

The Effect of Hormone Application on Root Formation and Yield in Tapioca

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Tapioca is the most important subsidiary food crop of Kerala. It is cultivated in this State over an estimated area of 548,837 acres with an annual production of 1,618,713 tons* of tubers. The demand for tapioca as a raw material in several industrial establishments is also rapidly increasing. Hence, the necessity for making every effort to increase the total tapioca out-put in this State is more keenly felt now, than at any other time before.

There have been several reports published on the earlier and better root development in a large number of crop plants as a result of hormone application. Boysen Jensen (1936), Went and Thimann (1948), Audus (1953) and Turkey (1954) among others have exhaustively dealt with the various aspects of root induction and development. But the information available on the effect of hormones on the growth and development of underground storage organs of plants like root tubers, stem tubers etc. is relatively scarce. Peterson (1958) working on sugar beets and Ito and Kato (1959) working on sweet-potato have indicated promotion of tuberization as well as increased yield as a result of hormone treatment. Chowdhuri (1960) while re-

cording increase in yield in treated potato plants has also made the significant remark that no serious attempt has been made to study the effect of chemical methods on increasing the yield of this crop so far.

In consideration of the above factors, a preliminary study on the effect of hormone application on the root-formation in tapioca as well as its tuber yield, has been made in the Agricultural College and Research Institute, Vellayani, Kerala.

Materials and Methods

Tapioca cuttings of variety M4 (Malayan No. 4) were used for this trial. The terminal and basal one-thirds of the selected stems were discarded and seven inch cuttings were taken from the middle portion. In the treated cuttings the basal portion was dipped in water and carefully dusted with Seradix B powder by means of a pad. In the control, the cuttings were just dipped in water and then they were planted. The treated and untreated cuttings to be lifted for root observation were planted in flower pots filled with river sand. At the same time the treated and untreated cuttings for observing the yield were planted in the field. A uniform dressing

* Source: Department of Statistics, Kerala.

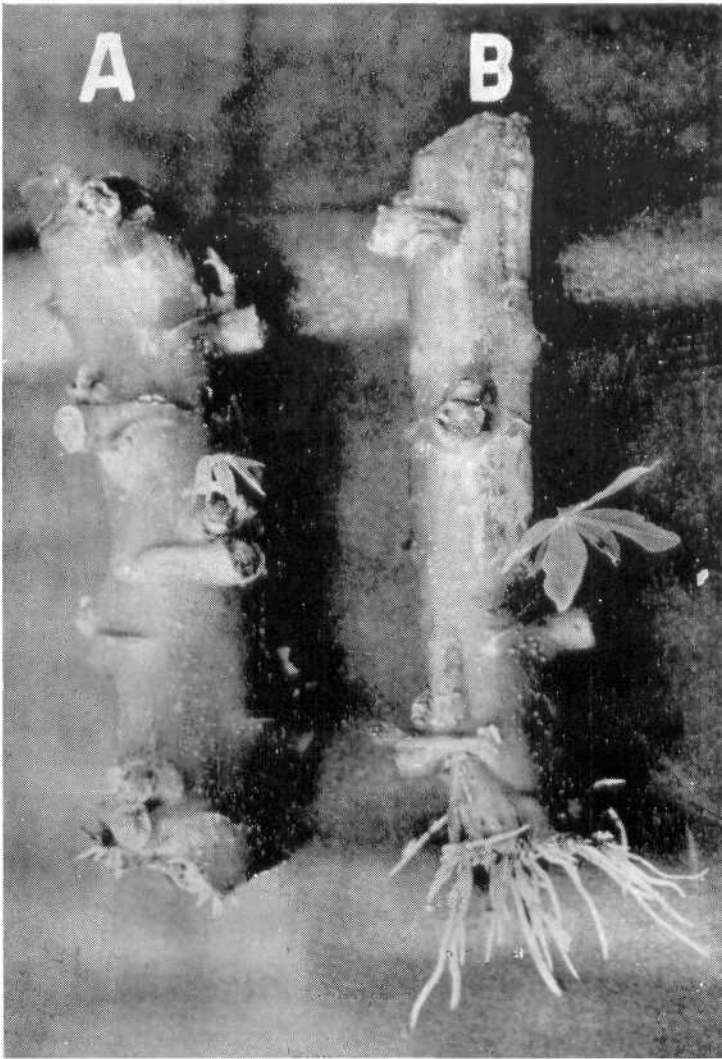


Fig. 1. Effect of hormone on root formation in tapioca
A.— Untreated B.— Treated

of F. Y. M. was applied to all the mounds on which planting was done in the field. All these cuttings were planted on 21-7-1960.

The data on root-formation were recorded on 18-8-1960. The plants in the field were uprooted and the yield data recorded on 17-4-1961.

Results and Discussion

Observation of 5 cuttings each of the treated and untreated materials was made for studying the root development. (FIG. 1)

The number of roots formed and the length of individual roots for each cutting were recorded as shown in Table I.

TABLE I
Effect of hormone application on root formation in tapioca

Plant No.	Control		Seradix treated	
	No. roots	Total length of roots (cm)	No. roots	Total length of roots (cm)
I	53	306.3	67	562.2
II	54	289.4	90	1061.4
III	60	258.4	143	1273.7
IV	46	437.4	73	761.0
V	81	606.9	148	864.0
Total	294	1898.4	521	4522.3

It can be seen from Table I that the average number of roots as well as the individual root length and total root length per plant of cuttings treated with Seradix were considerably higher than those of the untreated cuttings. The number of roots in the treated plants showed an increase

of more than 75% over the control and the total root length of treated plants was more than double that of the control.

The yield of tubers from the treated and untreated cuttings was recorded at 9 months duration after planting in the field. The data are presented in Table II.

TABLE II
Effect of hormone application on the tuber yield in tapioca

Treatments Plant No.	Control		Seradix treated	
	No. tubers	Wt. of tubers lb. oz.	No. tubers	Wt. of tubers lb. oz.
I	18	19 10	20	29 6
II	26	24 2	21	9 3
III	20	11 12	14	11 10
IV	27	11 14	27	16 10
V	14	8 6	24	7 3
VI	13	4 6	20	18 12
VII	22	4 10	13	16 4
VIII	17	14 14	28	12 8
IX	27	10 4	27	19 4
X	29	22 12	18	18 0
Total	213	132 12	212	158 2

Data regarding the yield were collected from 10 treated and 10 untreated plants. An increase of more than 12% in the fresh tuber weight was recorded for the treated plants over the control. It is remarkable to note that, whereas the average tuber number remained constant for both the treated and untreated plants there was such an increase in the tuber weight of the treated plants.

From the above observations it is clear that the application of the root inducing hormones gives definitely better initial root development in tapioca cuttings. Larger number and better development of roots in the early stages are not found to alter the number of the tubers formed, which may be a varietal character. Further study is,

however, required for establishing this observation. The increase in tuber weight associated with better initial root development in treated plants undoubtedly indicate more effective functioning of the roots in the treated tapioca leading to increased rate of synthesis and better storage of food.

Summary and Conclusions

- (1) Treatment with root inducing hormone is found to result in an increase in the number as well as the total length of roots in tapioca cuttings.
- (2) The number of tubers formed per plant is not altered as a result of hormone treatment, which may be varietal character.
- (3) Inducing better initial root formation

in tapioca is found to result in higher tuber weight.

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