant vegetative growth as well as yield of crop. Lower supply of nitrogen in maize crop resulted poor growth and lower yield. In view of this, present study was undertaken to investigate the effect of split dose of nitrogen for higher yield of maize.

The experiment was conducted at Crop Research Station Bahraich in winter season of 2008-09 and 2009-10 in randomized block design with three replications. The four treatments_were-T_1-30% as basal, 10% at four leaf stage, 30% at 8 leaf stage and 30% at tesling stage, T_2 -10% as basal, 20% at 4 leaf stage, 30% at 8 leaf stage 30% at tesling stage and 10% at grain filling stage. T_3 -5% as basal, 30% at 4 leaf stage, 40% at 8 leaf stage 15% at tesling stage and 10% at grain filling stage. T_4 - 20% as basal, 20% at 4 leaf stage 30% at 8 leaf stage 20% at tesling stage and 5% at grain filling stage. Full dose of P and K was applied as basal and nitrogen' was applied as per treatments. The level of N, P and K was applied @ 240kg N, 60 kg P and 60 kg K kg ha^1. The crop was sown on 30 October in both the years. All agronomical practices were adopted as. per requirement of crop. The growth parameters were noted at full growth stage of the crop. Yield attributes and yield were recorded at harvest of the crop. The grain and stover samples were analyzed for N, P and K as per procedures adopted by Jackson (1973). The cost of cultivation and net return from the crop was calculated on market price of produce and input.

Table 1: Effect of nitrogen scheduling on growth, yield attributes and yield of rabi maize (mean of 2 years)

Treatments	Height of Plant (cm)	Cobs Length (cm)	Cobs Girth (cm)	Grain row/cobs	Grains/row	1000 grain weight (g)	Grain yield (q ha^{-1})	Stover yield (q ha^{-1})
T_1	197.0	16.5	13.2	13.7	31.6	265.0	76.80	115.8
T_2	190.0	17.9	13.8	14.2	32.4	275.0	83.96	130.5
T_3	189.0	15.8	12.4	13.0	29.4	255.7	71.97	100.8
T_4	192.0	16.2	12.8	13.4	31.2	260.4	74.30	110.7
CD (P=0.05)	0.45	0.35	0.10	0.12	0.57	5.4	1.98	2.15

The Data indicated that highest plant height (197.0 cm.) was noted under T_1 treatment (30% as basal 10% at 4 leaf stage, 30% at 81eaf stage and 30% at tesling stage) which was significantly superior to other treatments. This was due to higher dose of nitrogen applied at the time of sowing, The yield attributes were highest (17.9 cm cobs length, 13.8 cm cobs girth, 14.2 grains row/cobs, 32.4 grains/rows and 275 g/1000 seed weight) under the treatment-T_2(10% as basal, 20% at 4 leaf stage, 30% at 8 leaf stage, 30% at tesling stage and 10% at grain filling stage) which were significantly superior to other treatments. This was possible due to split application of nitrogen at proper growth stage of crop. The application of 30% nitrogen at tesling stage was most effective on yield attributes. The similar result was also reported by Singh and Sarkar (2001). The yield data (Table-1) indicated that the highest grain yield of 83.96 q ha^1 was recorded under the treatment T_2, which was found 8.5, 14.2, and 11.5% higher over the treatment T_1, T_3 and T_4, respectively. The higher yield of stover was also found in the same treatment. The lowest values of yield attributes and yield (grain and stover) were recorded under T_3 treatment. The highest net income of Rs. 41778 ha^{-1} was noticed under T_2 which was found 14.5, 24.3 and 19.4% higher over the treatment T_1, T3 and T_4, respectively. It is due to higher yield under treatment T_2 B:C ratio was also found in the same treatments.

Table 2: Effect of nitrogen scheduling on net return, B:C ratio and total uptake of nutrients by maize crop(kg ha^{-1}) (mean of 2 years)

Treatments	Net return (Rs ha^{-1})	B:C ratio	N uptake	P uptake	K uptake
T_1	35720.00	1:2.27	240.8	26.5	204.5
T_2	41778.00	1:2.49	256.7	30.4	206.7
T_3	31592.00	1:2.12	215.7	24.7	195.6
T_4	33654.00	1:2.20	235.6	25.4	200.4
CD (P=0.05)	250.00	0.045	12.4	8.4	10.5

The higher net profit of Rs. (41778) and B:C ratio (2.49) was recorded under the treatment T_2 which was due to higher yield under the same treatment. The maximum nutrient uptake N (256.7 kg ha^{-1}), P (30.4 kg ha^{-1}), K (206.7 kg ha^{-1}) was also noted under T_2 due to higher yield. On the other hand, minimum values of N (215.7 kg ha^{-1}), P (24.7 kg ha^{-1}) and K (195.6 kg ha^{-1}) uptake by maize crop were recorded under T_3 treatment which may be attributed to lower grain and stover production. Avasthe (2011) reported that uptake of nutrients was significantly influenced by N fertilization with significant variation between schedules.

It may be concluded that maize responded to different schedules of N application. Nitrogen application as 10 % basal + 20 % at 4 leaf stage + 30 % at 8 leaf stage + 30 % at tesling stage and 10 % at grain filling stage performed the best amongst the various N application schedules evaluated.

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