

## EFFECT OF IRRIGATION SCHEDULES ON GROWTH AND YIELD OF BANANA CV. NENDRAN (*MUSAAA15*)

Nendran is an important commercial variety of banana cultivated under irrigated conditions. It is planted in October-November and the prevalence of dry weather for a period of about five months after sprouting of the suckers necessitates supplementary irrigation during this period. The present investigation was, therefore, undertaken to find out the response of Nendran banana to different levels of irrigation.

Field trials were conducted for two consecutive seasons in 1991-92 and 1992-93 at the Banana Research Station, Kannara, Trichur. The soil type of the experimental site was lateritic sandy loam with moisture at field capacity 18.5%, permanent wilting point 11%, bulk density  $1.1 \text{ g cm}^{-3}$  and pH 5.59.

The experiment was laid out in a randomized block design with four replications. The treatments consisted of five levels of irrigation, viz., irrigation at 20, 40, 60, 80 and 100 mm cumulative pan evaporation. Irrigation was provided to a depth of 20 mm. The irrigation schedule was drawn on the basis of sum of daily evaporation [cumulative pan evaporation](CPE) from the standard USWB class A open pan evaporimeter. Sword suckers of uniform conn size (3-4 month old) were planted at a spacing of 2 x 2 m in a plot of 64 m<sup>2</sup> and the recommended package of practices (KAU, 1989) were followed. Irrigation was applied to the crop (entire plot) from the middle of December to the end of May according to treatments (Table 1).

Growth of Nendran banana was significantly influenced by the different irrigation levels (Table 2 a & b). Irrigation at 20 CPE outyielded all other treatments in characters like plant height and pseudostem girth at 3rd and 5th month and at shooting, leaf number at 5th and 7th month and leaf area per plant at shooting. Observations at 5th month and at shooting showed that all these growth parameters increased with increase in irrigation from 100 CPE to 20 CPE. Values for all these characters decreased with a decrease in irrigation and

reached the lowest in treatment irrigated at 100 CPE. Similar result of increased plant height, pseudostem girth, leaf area and number of leaves at shooting was obtained with a rise in soil moisture level in a study by Krishnan and Shanmugavelu (1979).

Table 1. Details of irrigation applied to different trials

Irrigation schedule	Irrigation interval, days	No. of irrigations	Total water used, mm
T1 20 CPE	4	39	780
T2 40 CPE	9	19	380
T3 60 CPE	13	13	260
T4 80 CPE	18	9	180
T5 100 CPE	24	7	140

Shooting was found significantly early in 20 CPE (245 days) and days to shooting increased in the order of decrease in irrigation. Significantly delayed shooting was noticed in 100 CPE which took 283 days. Frequent irrigation favoured weed growth and increased the number of suckers produced as observed in T1 (20 CPE). A decrease in irrigation was found to decrease weed growth and sucker production as in the case of other treatments. Bhattacharya and Rao (1986) found that sucker production in Robusta banana was favourably influenced by the low moisture, depletion levels. Duration of the crop was the shortest in the treatment irrigated at 20 CPE and was the longest in the treatment irrigated at 100 CPE. Delayed shooting with a decrease in irrigation resulted in longer duration in that treatment. A study by Holder and Gumbs (1982 a & b) revealed that irrigation during 0-180 days period significantly reduced the time from planting to bunch emergence.

Irrigation treatments also significantly influenced the yield and yield attributing characters viz., number of hands and number of fingers

Table 2a. Effect of irrigation levels on the growth and development of Nendran banana in the early stage

Treatments	Observations at 3rd month stage			Observations at 5th month stage		
	Plant height, cm	Pseudostem girth, cm	Leaf No.	Plant height, cm	Pseudostem girth, cm	Leaf No.
T1 20 CPE	79.38	27.38	8.44	159.84	44.41	14.25
T2 40 CPE	71.66	25.31	8.44	127.22	36.69	12.50
T3 60 CPE	67.66	25.56	8.31	119.69	35.56	12.38
T4 80 CPE	56.88	22.25	8.69	94.50	30.72	11.81
T5 100 CPE	59.19	22.31	8.50	93.78	28.66	11.81
CD (0.05)	6.09	2.09	NS	7.03	2.21	1.23

Table 2b. Effect of irrigation levels on the growth, development and yield of Nendran banana

Irrigation schedule	Observations at shooting							Yield character			
	Plant height, m	Pseudo-stem girth, cm	Leaf No.	Leaf area/plant, m <sup>2</sup>	Days to shooting	Sucker No.	Weeds g m <sup>2</sup>	Duration, days	Bunch wt, kg	No. of hands	No. of fingers
T1 20 CPE	2.95	59.35	15.91	20.67	244.87	9.18	452.50	325.75	10.60	5.63	53.68
T2 40 CPE	2.53	54.24	14.45	14.61	258.21	6.98	211.88	341.18	8.07	4.92	48.00
T3 60 CPE	2.23	47.71	12.90	9.74	271.65	4.50	169.38	346.02	5.70	4.39	39.75
T4 80 CPE	1.94	43.47	11.87	2.70	277.27	3.05	136.25	353.16	3.42	3.65	30.59
T5 100CPE	1.64	42.00	11.28	1.88	282.82	2.03	119.38	361.82	2.62	3.34	24.34
CD (0.05)	0.48	2.18	1.13	2.31	5.72	1.20	38.38	3.58	0.49	0.33	3.33

per bunch. The highest bunch yield was obtained with irrigation at 20 CPE (10.6 kg) which was significantly superior to other treatments. The difference in bunch weight observed under different irrigation treatments was mainly due to the differences in yield components. The highest values for the number of hands and fingers were observed with irrigation at 20 CPE (5.63 and 53.68 respectively) and the values were the lowest for the treatment receiving irrigation at the widest interval of 100 CPE. In another study, Ramadas and Sheriff (1993) recorded that highest reduction in fruit number and weight resulted

in decreased bunch weight in plants subjected to moisture stress at later stages of growth i.e., 8th to 15th leaf stage.

Water deficit during the vegetative phase affect leaf development which in turn influences number of hands and fruit production. Like wise, water deficit during the flowering period may limit the number of fruits. In the yield formation period, water deficit affects fruit size. Thus continuous water supply is needed throughout for optimum production in the banana variety Nendran. Further more, root

system of banana is a poor drawer of water and must, therefore, receive water at regular intervals

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