



EFFECT OF DIFFERENT AGROCHEMICALS AS FOLIAR SPRAY ON THE GROWTH PERFORMANCE OF MANGO GRAFTS CV. AMRAPALI

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Nursery is a vital sector of modern agro-business, where mango is an important component, especially for the mango growing countries. As a mango growing country in some regions of Bangladesh different private nurseries have the scheme to produce mango grafts locally on commercial basis. To get number of grafts they follow close plantation that limits the proper soil management and causes poor growth of the grafts. To overcome this limitation foliar application of agrochemicals may be an option. Because, it is apparent that foliar application of growth regulating chemicals and fertilizers are becoming extremely important and valuable in the commercial control of crop growth, in both agriculture and horticulture (Nickel 1982). But the information or research work regarding vegetable growth of mango grafts at nursery bed is very much limited. Considering the above facts, this study was taken to find out the effect of foliar nutrition of urea and five growth regulating chemicals on growth performance of mango grafts cv. 'Amrapali'.

The experiment was conducted at the Germplasm Centre (GPC) of the Fruit Tree Improvement Project (FTIP), Department of Horticulture, Bangladesh Agricultural University, Mymensingh. The experimental site was situated under tropical monsoon climate characterized by heavy rainfall during the months from April to September and scanty rainfall during the rest period of the year. The experiment was laid in Complete Block Design with and 3 replications having 5 grafts per replication. The treatments consisted 7 different types of spraying compounds viz., control (water spray), urea (4%), surgrow (0.3%), ocozeme (0.1%), NAA (200 ppm), GA₃ (100 ppm) and planotonic (0.1%) and 7 different spraying times i.e., 3rd calendar day of February, 3th March, 3th April 3th February + 3th March, 3th February + 3th April, 3th March + 3th April, 3th February + 3th March- 3th April. Data were recorded on graft height (cm), length of rootstock (cm), girth of rootstock (cm), length of scion (cm), girth of scion (cm), total number of leaves/graft, number of branches/graft and canopy volume (cm). Canopy volume was calculated by using the following formula given by Westwood *et al.* (1963). i.e.. Canopy Volume (m³)= $\frac{4}{3} a^2b$, where a = half of the plant height, b = average of East-West and North-South plant spread and was expressed in (m³). Where, the initial data were recorded for all..... before each treatment and then to determine the growth of graft against each treatment, final data were recorded at marketable stage. The collected data were statistically analyzed to evaluate the effects of the treatments. The difference between the pairs of treatment means were evaluated by the LSD test for interpretation of the results (Gomez and Gomez 1984).

Results of this experiment revealed that, different spraying material and time of application significantly influenced on all of the parameters studied. The highest increase in graft height (35.53cm), length of rootstock (4.20cm), length of scion (31.20cm), girth of rootstock (0.697cm), girth of scion (0.510cm), total number of leaves/graft (38.56), canopy volume (0.103m³) and number of branches/graft (2.07) were recorded in planotonic spray. On the other hand the lowest increase in graft height (18.94cm), length of scion (18.04cm), girth of rootstock (0.469cm), girth of scion (0.38cm), total number of leaves/graft (24.44), canopy volume (0.05 1m) and number of branches/graft (0.65) were found in case of control grafts.

In respect of application time the highest increase in graft height (31.72cm), length of rootstock (3.61cm) and length of scion (27.53cm) were found in 3th February + 3th April spray. Among them increase in plant height (25.61cm) and length of scion (22.44cm) were lowest in 3th April spray and also obtaining the lowest increase in girth of rootstock (0.58cm) and girth of scion (0.36cm). The maximum increase in number of leaves/graft (34.56) and canopy volume (0.084m³) was recorded in 3d February spray. The lowest increase of leaf number/graft (28.53) and number of branches/graft (0.94) were recorded in 3th February + 3th April spray. The highest increase in branch number/graft (1.89) was in 3th February + 3th March spray. The lowest increased canopy volume (0.077m³) was in both 3th March + 3th April and 3d February + 3th March + 3th April spray.

Table 1. Effect of spraying compound on growth of mango grafts cv. 'Amrapali'

Spray compound	Graft height (cm)	Length of rootstock (cm)	Length of scion (cm)	Girth of rootstock (cm)	Girth of scion (cm)	Total number of leaves/graft	Number of branches/graft	Canopy volume (m ³)
Control (C ₀)	± 0.3.a	2.80	18.04	0.469	0.381	24.88	0.65	0.051
Urea (C ₁)	19.32a	2.17	18.87	0.583	0.353	33.40	1.31	0.054
Surgrow (C ₂)	32.54c	2.20	21.20	0.616	0.434	27.37	0.81	0.070
Ocozeme (C ₃)	30.12b	3.89	26.56	0.670	0.434	32.09	1.00	0.094
NAA (C ₄)	31.20bc	2.79	28.31	0.606	0.458	35.47	1.83	0.092
GH ₃ (C ₅)	32.34c	2.97	29.21	0.654	0.440	26.46	1.47	0.085
Planotonic	35.53d	4.20	31.20	0.697	0.510	38.56	2.07	0.103
LSD 0.05 (0.01)	1.134 (1.501)	0.103(0.136)	1.229 (1.627)	0.019 (0.026)	0.006 (0.008)	1.231 (1.630)	0.144(0.190)	0.006 (0.008)

Table 2. Effect of application time on the growth of mango graft cv. 'Amrapali'

Application time	Graft height (cm)	Length of rootstock (cm)	Length of scion (cm)	Girth of rootstock (cm)	Girth of scion (cm)	Total number of leaves graft	Number branches (ms)/graft	Canopy of volume
3 rd Feb. (T ₁)	6.19	3.09	24.68	0.581	0.410	34.56	1.52	0.084
3 rd Mar. (T ₂)	5.78	3.01	24.07	0.681	0.453	32.90	1.22	0.083
3 rd Apr. (T ₃)	6.58	3.16	22.44	0.579	0.360	28.98	0.96	0.076
3 rd Feb.+3 rd Mar. (T ₄)	5.31	3.33	24.55	0.581	0.453	33.15	1.89	0.073
3 rd Feb. + 3 rd Apr. (T ₅)	6.37	3.61	27.53	0.594	0.424	28.53	0.94	0.079
3 rd Apr. + 3 rd Mar. (T ₆)	5.18	2.34	23.51	0.620	0.471	28.96	1.29	0.077
3 rd Feb. + 3 rd Mar. + 3 rd Apr. (T ₇)	5.11	2.48	26.61	0.657	0.440	31.15	1.34	0.077
LSD 0.05 (0.01)	0.197 (0.260)	0.103 (0.136)	1.229 (1.627)	0.019 (0.026)	0.006 (0.008)	1.231 (1.630)	0.144 (0.190)	0.006 (0.008)

Combined effect of different spraying materials and time of application also exhibited marked influence on different parameters of the observation. The results revealed that the highest increase in number of leaves/graft (63.03), canopy volume (0.138m³), branch number/graft (3.38) were recorded with 3rd February spray of planotonic. The lowest increase in branch number (0.00), canopy volume (0.028m³) and leaf number (15.37) was recorded in 3 February + 3rd April spray of urea and also this combination occupied the lowest increase in plant height (14.08cm). The grafts having 3rd February + 3rd April spray of GA7 produced the maximum increase in plant height (44.85cm) and scion length (41.12cm). The lowest increase in scion length (10.55cm) was in combination of surgrow and 3rd April spray. From the above findings, it can be concluded that, planotonic showed positive effect on the most of the important parameters studied but it is very difficult to draw a conclusion about the time of application. Because of some important growth parameters, individually 3rd February and 3rd February + 3rd March application was the best. But, considering the overall individual and combined performance it can be concluded that 3rd February application is recommendable for the climatic condition of Bangladesh.

Table 3. Combined effect of chemicals and different application time on the growth of mango graft cv. 'Amrapali'

Treatment	Graft height (cm)	Length of rootstock (cm)	Length of scion (cm)	Girth of rootstock (cm)	Girth of scion (cm)	Total number of leaves/graft	Number of branches /graft	Canopy volume (m ³)
C ₀ T ₁	17.13	2.86	16.32	0.350	0.370	24.87	0.27	0.050
C ₀ T ₂	19.36	2.73	18.36	0.510	0.400	24.93	0.60	0.051
C ₀ T ₃	19.32	2.97	18.40	0.500	0.420	24.95	0.67	0.054
C ₀ T ₄	19.16	2.72	18.27	0.490	0.350	24.83	0.55	0.047
C ₀ T ₅	19.19	2.82	18.30	0.460	0.370	24.83	0.90	0.049
C ₀ T ₆	19.32	2.69	18.33	0.490	0.410	24.90	0.90	0.053
C ₀ T ₇	19.13	2.79	18.30	0.480	0.350	24.87	0.67	0.050
C ₁ T ₁	20.18	2.94	17.24	0.780	0.363	30.55	1.00	0.063
C ₁ T ₂	27.31	3.04	24.30	0.510	0.430	43.42	0.65	0.083
C ₁ T ₃	14.90	2.58	24.27	0.510	0.210	38.52	2.33	0.046
C ₁ T ₄	22.15	1.27	20.88	0.700	0.410	25.70	2.00	0.060
C ₁ T ₅	14.08	2.89	11.19	0.390	0.230	15.37	0.00	0.028
C ₁ T ₆	20.14	1.39	18.75	0.330	0.370	40.85	0.53	0.050
C ₁ T ₇	16.51	1.08	15.43	0.860	0.460	39.37	2.67	0.050
C ₂ T ₁	30.01	2.62	18.39	0.440	0.447	20.37	0.33	0.060
C ₂ T ₂	33.61	2.64	21.97	0.900	0.560	35.85	0.53	0.088
C ₂ T ₃	22.74	2.19	10.55	0.500	0.270	22.08	0.33	0.044
C ₂ T ₄	31.78	1.98	20.80	0.450	0.400	27.70	0.87	0.063
C ₂ T ₅	43.85	2.43	32.42	0.860	0.570	25.03	0.20	0.095
C ₂ T ₆	30.64	2.03	19.61	0.630	0.430	34.50	1.85	0.070
C ₂ T ₇	35.18	1.53	24.65	0.530	0.360	26.03	1.55	0.070
C ₃ T ₁	29.62	3.79	26.16	0.770	0.470	33.70	1.35	0.095
C ₃ T ₂	21.87	3.92	17.95	0.500	0.380	35.20	1.33	0.073
C ₃ T ₃	22.40	4.26	17.14	0.580	0.350	22.08	0.65	0.081
C ₃ T ₄	35.35	5.56	29.79	0.830	0.450	53.70	3.00	0.118
C ₃ T ₅	33.61	3.59	33.02	0.570	0.420	38.37	0.67	0.088
C ₃ T ₆	32.97	3.08	29.89	0.810	0.590	19.55	0.00	0.117
C ₃ T ₇	35.01	3.03	31.98	0.630	0.380	22.03	0.00	0.087
C ₄ T ₁	32.41	2.48	30.26	0.470	0.437	48.05	3.00	0.097
C ₄ T ₂	32.42	2.79	29.62	0.750	0.510	34.20	1.00	0.106
C ₄ T ₃	30.74	2.72	27.02	0.430	0.390	30.40	0.37	0.100
C ₄ T ₄	30.51	3.99	26.52	0.300	0.290	27.70	3.38	0.044
C ₄ T ₅	27.28	4.06	23.22	0.620	0.460	41.37	2.38	0.084
C ₄ T ₆	27.51	1.50	26.01	0.670	0.450	24.53	1.00	0.094
C ₄ T ₇	37.51	2.00	35.51	1.000	0.670	42.03	1.67	0.119
C ₅ T ₁	32.85	3.39	29.46	0.510	0.350	21.37	1.33	0.082
C ₅ T ₂	21.94	1.97	19.97	0.780	0.500	17.85	1.40	0.069
C ₅ T ₃	34.07	2.69	30.31	0.660	0.390	27.72	1.33	0.093
C ₅ T ₄	31.18	3.06	28.12	0.670	0.500	37.03	1.40	0.091
C ₅ T ₅	44.85	3.73	41.12	0.660	0.500	23.37	0.70	0.112
C ₅ T ₆	26.97	2.38	24.59	0.730	0.440	29.20	2.75	0.080
C ₅ T ₇	34.51	3.56	30.92	0.570	0.400	28.70	1.40	0.067
C ₆ T ₁	38.51	3.58	34.93	0.750	0.433	63.03	3.38	0.138
C ₆ T ₂	40.31	3.97	36.34	0.820	0.390	38.85	3.00	0.113
C ₆ T ₃	35.07	4.69	29.38	0.870	0.490	37.07	1.00	0.116
C ₆ T ₄	32.18	4.73	27.45	0.630	0.770	35.38	2.00	0.089
C ₆ T ₅	39.18	5.73	33.45	0.600	0.420	31.38	1.70	0.099
C ₆ T ₆	30.64	3.28	27.36	0.680	0.610	29.20	2.00	0.074
C ₆ T ₇	32.85	3.39	29.46	0.530	0.460	35.02	1.40	0.093
LSD(O.05)	3.000	0.271	3.251	0.051	0.016	3.258	0.380	0.016
LSD(O.01)	3.972	0.359	4.304	0.068	0.022	4.313	0.503	0.022
CV(%)	6.48	5.56	8.10	4.18	5.17	6.45	17.97	4.77

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