Online www.hortflorajournal.com ICV: 27.39; GIF: 0.364

HortFlora Research Spectrum, 2(2): 172-174 (April-June 2013) ISSN : 2250-2823

EFFECT OF BIOFERTILIZERS AND PRESOAKING TREATMENTS OF NITRATE SALTS ON YIELD AND CHARACTER ASSOCIATION IN CORN (*Zea mays* L.) YIELD

S.P. Tiwari*, Arti Guhey* and S.P. Mishra[1]

Department of Crop Physiology, I.G.K.V.Raipur (C.G.) India

[1]Department of Crop Sciences, M.G.C.G.V.V, Chitrakoot (M.P.) India

**E mail: shashiprakash30@gmail.com; arti_guhey@rediffmail.com*

ABSTRACT: Experiment was conducted at Precision Farming Development Centre IGKV, Raipur during *kharif* 2008-09 and 2009-10 in split plot design comprising of three varieties (Deshi, hybrid and composite) of corn as a main plot while biofertilizers and nitrate salts combination in sub plot treatments. Observations were taken at specific growth phases of the crop which clearly indicated superiority of association of grain yield with different yield contributing morpho-physiological traits of corn.

Keywords: *Azospirillum, biofertilizers, nitrate salts, correlation coefficient.*

Maize or corn is the world's most widely grown cereal. It is cultivated at latitudes ranging from the equator to approximately 50° North and South, at altitudes ranging from sea level to more than 3,000-metre elevation. Of the 140 million hectares of maize grown globally, approximately 96 million hectares are in the developing world. Although, 68 per cent of global maize area is in the developing world, only 46 per cent of the world's maize production of 600 million tons (*Anon.*, 1) is grown there. Low average yields in the developing world are responsible for the wide gap between the global share of area and share of production.

At present, the area covered by maize crop in India is about 8.0-8.2 m ha (*Anon*., 1). Giving allowance to different growing situations in India, it could, however, be safe to expect national average yields to reach around 3 t ha^{-1}. Diversified uses of maize for starch industry, corn oil production, baby corns, popcorns etc., would further provide the much-needed impetus to the growth of maize. Virtually every part of the maize plant has economic value, including the grain, the leaves, the stalks, the tassels and in some cases, even the roots.

Many the several plant microbes association is natures one. The high efficiency of nitrogen fixation combined with low energy requirements easy establishment on plant roots and tolerance of high soil temperature exhibited by *Azotobactor* and *Azospirillum* seem to make them ideally suited as microbial inoculants far cereal crops under tropical condition results of the preliminary field trials on crops like rice, wheat, barley, sorghum, maize, millets are quite encouraging (Saikia *et al.,* 5). The higher yield potentiality of maize cannot be manifested up to the breme due to several biotic and abiotic factors among which poor nutritional management is the prime one. The soaking of seed with various nitrate salts prior to sowing of maize, mustards and okra has shown a positive impact on their germination as well as on vegetative growth (Bose *et al.* 2; Bose and Mishra, 3; Bose and Pandey, 4).

MATERIALS AND METHODS

The experiment was conducted in research field of Precision Farming Development Centre, Indira Gandhi Krishi Vishwavidyalya, Raipur (C.G.) India during *kharif* season of 2009-10. Experiment was comprised of three levels of corn varieties viz. hybrid, Composite and deshi. The design adopted for experiment was spilt-plot with three replications. Bold and healthy seeds of corn (Hybrid, Composite and Deshi) were surface sterilized with 0.1% of $HgCl_2$ for five minutes. These were washed thoroughly and soaked either in

Received : 8.3.2013 *Accepted : 3.4.2013*

distilled water or in solution of different nitrate salts containing 15 mM of nitrate salt *i.e.* $Mg(NO_3)_2$ and $Ca(NO_3)_2$, in petri dishes on filter paper for 24h. Seeds were treated with N_2 fixing biofertilizer (*Azospirillum*) desolving the seed with 20 g of biofertilizer (*Azospirillum*) and 10 ml of water and powdered over one kg of seeds. The seeds were mixed with hand to get proper coating. There after the seeds were dried and treated seed were sown immediately in the field at spacing 60x 25 cm using a seed rate of 25 kg ha. Nitrogen, phosphorus and potash were applied in the form of urea (46% N), single super phosphate (16% P_2O_5) and muriate of potash (60% K_2O). Nitrogen was applied in two splits i.e. ½ at basal, ½ each at 30 DAS, whereas, full doses of P_2O_5 and K_2O in each treatment were applied as basal at the time of sowing. Observations were recorded on association of grain yield with different morpho-physiological traits. Seed yield was also analysed at maturity. Statistical analysis was done as per the standard procedure.

RESULTS AND DISCUSSION

Correlation coefficient presented in Table 1 revealed that grain yield exhibited significant positive association with test seed weight (0.97) seed per cob (0.93), cob length (0.87), number of cob (0.88), seed protein content (0.97) and plant height (0.86). Test seed weight exhibited significant positive correlation with seeds per cob (0.89), cob length and seed protein content. Seeds per cob exhibited significant positive correlation with cob diameter (0.88), cob length (0.86), seed protein content (0.96), number of leaves per plant (0.87) and plant height (0.87). Cob diameter exhibited significant positive correlation with number of cob (0.91), seed protein content (0.87) and number of leaves per plant (0.91). Cob length exhibited significant positive association with seed protein content (0.88), leaf weight ratio (0.88), and plant height (0.87). Number of cob exhibited significant positive association with seed protein content (0.92) and dry matter accumulation (0.86). Seed protein content exhibited significant positive association with leaf weight ratio (0.90) and plant height (0.90). Leaf weight ratio exhibited significant positive association with plant height (0.88).

Table 1: Correlation coefficient among yield and yield contributing traits of corn.

Traits	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	1.00	0.35	0.79	0.73	0.77	0.88*	0.65	0.90*	0.80	0.87*	0.85*	0.87*	0.82	0.86*
2		1.00	0.64	0.51	0.47	0.16	0.44	0.29	0.51	0.16	0.63	0.30	0.18	0.16
3			1.00	0.66	0.71	0.68	0.68	0.81	0.85	0.80	0.91*	0.87*	0.72	0.72
4				1.00	0.71	0.72	0.49	0.64	0.73	0.70	0.64	0.50	0.56	0.53
5					1.00	0.83	0.66	0.85	0.86*	0.73	0.78	0.73	0.79	0.78
6						1.00	0.75	0.90*	0.76	0.88*	0.66	0.82	0.82	0.85
7							1.00	0.76	0.71	0.63	0.62	0.74	0.67	0.72
8								1.00	0.92*	0.88*	0.87*	0.96*	0.94*	0.97*
9									1.00	0.81	0.91*	0.85	0.91*	0.88*
10										1.00	0.75	0.86*	0.86*	0.87*
11											1.00	0.88*	0.78	0.81
12												1.00	0.89*	0.93*
13													1.00	0.97*
14														1.00

*, **Significant at 5% and 1% probability level, respectively.

1-Plant height, 2-Leaf area index, 3-Number of leaves, 4-Dry biomass, 5-Dry matter accumulation, 6-Leaf weight ratio, 7-Specific leaf area, 8-Protein content, 9-Number of cob, 10-Cob length, 11-Cob diameter, 12-Seeds per cob, 13-Test seed weight, 14-Grain yield.

REFERENCES

1. Anonymous (2009). Maize: Area and Distribution, Production guidelines. FICCI Agribusiness Information Centre, New Delhi. India.
2. Bose, B., Srivastava, H.S. and Mathur, S.N. (1982). Effect of some nitrogenous salts on nitrogen transfer and protease activity in germinating *Zeamays* L. *Seeds Biol. Plantarum,* **24:** 89-95.
3. Bose, Bandana and Mishra, T. (1992). Response of wheat seeds to presoaking seed treatment with Mg $(NO_3)_2$. *Ann. Agric. Res.,* **13:** 132-136.
4. Bose, Bandana and Pandey, P. (2003). Effect of nitrate presoaking of okra (*Abelmoschus esculentus* L.) seeds on growth and nitrate assimilation of seedling. *Physiol. Mol. Biol. Plants,* **9**(2): 287-290.
5. Saikia, S.P., Jain, V. and Shrivastava, G.C. (2003). Effect of *Azospirillum* and *Azorhizobium* on maize yield. *Indian J. Plant Physiol.,* (Special issue) : 539-544.