

EFFECT OF CERTAIN AGRONOMIC PRACTICES ON THE PERFORMANCE OF KOKKAN AFFECTED NENDRAN BANANA

E.V.Nybe, K. Pushkaran, A. Suma and Darley Jose
Banana Research Station, Kannara 680 652, Kerala, India

Abstract: The effects of certain agronomic practices on the performance of kokkan affected banana, cv. Nendran were studied at the Banana Research Station, Kannara during 1987. The results of the study revealed that the different agronomic practices such as application of K at double the recommended dose, $MgSO_4$, fresh cowdung and neem cake showed no significant improvement in kokkan affected plants with respect to yield, yield contributing characters and overall appearance of the bunch.

INTRODUCTION

Banana crop in Kerala, especially, Nendran is now facing a drastic set back, mainly because of the kokkan disease, the first report of which was made as early as 1966 by Samraj *et al.* in Kerala. The etiology of the malady still remains unknown, however, the carry over of the disease through suckers was established by Amma *et al.* (1986). No systematic information on the agronomic management of kokkan disease is available. In view of the observations made at the Banana Research Station, Kannara regarding the beneficial effects of application of Mg, burning dry leaves in the pit etc., in improving the bunch weight of kokkan affected plants, the present studies were conducted to find out the effect of certain organic manures and fertilizers on the performance of kokkan affected plants.

MATERIALS AND METHODS

The investigations were carried out at the Banana Research Station, Kannara during 1987 on Nendran which is most seriously affected by the kokkan malady. The experiment was laid out in a randomised block design with six treatments, each with six plants and repeated thrice. The treatments were :

- T₁ Healthy sucker with package of practices recommendations of the Kerala Agricultural University (1986) + 500 g lime/plant
- T₂ Kokkan affected sucker with package of practices recommendations of the Kerala Agricultural University (1986) + 500 g lime/plant
- T₃ T₂ + double dose of K_2O (i.e., 600 g/plant)
- T₄ T₂ + 200 g $MgSO_4$ per plant applied in two equal splits at 90 and 180 days after planting
- T₅ T₂ + 10 g fresh cowdung per plant applied as basal
- T₆ T₂ + 2 kg neem cake per plant applied as basal

Individual plant observations of all the treatment plants on various characters such as height, girth (at ground level), number of functional leaves and area of the 3rd leaf from the top (D leaf) as reported by Hewitt (1955) were recorded at the time of shooting. Leaf area was estimated employing the formula ($A = 76 \times L - 3700$) suggested by Rajeevan *et al.* (1984) for Nendran cultivar. Duration from planting to harvest was also noted. At the time of harvest,

the bunch weight and the bunch and finger characters were recorded. The outer to inner length ratios of the fruit (5 fruits from the second hand of each bunch) were also determined and were expressed as the curvature of the fruits (Stower and Simmonds, 1987). The qualitative aspects of ripe fruits were determined following the methods outlined by AOAC (1960). The plants were observed throughout for the expression of kokkan symptoms as described by Samraj *et al.* (1966).

RESULTS AND DISCUSSION

The results of the trial showed that all the plants developed from suckers of kokkan affected plants i.e., all the experimental plants except those in T_1 manifested kokkan symptoms which confirm the carry over effect of the disease through suckers as observed by Amma *et al.* (1986).

Data on vegetative characters, duration, yield, bunch characters and fruit quality are presented in Table 1. None of the vegetative characters studied i.e., height, girth and number of functional leaves showed significant difference among treatments. However, the maximum values of 297 cm, 64 cm and 12.4 respectively of height, girth and number of functional leaves were recorded by the control plants (healthy). The different agronomic management practices failed to improve the height, girth and number of functional leaves of kokkan affected plants. However, the lowest number of functional leaves (10) was recorded by T_2 (kokkan untreated) followed by T_4 ($MgSO_4$) with 11.1, T_3 (double dose of K_2) with 11.2, T_6 (neem cake) with 11.4 and T_5 (cowdung) with 11.6 leaves. The above findings are in confirmation with that of Amma *et al.* (1986). The area of the leaf did not differ significantly among treatments.

Samraj *et al.* (1966) also did not observe any difference between leaf area of healthy and kokkan affected plants.

With regard to crop duration, there existed no significant variation among treatments. But the kokkan affected plants without any agronomic treatment (T_2) took comparatively more number of days for harvest (356). Slight reduction in duration could be achieved by the various agronomic management practices tried. Amma *et al.* (1986) observed significant increase in total crop duration and days to flower in the case of kokkan affected plants as compared to healthy. Though not significant, the same trends were observed in the present study also.

The results on bunch and finger characters revealed that the healthy plants (T_1) produced the heaviest bunch (8.86 kg) which was significantly superior to all other treatments. The kokkan affected plants without any additional agronomic management (T_2) recorded the lowest bunch weight (5.79 kg) and was on par with all other treatments except T_1 . Results of the earlier studies conducted in this line at the Banana Research Station (1980) had revealed that burning dry leaves in pits and application of $MgSO_4$ showed a positive trend in improving the bunch weight of kokkan affected plants. The number of hands and fingers on the other hand were not significantly influenced by the different treatments.

In the case of finger characters such as length, girth, weight and volume, T_1 (healthy) was significantly superior to all other treatments. Fingers from healthy plants recorded 32.8 cm length, 14.7 cm girth, 192 g weight and 189 cc volume. For all the above finger characters, T_2 (kokkan untreated)

Table 1. Vegetative growth, duration, yield, bunch characters and fruit quality as influenced by agronomic practices

Treatment	Height (cm)	Girth (cm)	No. of leaves	Leaf area (m ²)	Crop duration (days)	Bunch weight (kg)	No. of hands	No. of fingers	Acidity (%)	Reducing sugar (%)
T ₁ Healthy	297	60	12.4	1.23	337	8.86	4.9	46	0.35	11.7
T ₂ Kokkan untreated	272	57	10.0	1.15	356	5.79	5.2	51	0.36	10.3
T ₃ T ₂ +double K	269	58	11.2	1.02	334	6.00	5.6	49	0.37	10.8
T ₄ T ₂ +MgSO ₄	267	50	11.1	1.23	347	6.36	4.9	45	0.36	10.7
T ₅ T ₂ +cowdung	251	56	11.6	1.03	332	6.13	5.1	46	0.35	10.8
T ₆ T ₂ +neem cake	262	56	11.4	1.18	333	6.16	4.9	46	0.36	10.9
CD (0.05)	NS	NS	NS	NS	NS	1.52"	NS	NS	NS	0.65*

* Significant at 5% level

** Significant at 1% level

NS = Not significant

Table 2. Finger characters as influenced by the treatments

Treatment No	Length (cm)	Girth (cm)	Curvature (ratio)	Weight (g)	Volume (cc)
T ₁	28.6	14.7	1.26	192	189
T ₂	22.3	12.9	1.41	112	111
T ₃	24.0	13.7	1.32	120	122
T ₄	22.5	13.5	1.35	138	130
T ₅	23.2	13.6	1.32	134	130
T ₆	24.0	13.6	1.32	136	137
CD (0.05)	1.1**	0.9**	0.07"	21"	28"

** Significant at 1% level

recorded the lowest values of 22.3 cm, 12.9 cm, 112 g and 11 cc respectively. Significant increase in length of finger was recorded by T_3 and T_6 over T_2 . With respect to girth and volume, the different agronomic management practices failed to register any improvement from T_2 . Application of $MgSO_4$, fresh cowdung and neem cake significantly increased the weight of fingers of kokkan affected bunches. The curvature of the finger, characteristic to the disease, was minimum in the case of healthy plants (1.26) which was on par with T_3 , T_5 and T_6 , all with a value of 1.32. The kokkan affected plants without any additional agronomic treatment (T_2) recorded the maximum curvature of 1.41 which was on par with T_4 . The fruits produced by kokkan affected plants were shorter, lighter in weight and more curved which in turn reduced the bunch weight and affected the appearance and market acceptability of the bunch.

The data on qualitative characters of ripe fruits indicated that the acidity was not significantly influenced by the various agronomic treatments. But the fruits from healthy plants (T_1) contained significantly more reducing sugars (11.7%) as compared to other treatments. Percentage of reducing sugars was lowest in T_2 (10.3%) which was on par with all other treatments except T_1 (healthy). Same was the result when a comparative analysis of healthy vs kokkan affected plants was made by Amma *et al.* (1986).

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