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Influence of Integrated Nutrient Management on Shelf Life Extension and Crown Rot in Banana cv Jahaji

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Abstract

A study was conducted to examine the effect of integrated nutrient management on shelf life extension and crown rot infestation in Jahaji banana during 2005-06. The experiment was laid out in randomized block design with eight treatments viz. T_0 : 100% recommended dose (RD) of NPK + FYM, T_1 : 100% RD of NPK + vermicompost, T_2 : 100% RD of NPK (P as rock phosphate) FYM + *Azospirillium* + PSB (phosphate solubilizing bacteria), T_3 : 75% RD of NPK (P as rock phosphate) FYM + *Azospirillium* + PSB (phosphate solubilizing bacteria), T_4 : 50% RD of NPK (P as rock phosphate) FYM + *Azospirillium* + PSB(phosphate solubilizing bacteria), T_5 : 50% RD of NPK (P as rock phosphate) vermicompost + *Azospirillium* + PSB (phosphate solubilizing bacteria), T_6 : 50% RD of NPK (P as rock phosphate) FYM + *Azospirillium* + PSB (phosphate solubilizing bacteria) + *Trichoderma harzianum,* T_7 : 50% RD of N + 100% RD of PK + FYM + *Azospirillium* + PSB (phosphate solubilizing bacteria) respectively. The study reveals that the treatments had significant influence on self life extension of banana on storage and crown rot infestation.

Key words : Integrated nutrient management, Banana, Jahaji (AAA), Shelf life, Crown rot.

The bananas are well known not only as delicious edibles with high nutritional value but also for enormous medicinal significance. Banana and plantains are reported to be the fourth important global food commodity in terms of gross value production (1). Considering the nutritive value of the fruit, it is considered as poor man's apple and it is the cheapest among all other fruits in the country. However, the fruit due to its highly perishable nature it cannot be stored for longer time. On the other hand,crown rot is known to cause severe post harvest losses in banana which generally develops from the infection of the cut surface of the crown by pathogenic fungi. *Colletotrichum musae* is considered the major fungal pathogen associated with the crown rot of banana (2). *C. musae* also causes anthracnose lesions which commonly appear on the fruit peel after ripening (3). Control of crown rot in banana is generally done through the application of fungicides as a dip or spray shortly after hatvest of the crop (4). The most commonly used fungicides were benzimidazole such as benomyl and thiabendazole but *C. musae* has developed resistance to these fungicides (5). However, the alternative disease control treatments for bananas are urgently needed. Hence the present investigation was carried out to study the influence of integrated nutrient management on shelf life extension and crown rot infestation in banana cv Jahaji.

Methods

The field experiment was undertaken during 2005-06 in the experimental farm of the Department of Horticulture, Assam Agricultural University, Jorhat. The experiment was laid out in randomized block design with different treatments combinations being replicated three times. The treatments were as follows : T_0—100% recommended dose (RD) of NPK + FYM ; T_1—100% RD of NPK + vermicompost ; T_2—100% RD of NPK (P as rock phosphate) + FYM + *Azospirillum* + PSB ; T_3—75% RD of NPK (P as rock phosphate) + FYM + *Azospirillum* + PSB ; T_4—50% RD of NPK (P as rock phosphate) + FYM + *Azospirillum* + PSB ; T_5—50% RD of NPK (P as rock phosphate) + vermicompost + *Azospirillum* + PSB ; T_6—50% RD of NPK (P as rock phosphate) + FYM +

Table 1. Effect of integrated nutrient management on shelf life and crown rot infestation in Jahaji banana.

Treatment	Shelf life (days)	Crown rot (%)	Taste	Flavor	Texture
T_0	8.32	55.83	8.00	7.00	7.33
T_1	9.14	55.16	8.33	7.33	7.67
T_2	9.19	54.20	8.00	7.67	7.67
T_3	10.07	53.53	8.67	7.67	8.00
T_4	10.16	52.92	8.67	8.00	8.33
T_5	11.09	47.53	9.00	8.33	8.33
T_6	10.19	51.13	8.67	8.33	8.33
T_7	8.84	52.41	8.67	8.00	8.00
CD at 5%	0.64	1.76	0.89	0.78	1.14

Azospirillum + PSB + Trichoderma harzianum ; T_7— 50% RD of N + 100% RD of PK + FYM + *Azospirillum* + PSB. The planting material sword suckers of banana cv Jahaji (AAA) about 2 kg weight were planted during March 2005 at a spacing of 1.5 m × 1.5 m. The treatment details of the experiment are explained as follows : In T_0, 100% recommended dose (RD) of NPK i.e. 110g N, 33g P_2O_5 and 330g K_2O per plant in the form of urea, single super phosphate (SSP) and murate of potash (MOP) were applied in two split doses, one at third month after planting and other half at fifth month after planting. The whole amount of SSP i.e. (206 g) and half of urea and MOP (i.e. 121g urea and 275 g MOP) were applied at fifth month after planting. Farm yard manure (FYM) 12 kg per pit was applied before planting in this treatment. In T_1 100% RD of NPK was applied as T_0 and vermicompost at 2 kg per pit was applied instead of FYM before planting in this treatment. In T_2, 100% recommended dose of NPK was applied with phosphorus in the form of rock phosphate (RP) (137.5 kg) which was mixed with the pit soil before planting. FYM (12 kg), *Azospirillum* (50 g) and phosphate solubilizing bacteria (PSB) (50 g) were applied in pit before planting in this treatment. In T_3, 75% of the RD of NPK (P as RP), FYM, *Azospirillum* and PSB were applied as T_2. In T_4, FYM, Azospirillum and PSB were applied as T_3 and NPK dose was reduced to 50%. The treatment T_5 was as T_4 except vermicompost (2 kg/plant) was applied instead of FYM and treatment T_6 was similar to T_4 except *Trichoderma harzianum* at 50 g/plant was mixed with the soil at the time of planting in this treatment. In T_7, 50% RD of N in the form of urea and 100% recommended dose of P and K in the form of SSP and MOP were applied along with FYM, *Azospirillum* and PSB like other treatments. Recommended package of practices was followed for other agronomic practices. Observations recorded for shelf life assessment and crown rot infestation were subjected to statistical analysis of variance by randomized block design (RBD). Taste, flavor and texture were assessed by scoring method by a panel of six judges. Significance and non-significance of variances due to different treatments were determined by calculating the respective *F* values as per the method described by Panse and Sukhatme (6)

Results and Discussion

In the present study, shelf life of banana significantly responded to the different treatments (Table 1). Among the treatments, T_5 recorded the highest value for shelf life while it was lowest inT_0. It was found that treatments with 100% NPK showed lower shelf life as compared to treatments with 50% NPK. On the other hand, in crown rot infestation, treatment T_5 recorded the lowest while it was highest in T_0 (100% NPK + FYM). In contrary to shelf life, crown rot infestation recorded higher in treatments with 100% NPK as compared to lower doses of NPK. However, treatments T_0, T_1 and T_2 were at par in crown rot infestation. It is evident that treatments with higher dose of inorganic nutrients had positive influence on crown rot infestation while shelf life of fruit was reduced in these treatments.

On the other hand treatments with 50% inorganic fertilizers and vermicompost with biofertilizer (T_5) recorded higher shelf life which may be due to beneficial effect of vermicompost. The score values for taste, flavor and texture were also found to be higher in T_5 while T_0 recorded the lowest. However, these values showed similar trend in T_4, T_5 and T_6. According to Mustaffa (7) and Hazarika and Mohan (8), nitrogen affects fruit quality by reducing total sugars and total soluble solids and increasing acidity. Our results also in conformity with these finding as lower values of scores for taste, texture and flavor were recorded with higher doses of NPK. Higher level of NPK had also more influence on crown rot infestation.

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