RESULTS & DISCUSSION

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I. Vegetative Growth

I.1 Effect of Growth Regulators

a. Effect of Kinetin

a.1 Plant Height

Data in Table (1) and Figure (1) indicated that kinetin increased plant height in cms; both levels of kinetin showed highly significant increase in the length of rose bushes as compared to control. The percentages of increase over control reached 51.28 and 78.20% for the low and high levels respectively. Also the high concentration of kinetin significantly increased plant hight over th low one.

The data obtained in this part; i.e length of rose plant, can be supported by the results of Catarino (1964), who demonstrated that the shoots of flower of Bryophyllum diagremontianum elongated and thickened in response to the application of kinetin 50ppm. Also the previous results hold true with those obtained by

Table (1) Effect of Spraying Kinetin, Bg, Nitrogen Fertilization and their Combination on Growth Characters of Rosa gallica var. aegyptiaca Two- Years Old Plants in 1987 Season.

Treatments	Plant Height in cm	No. of canes per plant	Fresh Weight of canes (gm)	% of dry Matter in canes	Fresh Weight of leaves per plant	% of dry Matter in Leaves
Control	78.86	29.66	172.92	55.56	30.46	52.89
K_1	118.66	41.33	357.56	65.33	40.50	61.53
K_2	139.12	57.66	501.65	62.70	45.70	58.72
Bg_1	116.82	60.00	387.71	64.53	46.65	66.53
Bg_2	108.33	47.33	362.42	60.50	42.72	59.62
N_1	106.33	35.33	225.46	56.30	35.71	57.14
N_2	103.40	39.66	285.76	57.94	37.75	56.85
N_3	112.7	44.00	254.47	61.67	41.55	62.96
$K_1 N_1$	122.46	32.66	333.52	57.14	39.55	55.08
$K_1 N_2$	116.37	36.33	364.64	63.06	42.65	57.66
$K_1 N_3$	124.25	49.00	300.49	62.93	44.50	58.42
$K_2 N_1$	136.52	54.00	500.58	61.14	40.39	60.66
$K_2 N_2$	101.72	58.00	458.30	60.00	43.60	58.62
$K_2 N_3$	128.27	49.33	377.48	63.34	36.57	55.38
$Bg_1 N_1$	122.92	42.66	349.62	65.80	35.65	61.57
$Bg_1 N_2$	114.78	57.33	380.39	67.56	32.67	62.67
$Bg_1 N_3$	112.60	43.00	317.55	62.63	36.73	56.64
$Bg_2 N_1$	115.84	37.66	224.51	65.14	33.58	53.12
$Bg_2 N_2$	107.58	39.00	323.53	67.46	37.61	52.38
$Bg_2 N_3$	113.36	42.33	330.76	64.28	43.68	54.63
L.S.D.						
General 0.05	11.48	13.58	41.92		4.87	
0.01	15.42	19.37	57.40		6.53	
Kinetin or Bg 0.05	6.82	10.20	32.50		3.75	
0.01	8.78	15.30	44.50		5.10	
Nitrogen Fer. 0.05	5.72	7.58	29.46		2.20	
0.01	7.68	9.83	40.83		4.10	
Combination 0.05	3.31	5.35	23.70		1.90	
0.01	4.48	7.90	36.58		2.64	

Milbocker (1972), White et al., (1978), Beck and Caponetti (1983), and El-Kholy (1984), on funegreek. The increase in the plant length was attributed to the primarily effect by kinetin on nucleic acid metabolism, which in turn stimulate RNA synthesis.

a.2 Number of Canes Per Plant

In Table (1) and Figure (1) data revealed that kinetin increased the number of canes carried on plant. The increasement was linearly correlated with kinetin concentration, so the low level (50ppm) increased number of canes with 100% over the control plant, this increase reached 179.09% with the high level (100 ppm).

This might be due to the increase in meristimic tissues enhanced by exogeneous application of kinetin. These results hold true with those of Carpenter and Beck (1972), who mentioned that PBA as foliar sprays increased branching and shoot number of poinsettia, the same which was found by Carpenter and Beck (1972), on chrysanthemum. Also Jeffcoat (1977), found that cytokinin treatment increased branching of chrysanthemum. Idem (1981), came to the same conclusion with carnation plants, same results were obtained by

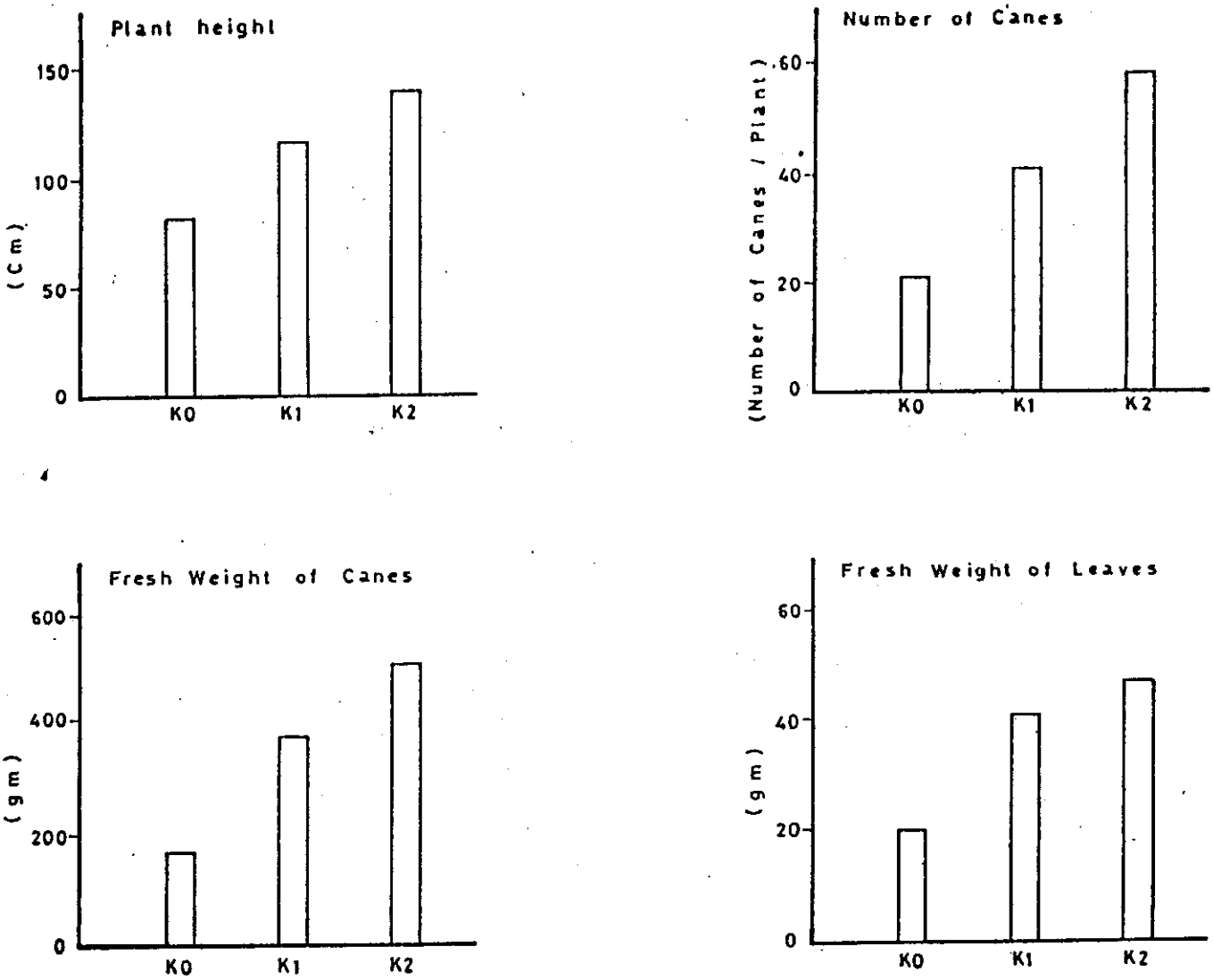


Fig.(1) Effect of spraying kinetin on growth characters of Rosa gallica var. aegyptiaca during 1987 season.

Ching and Einert (1984), on poinesstia who obtained 90-100% increase in branching by applying PBA or BA as foliage spray. The particular role of kinetin in this point (increasing branching) was seen that cytokinin can serve to stimulate doubling of nuclear DNA, a-Property it shares with some other regulators as well as mitosis and cytokinins as referred by Das et al., (1975). Hassen et al., (1984), on Capsicum annum found that at PBA at 100 ppm increased the number of branches.

a.3 Fresh Weight of Canes Per Plant

As shown in Table (1) and Figure (1), the fresh weight of canes increased parallely with increasing canes number. The low kinetin concentration increased fresh weight of the canes by 106.80% while the high one gave 191.20% over control and the increase was highly significant, however, the increase due to the higher kinetin concentration over the lower one was only 40.30%.

a.4 Dry Matter Percentage of Canes

The dry matter percentage of rose canes are tabulated in Table(1). Kinetin added as foliar spray increased the percentage dry matter of canes by 17.53%

over the control, while the second level 100 ppm gave 12.85% over the control.

a.5 Fresh Weight of Leaves Per Plant

Data in Table (1) and Figures (1), show that the fresh weight of leaves influenced greatly by kinetin treatments. The first level of kinetin caused a remarkable increase in the fresh weight of leaves per plant which reached 40.50 gram versus 30.46 gram for untreated plant. Mean while, the second level produced 45.70 gram of fresh leaves per plant. This means that there was a linear relation between kinetin treatments in its two concentrations used and the leaves fresh weight obtained.

a.6 Dry Matter Percentage of Leaves

The percentage of dry matters of leaves was calculated and presented in Table (1). The data showed that 50 ppm kinetin produced 16.33% increase over the control, while 100 ppm gave only 11.02%

At the end of this part one may suggest the importance of kinetin on plant growth. There is a close

relationship between cytokinins and nucleic acid. Also it is known cytokinin are derivatives of adenine which is the purine base of nuclei acid. Its position in the RNA_t is crucial to elucidate its function. Therefore it appears that cytokinin may help in binding of RNA_m with RNA_t amino acid complex during protein synthesis and hence in the accumulation of other metabolites and/or dry matter (Krishnmoorthy , 1981).

The results obtained in this part accumulation of other metabolites and/or dry matter (Krishnamoorthy , 1981).

The results obtained in this part were in accordance with those of Carpenter and Rodriguez (1971), Zieslin and Halevy (1976), and Faber and White (1977), on roses, the concluded that kinetin enhanced the development of axillary buds and hence shoots number. Also Marczynski et al., (1979), on rose reported that benzyl adenine (BA) or Indole buytric acidic (IBA) resulted in increasing basal shoots and in turn their fresh and dry weight on other plants than rose. Carpenter and Carlson (1972), demonstrated that (6-benzylamino 9,2-tetrahydropyranyl 9-H purine) PBA

increased fresh weight of chrysanthemum shoots, but inhibited stem elongation. Jeffcoat (1977), reported that foliar sprays of PBA increased branching and did not reduce plant height of carnation, he added also that application of PBA to flower buds increased both the diameter and fresh weight of carnation.

b. B_9

b.1 Plant Height

As shown from Table (1) and Figure (2), the first concentration of B_9 2000ppm increased plant height of rose from 78.86cm in untreated plants to 116.37cm. When B_9 was sprayed with the second concentration 4000ppm, rose plant reached 108.33cm in height. The more increase in plant height was obtained with decreasing B_9 concentration. This differ than the trend obtained with kinetin which increased plant height by increaseing kinetin concentration. Here Bg is a growth retardant and exhibits a stimulant effect with the lower concentration only, so the higher one might not produce such a stimulant action. This might explain the better effect of increasing the plant height due to the lower concentration of Bg than the higher one.

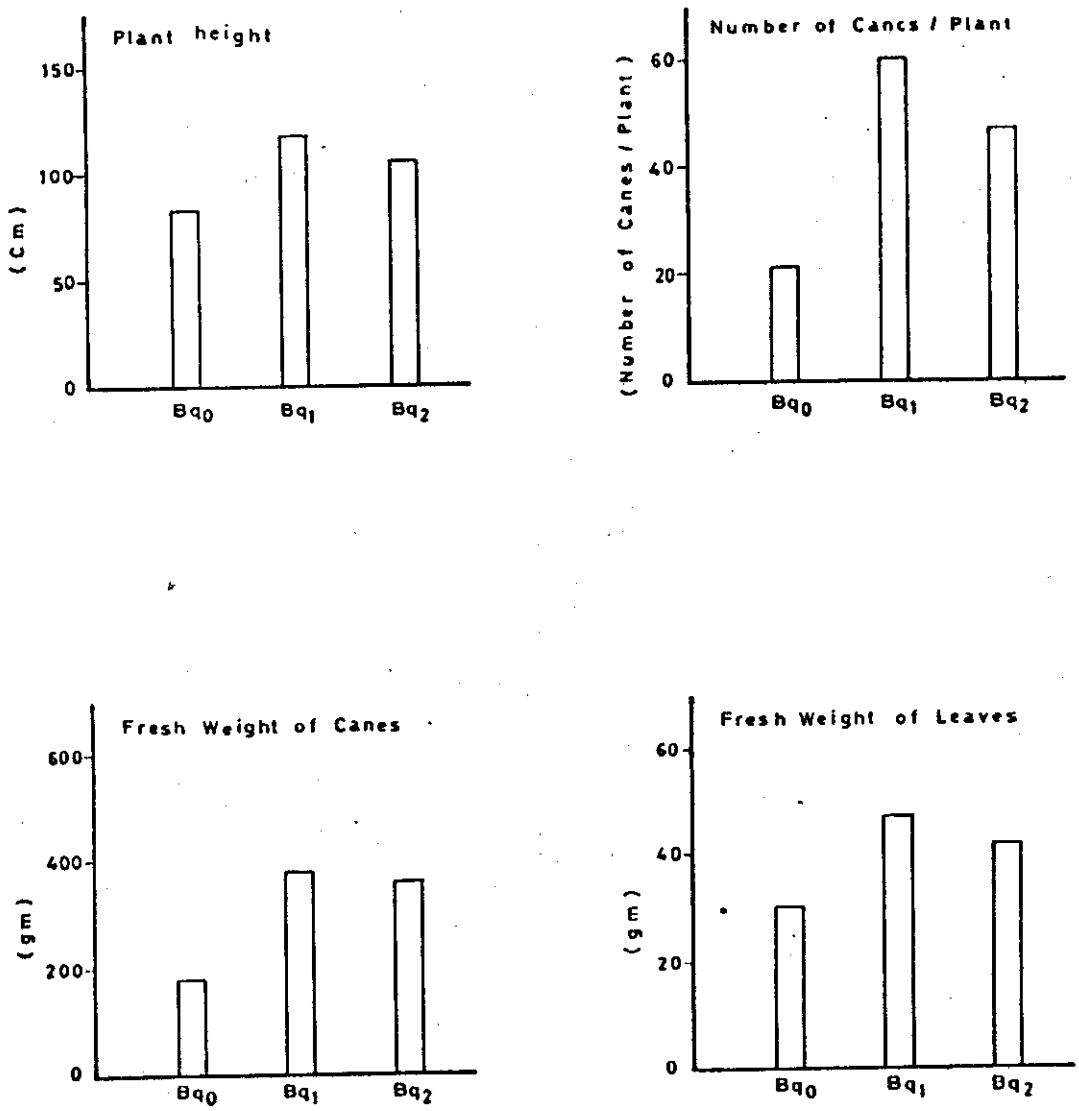


Fig. (2) Effect of spraying Bq on growth characters of Rosa gallica var. aegyptiaca during 1987 season

These results obtained confirmed those found by Gaber and El-Sherbieny (1978), who reported that B_9 at 250 and 1000ppm increased plant height of Datura metel, the same finding was obtained by Hassan et al., (1983a), on Jasminum Sambac, they mentioned that B_9 1000 and 2000ppm increased plant height.

b.2 Number of Canes Per Plant

The number of rose canes per plant was increased by the treatments with B_9 2000 and 4000ppm application. The increasing percentage over control reached 190.41% and 129.09% due to the first and second levels of B_9 respectively. The trend of increase here was like that of plant height.

Many investigators, Bhattachrjee (1979), found that B_9 at 2000 and 4000ppm stimulated branching of several varieties of rose. Hassan and et al., (1983a), on Jasminum sambac revealed that B_9 at 1000 and 2000ppm increased the number of branches per plant. Also El-Khayat (1987), on Tagetes patula found that B_9 at all rates (500, 1000, 2000 and 3000ppm) increased number of branches per plant.

In conclusion, the action of Bg was more promising at the lower concentration, which gave 190.41% increase over the control plants.

b.3 Fresh Weight of Canes Per Plant

Data in Table (1) and Figure (2) revealed that the fresh weight of canes increased by Bg treatments with the two levels used. The percentage of increase in the fresh weight of canes over control plant due to 2000ppm was 124.21% while with 4000ppm it was 109.58%. The results confirmed the similar effect and trend noticed before with the plant height and the number of canes.

b.4 Dry Matter Percentage of Canes

The date in Table (1) indicated that Bg effect greatly the dry matter percentage. The increase was mainly due to the first level of Bg , which go parallel to other trends obtained whith the previous parameters studied.

b.5 Fresh Weight of Leaves Per Plant

Table (1) and Figure (2) summerized the data obtained. It is clear that Bg affected the leaves fresh weight.

The first level produced one and half the fresh weight obtained by the control, however the second one produced higher fresh weight in comparison with control, but smaller than that obtained by the lower concentration 46.65 and 42.72 grams for the first and second level respectively.

b.6 Dry Matter Percentage in Leaves

It is clear from Table (1) that the effect of lowest concentration of Bg gave the heigher dry matter in leaves than control or Bg treatment with its higher dose. The percentage dry matter in leaves for untreated plants was 52.89% versus 60.53 and 59.62% for the treatments with 2000 and 4000ppm respectively.

Our results were confirmed by those reported by Hor and Bos (1972), they found that shoot growth of some

Table (2) Percentage Increase in Different Growth Characters of Rosa gallica var. aegyptiaca Plants Two-Years Old as Affected by Growth Regulators Assuming that Control=100 in 1987 Season.

Treatments	Plant Height (cm)	Number of Canes per Plant	Fresh weight of Canes (gm)	% Dry Matter in Canes	Fresh weight of leaves/plant (gm)	% Dry Matter in Leaves
Control	100	100	100	100	100	100
K_1	150.47	200.05	206.78	117.53	132.96	116.34
K_2	176.41	279.89	290.10	112.85	150.03	111.62
B_{9_1}	148.15	290.42	224.21	116.14	153.15	114.44
B_{9_2}	137.37	229.09	209.59	108.89	140.25	112.72

species of flowering shrubs increased by appling Bg at 500, 750 and 1000ppm. They concluded that the lowest concentration was the best for growth and for increasing flower in Allamanda grandiflora. Also Gaber and El-Sherbeiny (1978), reported that increased dry matter accumulation as a result of Bg application in the rates 250 and 1000ppm on Datura metel plants, but decreased with 4000ppm.

The results obtained with Bg treatment, showed a stimulant effect with the lower concentration inspite of the retardation effect Known to occur with Bg . The site of action of Bg is the subapical meristem where it inhibits cell divition. The stimulation effect which occur with lowest concentration may probably because of the breakdown of Bg leading to supply of nitrogen, Phosphorus and other minerals which enhanced growth.

Summerizing the data obtained with the growth characters as affected by the two growth substances with the two concentrations applied Table (2) can illustrate the increase occured due to these treatments tacking into consideration that the control equal 100.

All the parameters studied increased by increasing kinetin concentration except with the dry matter percentage either in canes or in the leaves. The pattern was changed with B_9 treatments, where the first level of B_9 2000ppm produced more increase than the second one.

2. Effect of Nitrogen Fertilization

1.1 Plant Height

As showen from Table (1) and Figure (3) nitrogen was found to affect greatly plant height. The addition of the first level 150 kg per feddan increased plant height from 78cm for the untreatead plant to 106.33cm, which amounted to 34.83% over the control. Also the increase in plant height due to the second level of nitrogen 300kg per feddan reached 31.12% over the control. The highest increase in plant height was obtained by adding the third level of nitrogen of (450kg per feddan) since the increase reached 42.91% over control.

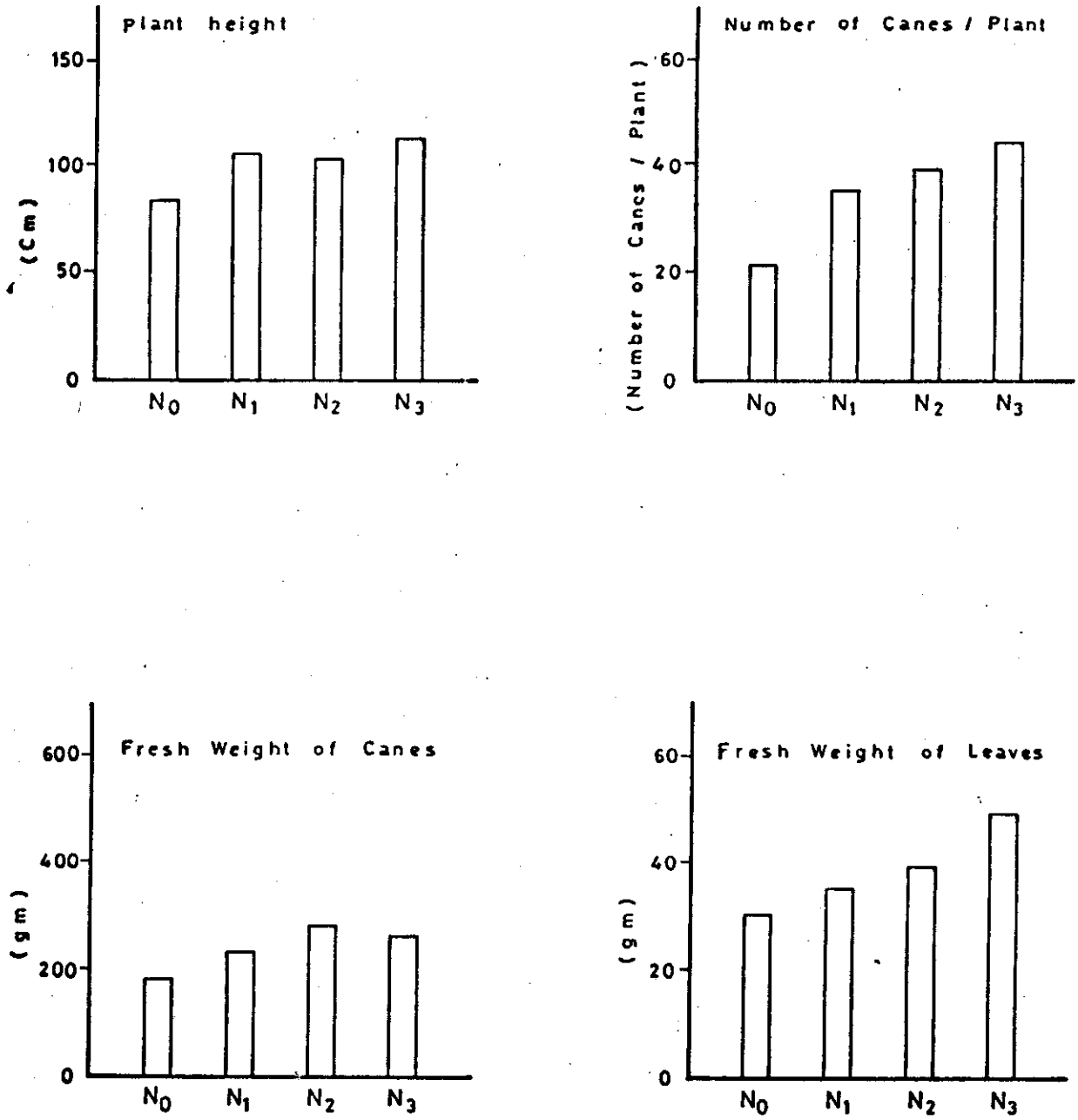


Fig.(3) Effect of nitrogen fertilization on growth characters of Rosa gallica var. aegyptiaca during 1987 season.

2.2 Number of Canes Per Plant

In Table (1) and Figure (3), the data indicated a linear increase between the doses of nitrogen added and the number of canes. The canes number corresponding to each level of nitrogen were 20.66, 35.33, 39.66 and 44.00 for 0, 150, 300 and 450 kg per feddan ammonium nitrate respectively. This means that rose plant responded well to nitrogen fertilization till 450 kg per feddan.

2.3 Fresh Weight of Canes Per Plant

Fresh weight of canes per plant was caclculated at the maturity stage of rose plant. The addition of nitrogen created a linear increase on the fresh weight of canes which amounted to 30.38, 65.25 and 47.16% over the control due to three levels respectively. The second level of fertilization had most promising and highly significant effect.

2.4 Dry Matter Percentage of Canes

Dry matter percentage of canes were present in Table (1). Gradual increase in dry matter percentages were noticed due to the addition of nitrogen

fertilization. The percentage of dry matter of canes was 55.56 compared to 56.00 with the first level of fertilization. The second and third levelsof nitrogen gave 57.84 and 61.67% dry matter respectively.

2.5. Fresh Weight of Leaves Per Plant

From Table (1) and Figure (3), it was found that nitrogen fertilization increased gradually leaves fresh weight, the valuesobtained were 30.46, 35.71, 37.75 and 41.55 grams for N_1, N_2 and N_3 respectively. Higher increase was obtained due to the first one over the control. The percentage increase, due to the different nitrogen levels over the control were 17.00, 23.93 and 36.41 for the three levels of nitrogen respectively.

.2.6 Dry Matter Percentage in Leaves

The percentagesof dry matter in leaves tabulated in Table (1) from which the corresponding percentage of increase due to the three levels of nitrogen were 8.04, 7.49 and 19.04 respectively.

In all the parameters of growth studied, it was found that nitrogen had a remarkable effect on the aspects studied with all its levels used. The third level gave the higher increase. This means that rose as a small shrub responded well to nitrogen fertilization till 450 kg per fedden.

The results obtained from this part, i.e. nitrogen fertilization were in agreament with Maharan and pradhan (1976) presented the requirement of rose plants to nitrogen and found that 15 grams nitrogen was optimum for growth. Niggar and Rehalle (1977), on roses, found that nitrogen at 25 gram per plant increased stem length. Koseva (1978), with rose reported an increase in organic matter with nitrogen fertilized plants than unfertilized ones. Chandra (1981), on Rosa damascena reported also that plants required 200kg nitrogen per hectare as top dressing to produce benificial effect on plant growth. Nitrogen also produced its benificial effect on dry matter and other growth aspects with other plants than rose, Rofaeal (1976), mentioned that mean fresh and dry weight and plant height of Hyocyamus muticus were greatly affected by nitrogen till 200 kg per feddan. The same findings

Table (3) Percentage Increase in Different Growth Characters of Rosa gallica var. aegyptiaca Plants Two-Years Old as Affected by nitrogen fertilization Assuming that Control=100 in 1987 Season.

Treatments	Plant Height (cm)	Number of Canes per Plant	Fresh weight of Canes (gm)	% Dry Matter in Canes	Fresh weight of leaves/plant (gm)	% Dry Matter in Leaves
Control	100	100	100	100	100	100
N_1	134.83	171.01	130.38	100.79	117.24	108.04
N_2	131.12	191.97	165.26	104.10	123.93	107.49
N_3	142.91	212.97	147.16	110.99	136.41	119.04

were reached by Harig (1979), on Rhodendron, Natarojan and Roe (1980), on Jasminum grandiflorum, Singh et al., (1981), on Citronella and Hassan et al.,(1983b), on Jasminum sambac.

Ending this part, Table (3) summerized the data obtained with the effect of nitrogen on the growth characters, assuming that control equal one hundred.

Generally a linear increase in the growth character were correlated with nitrogrn doses except with fresh weight of canes.

3 Effect of Interaction between Growth Regulators and Nitrogen Fertilization

c. Combination between Kinetin and Nitrogen Fertilization

c.1 Plant Height

The data recorded in Table (1) and Figure(4) revealed that all combinations between kinetin and nitrogen obtained highly significant increase in plant height over control. Remarkable and significant increase

in plant height was also noticed when low concentration of kinetin was combined with both low and high levels of nitrogen over the medium one. While with the high concentration of kinetin when combined with nitrogen, the most effective combinations were with low and high level of nitrogen with highly significant increase in plant height over the combination between high concentration of kinetin and medium level of nitrogen. Although the combination between high concentrations of kinetin and the low level of nitrogen was superior over all other combinations in plant with highly significant increase.

c.2 Number of Canes Per Plant

The data in Table (1) and Figure (4) showed that combining the first level of kinetin with any of the nitrogen doses applied, it was found that the treatment of kinetin combined with the third nitrogen level gave greater number of canes in comparison with the other levels and with kinetin alone.

When the second level of kinetin was combined with the three levels of nitrogen, the treatment with the medium nitrogen was the superior one, which gave

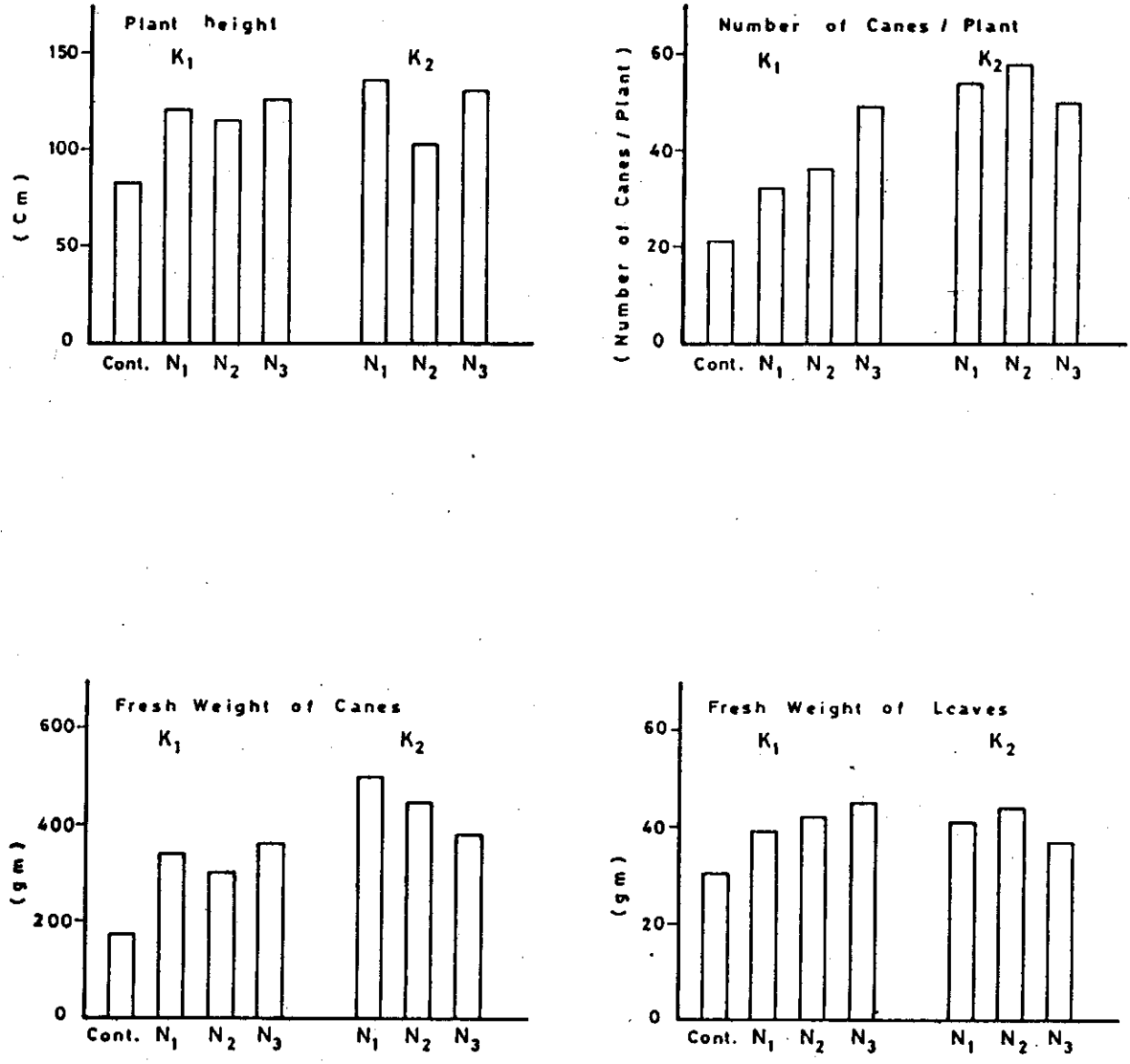


Fig.(4) Effect of combination between spraying kinetin and nitrogen fertilization on growth characters of Rosa gallica var.. aegyptiaca during 1987 season.

58.00 canes in control to 54.00 and 49.33 for the first and third level of nitrogen. This indicate that kinetin in its lower concentration combined with nitrogen in its higher level or kinetin in its higher dose with nitrogen in its medium level produced more canes number in rose plants. However kinetin alone in the higher concentration produced also more canes number, 57.66.

These findings of plant height and canes number go parallel with those of Niggar and Rehalle (1977), who reported an increase in stem length by nitrogen fertilization. Idem (1981), on carnation plants, Ching and Einert (1984), and Griffin (1984), on chrysanthemum reported that kinetin treatments increased plant height and number of branches.

c.3 Fresh Weight of Canes Per Plant

As the fresh weight of canes concerned, it was found that the combination between the first level of kinetin and the second level of nitrogen produced higher fresh weight.

When combining the second level of kinetin with any nitrogen level , no interaction occurred between kinetin and nitrogen fertilization, as kinetin alone in its higher doses produced the higher fresh weight of canes, which reached 501.65 grams.

The results obtained by El-Hamidi and Saleh (1969), reported that nitrogen fertilization increased the fresh weight of chamomile. Carpenter and Carlson (1972), demonstrated that PBA increased fresh weight of Chrysanthemum. Othman (1972), found that nitrogen fertilization increased growth of fennel plant.

c.4 Dry Matter Percentage of Canes

The date in Table (1) which described the effect of combination kinetin and nitrogen on the percentage of dry matter of canes, indicated that no interaction occurred between these two factors, as kinetin alone in its lower concentration produced higher dry matter of canes 65.30% in comparison with all other combinations. But all these combinations gave higher and significant results when comparing it with the control .

These results were in accordance with the results obtained by Maheshwari et al., (1984), on Cymbopogon martinii who mentioned that nitrogen fertilization significantly increased grass dry weight over the control. El-Khayat (1987), found that kiniten treatments increased dry matter in stems of Tagetes patula. El-Ghawwas (1988), on Hyoscyamus muticus, found that the nitrogen fertilization increased plant height, fresh and dry weights of leaves, stems and the total weight of the plant.

c.5 Fresh Weight of Leaves Per Plant

From the previous Table (1) and Figure (4) it was evident that when combining the first level of kinetin with any of the nitrogen applied, a clear interaction occurred between the first kinetin level and the third nitrogen level which gave 44.50 grams virsus 42.65 gram in the treatment of the first kinetin level combined with the second nitrogen level compared to 30.46 grams in the control.

Also an interaction happened when combining the higher levels of kinetin and second nitrogen dose which gave 43.60 grams.

c.6 Dry Matter Percentage in Leaves

Dry matter of leaves as percentage was tabulated in Table (1). From the data it was obvious that no interaction could be obtained between kinetin and nitrogen. All other combination did not produce significant effect.

These findings holds true with those of El-kohly (1968), who observed that nitrogen application affected dry weight of leaves of sweet peas. Rofaeel (1976), indicated that dry weight of Hyoscyamus muticus plant and its organs were greatly affected by nitrogen fertilization. Also El-Khayat (1987), and Radwan (1988), on Tagetes plants, observed that kinetin increased plant height, number of branches per plant, fresh and dry weight of plant over control. Maddawy (1988), on Polianthes tuberosa found that BA increased plant height, fresh and dry weight of leaves.

Table (4) Percentage Increase in Different Growth Characters of Rosa gallica var. aleguptiaca Plants Two Years Old as affected by Combination between Growth Regulators and Nitrogen Fertilization Assuming that Control=100 in 1987 Season.

Treatments	Plant Height (cm)	Number of Canes per Plant	Fresh weight of Canes (gm)	% dry Matter in Canes	Fresh weight of leaves/plant (gm)	% Dry Matter in Leaves
Control	100	100	100	100	100	100
K N 1 1	155.29	158.08	192.88	102.84	129.84	104.14
K N 1 2	147.52	175.85	210.87	113.49	140.02	109.82
K N 1 3	157.56	237.17	173.77	113.21	146.09	110.46
K N 2 1	173.12	261.37	289.49	110.04	132.60	114.69
K N 2 2	128.99	280.74	265.03	107.99	143.14	110.83
K N 2 3	162.66	238.77	218.29	114.00	120.06	104.71
B N 9 1 1	155.87	206.49	202.19	118.43	116.71	116.41
B N 9 2 1	145.55	277.49	219.98	121.59	107.26	110.49
B N 9 3 1	142.78	208.13	183.64	112.72	120.58	107.89
B N 9 1 2	146.89	182.28	129.83	117.24	113.24	100.43
B N 9 2 2	136.42	188.77	188.25	121.42	123.47	99.03
B N 2 3	143.74	204.89	191.28	115.69	143.40	103.29

Generally, with the combination of kinetin and nitrogen, we can point out the higher values obtained in each parameter studied with the treatment as follows, taking into consideration that control equal one handred, Table (4):

Plant Height

The optimum treatment was $K_2 N_1$ higher kinetin with the first nitrogen level.

Number of Canes Per Plant

The optimun treatment was $K_2 N_2$ higher kinetin with medium nitrogen.

Fresh Weight of Canes Per Plant

The optimum tratment was $K_2 N_1$ higher kinetin with lower nitrogen.

Dry Matter Percentage of Canes

Higher levels of both kinetin and nitogen $K_2 N_3$

Fresh Weight of Leaves Per Plant

Lower level of kinetin with higher one of nitrogen $K_1 N_3$

Dry Matter Percentage in Leaves

Higher level of kinetin with the lower level of nitrogen $K_2 N_1$.

These means that all the higher values were centred with the higher level of kinetin with the first or the second level of nitrogen.

d. Combination between B_9 and Nitrogen Fertilization

d.1 Plant Height

Table (1) and Figure (5) summerized the data obtained. It is evident from that table that the first level of B_9 when combined with the first level of nitrogen gave the higher and significant increase in plant height, 122.92cm when compared with B_9 alone or nitrogen alone.

The results obtained by Gaber and El-Sherbeiny (1978), mentioned that B_9 in concentration of 250 and 1000 ppm increased the plant height of Datura metel. Hassan et al., (1983a), on Jasminum sambac reported that B_9 increased plant height. Also Maddawy (1988), observed that nitrogen application increased plant height of Polianthes tuberosa.

d.2 Number of Canes Per Plant

The combination between Bg and nitrogen was studied, Table (1) indicated this effect. It was found that the combination between B_9 and nitrogen gave higher value only over the control, but B_9 applied alone in the first level produced the higher number of canes.

Our results were confirmed by the data obtained by Kher (1973), on chrysthemum mentioned that B_9 increased the number of branches. Bhattacharjee (1979), on rose, found that B_9 stimulated branching. Also Hassan et al., (1983b), mentioned that nitrogen fertilization increased branches number in Jasminum

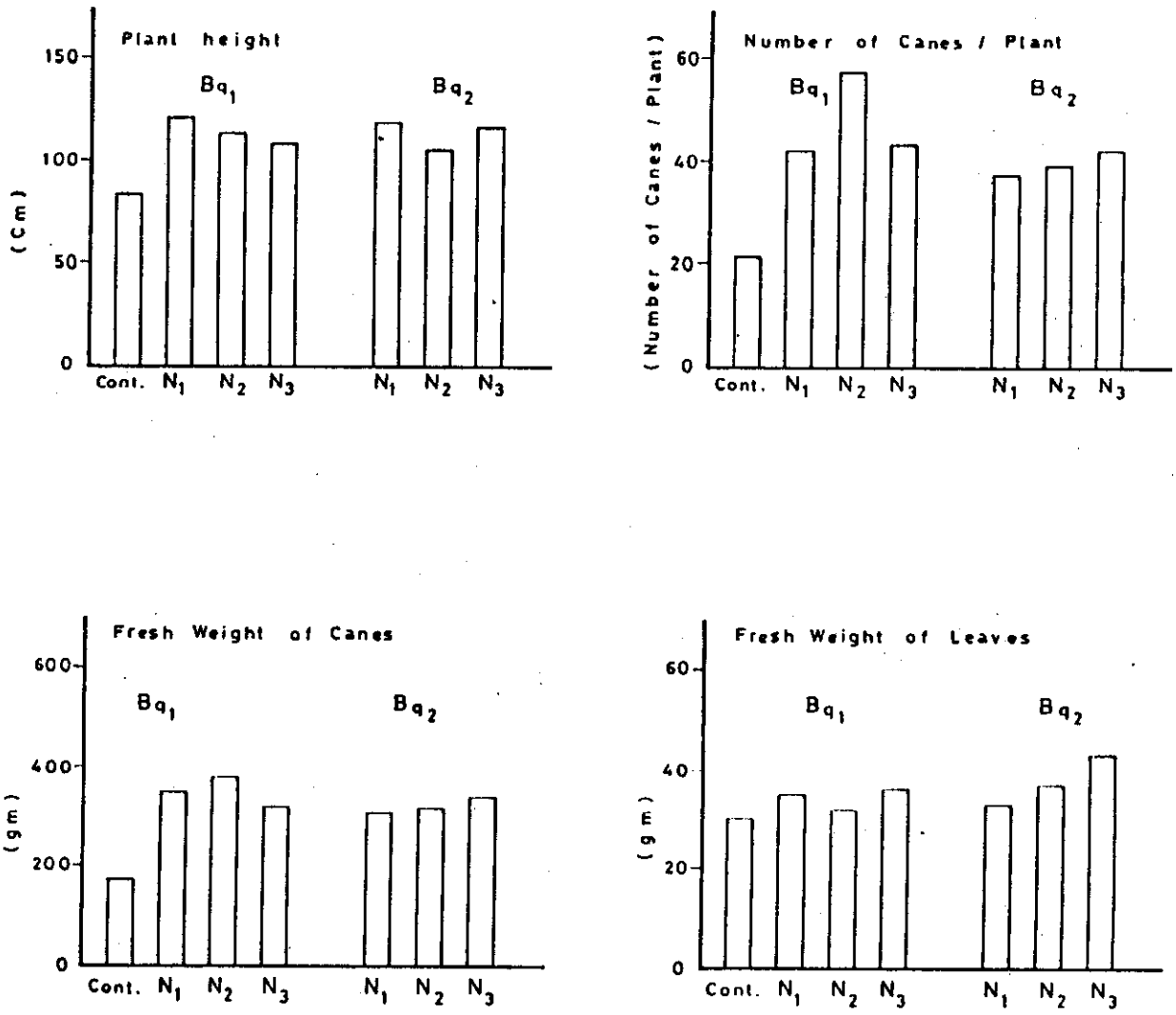


Fig.(5) Effect of combination between spraying Bq and nitrogen fertilization on growth characters of Rosa gallica var. aegyptiaca during 1987 season.

sambac.

d.3 Fresh Weight of Canes Per Plant

No significant effect was observed with the interaction between B_9 and nitrogen fertilization on their effect on the fresh weight of canes. So, B_9 diminished here the effect of nitrogen fertilization, however B_9 alone gave the highest fresh weight of canes. The same results obtained by Samata et al., (1974), found that the B_9 treatement increased stem thickness of cosmos plant. Rofaeel (1976), indicated that the mean fresh weight of Hyoscyamus muticus plant and its organs were greatly affected by nitrogen applied. Maheshwari et al., (1984), on Cymbopogon martinii reported that nitrogen application significantly increased grass fresh weight yield over the control.

d.4 Dry Matter Percentage of Canes

From Table (1), it was clear that the interaction occurred when B_9 in its two doses applied were combined with the medium level of nitrogen. The percentages dry

matter were 67.56 and 67.46 for B_9 N_1 and B_9 N_2 $_2$ respectively. Also B_9 in the higher concentration gave greater dry matter percentage, which reached 65.14%. These results obtained were in accordance with Abou-Leila (1978), indicated that fresh and dry yields of the different organs of Datura metel increased by nitrogen fertilization. Gaber et al., (1978), on Datura metel reported that Bg increased dry matter.

d.5 Fresh Weight of Leaves Per Plant

The data in Table (1) revealed that B_9 alone had superior effect on the fresh weight of leaves than the combined treatments with nitrogen. However the treatment of B_9 and nitrogen in their higher doses produced higher fresh weight, but it was little smaller than B_9 in its first level. Can conclude that no interaction had been occurred corresponding to this aspect.

d.6 Dry Matter Percentage in Leaves

From the previous Table (1) it was evident that no interaction had been occurred between B_9 and nitrogen because nitrogen in its higher level produced

higher values, however almost all the combinations produced higher percentage of dry matter over the control.

These finding were in accordance with the results obtained with Hassan et al., (1983a), on Jasminum sambac found that B_9 increased dry matter of leaves as percentage. El-Khayat (1987), on Tagetes patula reported that B_9 increased dry weight of leaves as percentage. They also found that nitrogen fertilization increased the dry weight of leaves.

Table (4) which illustrate the increases obtained as percentage, revealed that treatment $B_9 N_2$ which B_9 in its lower concentration was combined with the medium level of nitrogen, produced the higher values of canes number, canes fresh weight, canes dry weight and leaves dry weight. It was noticed that for higher production of leaves, higher nitrogen levels were required.

II Flowering

II.1 Growth Regulators

II.a Kinetin

a.1 Effect of Kinetin on Monthly and Yearly Yield of Flower

The monthly yield of rose flower was calculated during the flowering period, which start from March and continuedto May . The percentage of the monthly yield to the total one was determined. Data in Tables 5 and 6 and Figure (6) described this relation. Observing the data of untreated plant, it is clear that the yield increased from 5.10 gram in March to 45.00 in May, which represented7.1 and 63.18 percentages of the total yield,respectively. In this concern, the major yield was obtained during May.

Dealing with the effect of kinetin on flower yield in the different months, it was found that kinetin in its first level increased the monthly yield compared with control. The yield was 25.20, 55.00 and 118.05 grams in March, April and May,respectively versus 5.10,

Table (5) Effect of Spraying Kinetin, Bg, Nitrogen Fertilization and their Combination on Monthly and Yearly Yield of Flower of Rosa gallica var. aegyptiaca (gm/plant) in 1986 Season.

Months	March		April		May			
Treatments	Fresh Weight of Flower	% to Total Yield	Fresh Weight of Flower	% to Total Yield	Fresh Weight of Flower	% to Total Yield	Total Yield gm/plant	Total Yield kg/Feddan
Control	5.10	7.16	21.13	29.66	45.00	63.18	71.23	610.51
K_1	25.20	12.71	55.00	27.74	118.05	59.55	198.25	1699.20
K_2	19.15	13.28	44.00	30.53	81.00	56.19	144.15	1235.51
Bg_1	10.05	8.43	38.14	31.99	71.05	59.58	119.24	1022.00
Bg_2	11.20	7.08	51.84	32.24	96.05	60.68	158.29	1356.78
N_1	6.20	6.31	22.17	22.54	70.00	71.15	98.37	843.13
N_2	26.13	13.84	57.30	30.39	105.18	55.77	188.61	1616.57
N_3	10.20	8.99	26.03	22.95	77.17	68.06	113.40	971.95
K_1N_1	10.10	9.25	25.03	22.89	74.10	67.86	109.20	935.95
K_1N_2	14.30	10.41	36.11	26.28	87.03	63.31	137.41	1177.74
K_1N_3	26.00	12.87	56.30	27.72	120.00	59.41	202.33	1733.91
K_2N_1	24.30	23.51	28.09	27.15	51.00	49.34	103.37	885.98
K_2N_2	5.13	4.79	34.00	31.74	68.00	63.47	107.13	918.21
K_2N_3	24.12	17.58	33.07	24.11	80.00	58.31	137.19	1175.86
Bg_1N_1	7.04	6.57	23.06	21.50	77.13	71.93	107.23	919.07
Bg_1N_2	6.10	5.34	38.10	26.36	78.00	68.30	114.20	978.81
Bg_1N_3	7.03	5.52	38.20	29.98	82.17	61.47	127.40	1091.95
Bg_2N_1	26.15	20.21	39.10	30.23	64.11	49.56	129.36	1108.74
Bg_2N_2	22.17	17.84	33.03	26.58	69.05	55.58	124.25	1064.95
Bg_2N_3	26.08	15.32	40.20	23.60	104.00	61.08	170.28	1459.47

L.S.D.		Months	Total Yield
General	0.05	11.66	20.20
	0.01	15.33	26.53
Kinetin or Bg	0.05	10.53	18.23
	0.01	13.83	23.96
Nitrogen Fer.	0.05	9.11	15.79
	0.01	11.97	20.76
Combination	0.05	5.25	

Table: (6) Effect of Spraying Kinetin, Bg, Nitrogen Fertilization and their Combination on Monthly and Yearly Yield of Flower of *Rosa gallica var. aegyptiaca* (gm/plant) in 1987 Season.

Months	March		April		May			
Treatments	Fresh Weight of Flower	% to Total Yield	Fresh Weight of Flower	% to Total Yield	Fresh Weight of Flower	% to Total Yield	Total Yield gm/plant	Total Yield kg/Feddan
Control	5.05	6.75	15.15	20.58	53.16	72.47	73.36	628.77
K_1	23.10	12.20	52.15	27.54	114.10	60.26	189.35	1622.92
K_2	18.18	13.01	43.03	30.93	78.00	56.06	139.13	1192.48
Bg_1	8.18	8.25	36.00	36.30	55.03	55.45	99.18	850.07
Bg_2	9.19	5.96	54.07	35.08	90.90	58.96	154.16	1321.31
N_1	9.05	9.67	27.12	28.98	57.43	61.35	93.57	801.99
N_2	24.10	13.30	52.14	28.76	105.02	57.94	181.26	1553.58
N_3	7.15	6.65	32.10	29.86	68.25	63.49	107.50	921.38
$K_1 N_1$	9.15	9.42	24.00	24.70	64.00	65.88	97.15	832.67
$K_1 N_2$	16.85	12.82	30.10	24.05	79.00	63.13	125.15	1072.66
$K_1 N_3$	28.28	14.73	50.15	26.19	113.10	59.08	191.45	1640.92
$K_2 N_1$	24.15	24.81	30.20	31.02	43.00	44.17	97.35	834.39
$K_2 N_2$	8.08	7.92	33.00	32.67	60.00	59.41	101.00	865.67
$K_2 N_3$	24.16	18.97	30.20	23.71	73.01	57.32	127.37	1091.69
$Bg_1 N_1$	5.12	5.49	26.20	28.08	62.00	66.43	93.32	799.85
$Bg_1 N_2$	7.05	7.11	36.03	36.36	56.82	56.53	99.18	849.39
$Bg_1 N_3$	9.12	7.46	45.15	36.91	68.85	55.63	122.38	1048.23
$Bg_2 N_1$	27.05	21.80	33.03	26.62	64.00	51.58	124.08	1063.49
$Bg_2 N_2$	26.19	18.46	35.07	24.82	80.13	56.72	141.30	1211.08
$Bg_2 N_3$	24.05	14.92	53.03	32.91	84.07	52.17	161.15	1381.22

		Months	Total Yield
L.S.D. General	0.05	11.62	20.11
	0.01	15.28	26.42
Kinetin or Bg	0.05	9.51	16.44
	0.01	12.49	21.61
Nitrogen Fer.	0.05	8.23	14.26
	0.01	10.82	18.73
Combination	0.05	4.74	6.37
	0.01	6.23	8.37

21.13 and 45.00 grams for control in the previous months in 1986 season.

The percentage of the yield in every month to the total yield increased also with age. From the data obtained, it was found that the maximum yield of flowers was occurred during May. The same pattern was occurred during the second season, however, with smaller values, Table (6).

The second level of kinetin influenced the flower yield per month, but with smaller values than the first level. So, it could be concluded that kinetin at concentration of 50 ppm was sufficient to produce the benificial and economical yield of flowers of Rosa gallica var. aegyptiaca. The total flower yield per plant was influenced by kinetin concentrations, which were 198.25 and 144.15 for K_1 and K_2 versus 71.23 grams per plant for untreated plant in season 1986. These values were 189.35 and 139.13 versus 73.36 grams per plant in the second season 1987. The total yield per feddan was calculated during the two season with the two concentrations of kinetin.

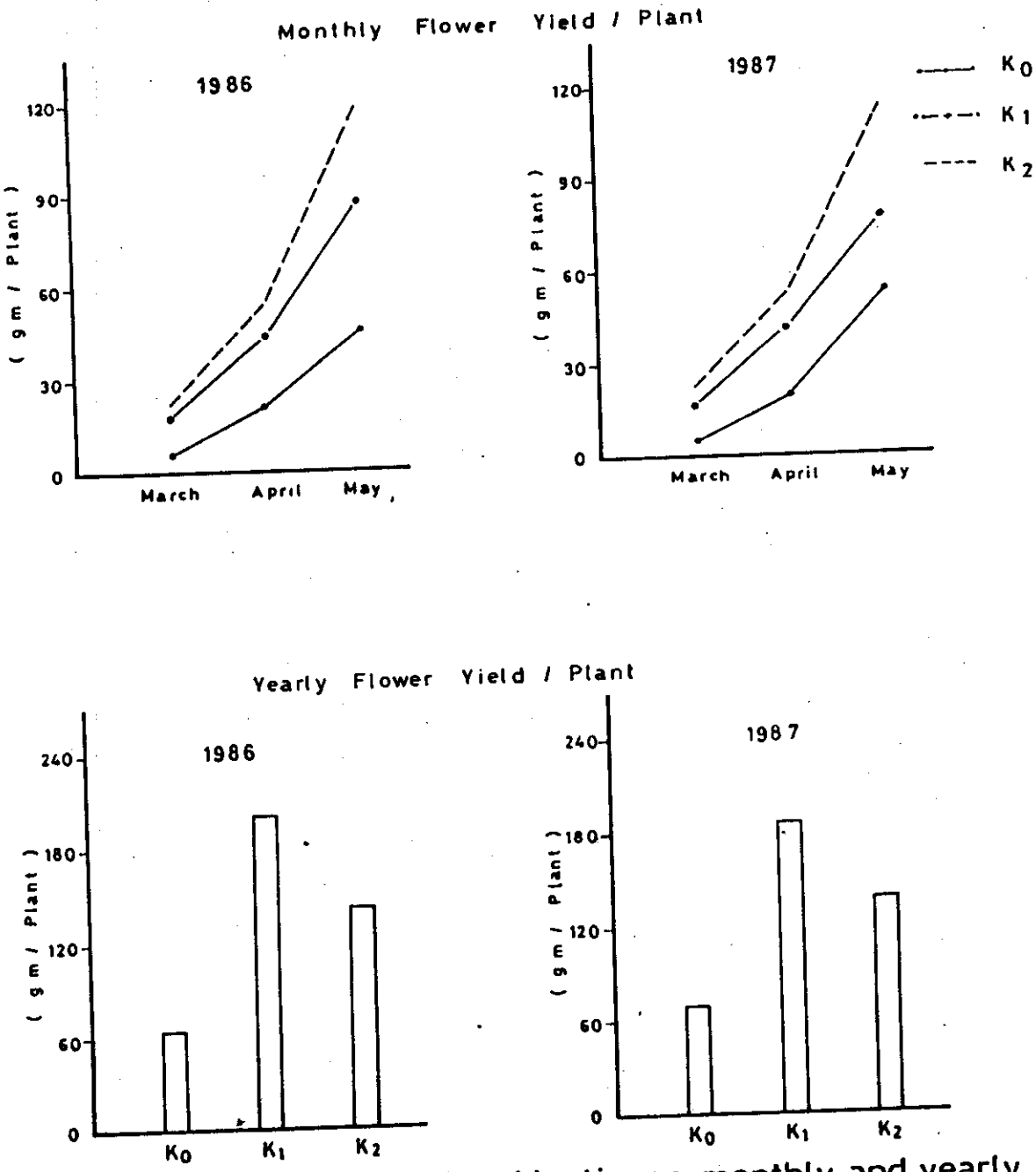


Fig.(6) Effect of spraying kinetin on monthly and yearly yield of flower of Rosa gallica var. aegyptiaca during 1986 and 1987 seasons.

The increased percentage of K_1 (50ppm) over the control, reached 178.32%, while that due to K_2 (100ppm) was 102.37%.

In the second season(1987), the same trend of first season was obtained. The increase percentage of the first level of kinetin over the control in the total yield of flowers per feddan was 158.11%, while that due to second level was 89.65%.

The results obtained coincide with those of Faber and White (1977), Ohkaw (1979) and Marczynski et al., (1979) on rose, they found that kinetin affected flower axillary buds and had a role in the development of renewal canes for rejuvenating rose plant and increased their cut flower production. Idem (1981) found that spraying carnation plants with BA at 100 mg/L increased flower diameter stimulated the production of lateral shoots and inhibited the production of lateral flower buds. Abou-El-Ghaith (1985) mentioned that spraying carnation with PBA had more promising and direct effects on increasing number of flowers per plant compared to NBA. El-Khayat (1987), and Radwan (1988) on Tagetes plants observed that kinrtin increased the number of flowers and flower yield per plant.

a.2 Effect of Kinetin on Bud Developments

When examining the T.V. section of buds at different stages, 4, 8 and 12 days old of the kinetin treated plants. Plate 4,5 and 6, show that the cells and tissues at 12 days old are more developed and differentiated than those of the stage of 8 and 4 days old and control plants plate 1,2 and 3. Also conductive bundels differentiation are greater than control plants, thus the development of the buds in this treatments are greater. So, it was concluded that kinetin stimulatedthe development of buds, which may lead to higher flower yield. This was also correlated with the higher yield of flowers obtained by kinetin treatments. Thes results agree with those decomented by Letham (1967), who found that the expansion of detached radish cotyledons by cytokinin was due to cell enlargement and not cell division. The enlargement was, at least in part, due to stimulated water uptake. The water uptake was in response to the production of reducing sugars in the cotyledonasy cells. He added that in the presence of cytokinin, the reducing sugars appeared to build up due to the conversion of lipids. Although the cytokinin did not appear to effect the lipid conversion enzymes.

Kinetin increased invertase activity in the cotyledons, thus suggesting that sucrose, are hydrolyzed rapidly to the osmotically active sugars, glucose and fructose. Cytokinin was found to promote cell wall changes by some unknown mechanism in which cell wall modification (increased plasticity) takes place. Thus cytokinin will affect the walls of the cells in vivo.

Weinberger (1969), applied cytokinin to buds of peach during winter months, this treatment stimulated bud development under laboratory condition in the rest period. This cytokinin was able to advance bud development by only a day or two.

Faber and White (1977) on rose found that the most of axillary buds broke dormancy and increase the number of atrophied flower when (PBA) and (^{6}N BA) were applied by any of application methods. The development of axillary shoot, flowering and blind shoot were significantly increased in all rose clones. PBA generally increased bud break on both lay back and cutback pruned plants in greenhouse roses.

II.b B_9

b.1 Effect of B_9 on monthly and Yearly Flower Yield

The data obtainedin Tables 5 and 6 and Figure (7) revealed that the monthly yield increased from March till May in which a maximum flowering occurred, in both treated and untreated plants and in the two seasons also. Significant production of flower began in April. In control plants flower production in May equal percentages of 63.18 and 72.47 from the total production of flowers in the whole period of flowering in the two seasons, 1986 and 1987, respectively.

With respect to the effect of B_9 on the flower yield, the first level produced higher increase over the control. The percentages of monthly flower yield to the total flower production were 8.43, 31.99 and 59.58 in March, April and May respectively, in the first season. In the second one, Table (6), these percentages were as follows 8.25, 36.30 and 55.45 respectively. The second level of Bg significantly affecte flower yield, higher

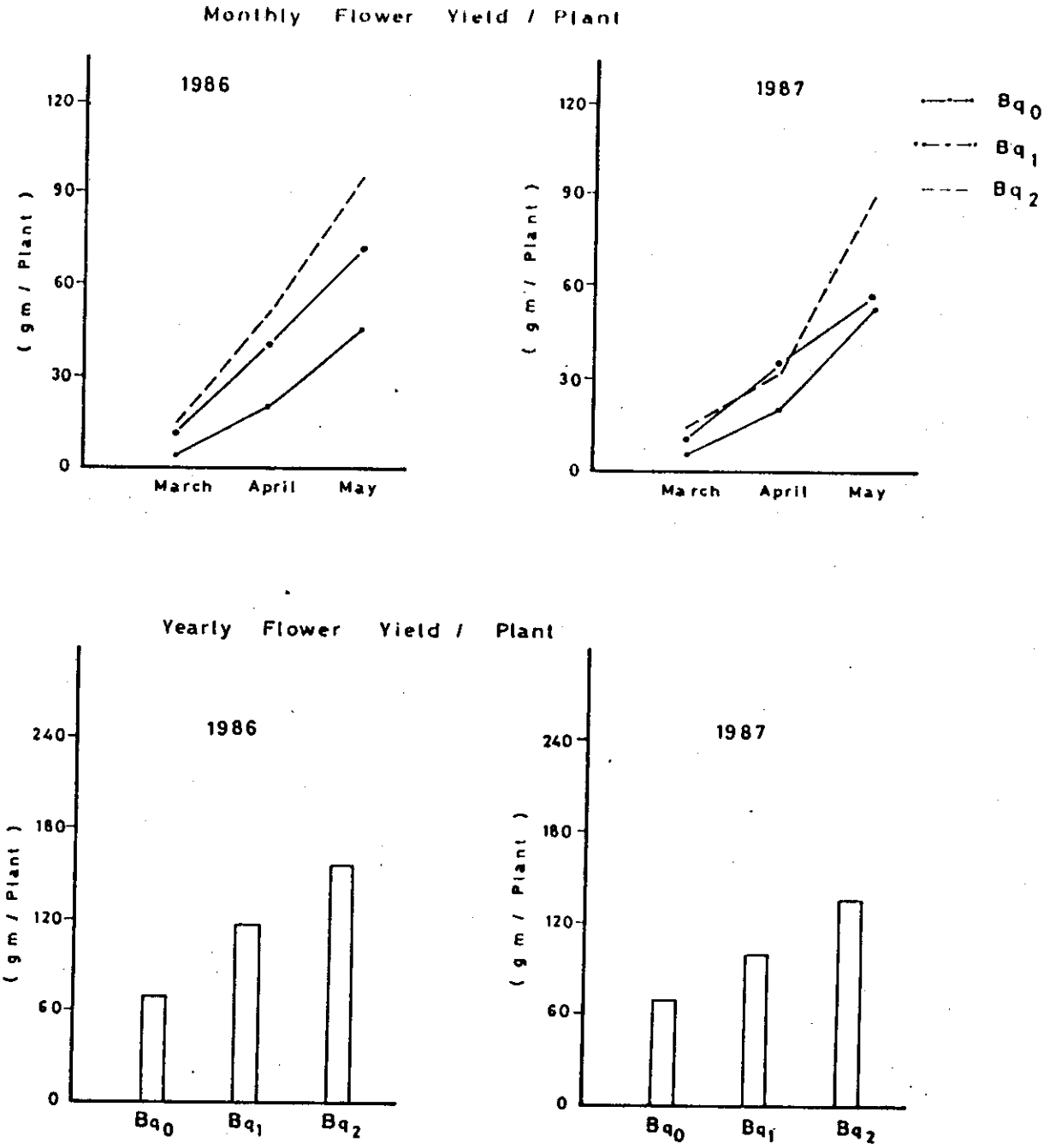


Fig.(7) Effect of spraying Bq on monthly and yearly yield of flower of Rosa gallica var. aegyptiaca during 1986 and 1987 seasons.

flowers were obtained due to this treatment. The increase go linearly with B_9 concentrations in the two seasons and in different months. Slight differences, however not significant occured between the two seasons, in which significant flower production began in April in the second one.

When we compare the effect of the two growth regulators, kinetin and B_9 on flowering of rose plants, it was found that the first level of kinetin was sufficient to produce the economical and higher flower yield. On the other hand B_9 can exert its favorable effect till 4000 ppm.

This picture with flower yield was nearly the opposite with the vegetative growth. Kinetin linearly increased the growth characters studied, but with B_9 the first level was the optimum to produce the desired effect.

These results were in accordance with those obtained by Matous (1971), stated that B_9 and ccc delayed flower opening by 5 to 7 day of azealea plants, but increased flower bud production and had no effect on flower size, the results also revealed a significant

flower yield production starting from April only. Bhattacharjee (1979), who studied the effect of B_9 on several varieties of rose. He found that it stimulated branching, increased flower size and improved vase life, however, he added that the chemical induced early flowering which contradicted the percent results. On the same subject, Hassan et al., (1983a), found an increase of flower yield of Jasminum sambac which reached 42 and 68% after treating the plants with B_9 at 100 and 200 ppm.

Tables (7) and (8) indicated the increases obtained due to different treatmenets of growth regulators as percentage in the two seasons. Kinetin in its lower level produced the higher percentage of flowering through the different months and the total yield. Higher kinetin, also produced higher flower yield, but less than the first one.

B_9 increased flower production during months and total yield per plant and per feddan as its concentration increased.

Table (8) Percentage Increase in Flower Yield of *Rosa gallica* var. *aegyptiaca* (gm/plant) as Affected by growth Regulators Assuming that Control=100 in 1987 Season.

Treatments	March	April	May	Total Yield (gm/plant)
Control	100	100	100	100
K_1	457.43	344.22	214.64	258.11
K_2	358.42	284.83	146.73	189.65
B_{9_1}	161.98	237.62	103.46	135.20
B_{9_2}	181.91	356.90	170.99	210.14

So, the two growth regulators differ in their effect. This is also confirmed by the data obtained in the second season, 1987.

II.b.2 Effect of B_9 on Bud Developments

As the anatomical studies were considered, B_9 is found to affect the buds, at 12 days old. The cells and tissues were more developed and differentiated than these of 8 days old and the buds of the untreated plant plates 7, 8 and 9. The cells were minute in shape and size and very narrow in its diameter than the control and kinetin treated, plats which described the retardation effect. The oil gland is clear, the development of leaf primordia is delaying and the primordia is less in its length.

No signs could be pointed out from the structure of plants treated with Bg and the flower yield.

These findings hold true with those Krishnamoorty (1981), mentioned that the growth retardants does not effect cell division in the apical meristem, the number and morphology of leaves and flower is not affected.

II.2 Nitrogen Fertilization

II.2.1 Effect of Nirtogen Fertilization on Monthly and Yearly Yield of Flower

As shown from Table 5 and 6 and Figure (8), flower production increased by time from April to May in which the higher yield of flowers was obtained, in the treated and untreated plants. Significant increase in flower yield was obtained starting from April with control plants. With nitrogen fertilization, no significant yield was obtained during March except with the second level of nitrogen only during the two seasons, which were 26.13 and 24.10 gram per plant in March through the first and second seasons respectively. In April the flower production per plant was greatly affected by nitrogen fetilization,it increased from 21.13 in control 57.30 gram by appling the second level of nitrogen. The same trend occured in the second season. In all cases the second nitrogen level was the optimal for producing higher flower production per plant. On May the flush production of flower was obtained in all treatments and control. The same trend of April was repeated with May i.e the second nitrogen level was almost the effective one.

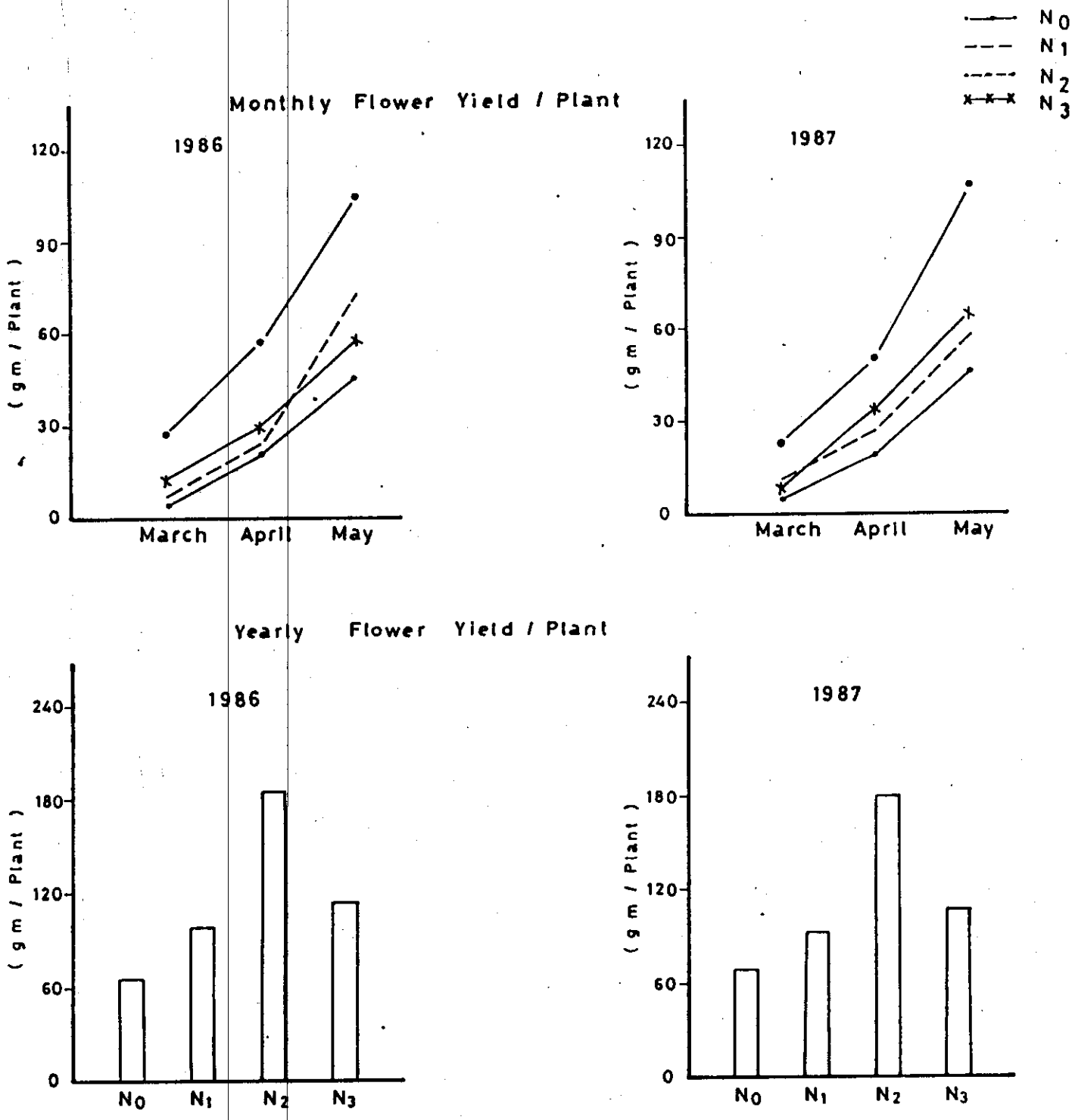


Fig. (8) Effect of nitrogen fertilization on monthly and yearly yield of flower of Rosa gallica var. aegyptiaca during 1986 and 1987 seasons.

Considering the total yield during the flowering period, it is clear that the second level of nitrogen was the treatment to produce the higher yield followed by the third level then the first one. Similar results were obtained in the second season.

So, one can conclude that nitrogen is economically of benificial effect till 300 kg/Feddan.

The data obtained in this part were supported by the finding of Maharana and Pradhan (1976), found that the nitrogen at 15 grams per plant which gave the high flower yield per plant of hybrid rose. Niggar and Rehalle (1977), on rose found an increase in flower number and size due to higher nitrogen rate. On rose bearing essential oil type. Koseva et al., (1978) indicated the required nitrogen dose to produce flower yield 3760-4620 kg per hectar to be 91 to 123 kg nitrogen unit. On the same subject chandra (1981) reported that nitrogen had benificial effect on the production of flowers of Rosa damascena. Also Akbar and Rao (1982) on Rosa bourboniana came to the same finding. Tables (9) and (10) summarizing the data obtained with

Table (9) Percentage Increase in Flower Yield of Rosa Gallica var.. aegyptiaca (gm/plant) as Affected by Nitrogen Fertilization Assuming that Control=100 in 1986 season.

Treatments	March	April	May	Total Yield (gm/plant)
Control	100	100	100	100
N_1	121.57	104.92	155.56	138.10
N_2	512.35	271.18	233.73	264.79
N_3	200.00	123.19	171.49	159.20

Table (10) Percentage Increase in Flower Yield of *Rosa gallica var. aegyptiaca* (gm/plant) as Affected by Nitrogen Fertilization Assuming that Control=100 in 1987 Season.

Treatments	March	April	May	Total Yield (gm/plant)
Control	100	100	100	100
N_1	179.21	179.01	107.98	127.55
N_2	477.23	344.16	197.55	247.08
N_3	141.58	211.88	128.39	146.54

nitrogen fertilization and its effect on monthly and total yield assuming that the control equal 100, it was found that the percentage increase was 5 times of the control in March with the second nitrogen level.

The medium nitrogen level was the superior in production of rose flowers through April and May and consequently the total yield per plant and feddan. The second season showed the same picture.

II.2. Effect of Nitrogen Fertilization on Bud Developments

When dealing with bud development, tissue structure and nitrigen fertilization, it was found that ther were differences between the plants fertilized with nitrogen and control ones in the cellsshape and bud initiation.

II.3 Interaction Between Growth Regulators and Nitrogen Fertilization

C.1 Effect of Combination Between Kinetin and Nitrogen Fertilization on Monthly and Yearly Yield of Flower

As shown from Tables (5) and (6) and Figure (9), the data of the treatments of the combination between kinetin and nitrogen were summarized. We will deal with it through each month. During March an interaction effect occurred between the first level of kinetin and the higher dose of nitrogen 450 kg/Feddan in the first and second seasons which amounted to 26.00 and 28.20grms per plant respectively. When combining the second level of kinetin with any of the nitrogen doses, a synergetic effect occurred only with nitrogen in the first and third level in the two seasons, however, the second dose of nitrogen did not show any response which was an odd observation.

Through April no accumulated effect of both nitrogen and kinetin in their available combination were observed in both seasons.

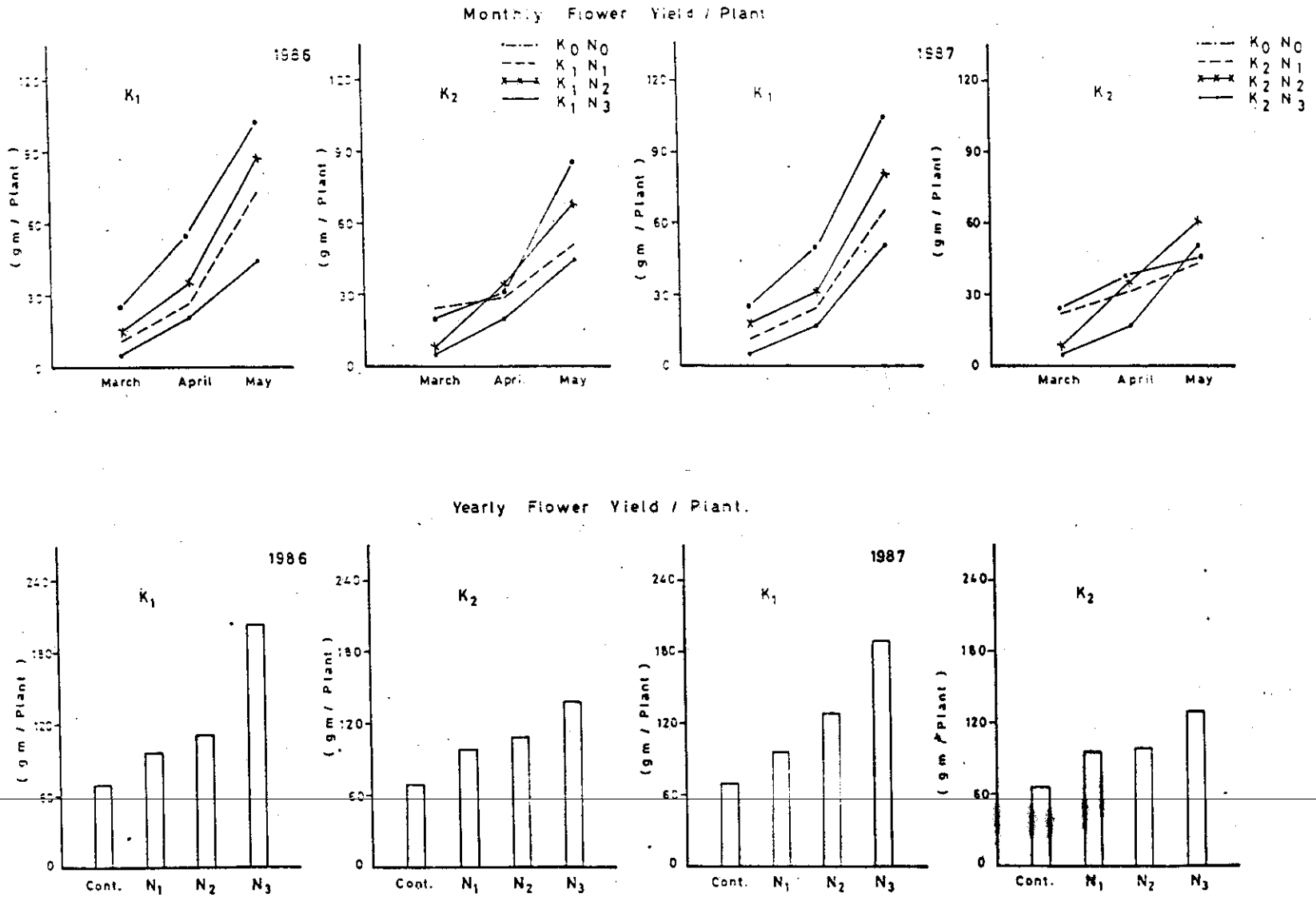


Fig. (9) Effect of combination between spraying kinetin and nitrogen fertilization on monthly and yearly yield of flower of Rosa gallica var. aegytiaca durin 1986 and 1987 seasons.

In May the only interaction was occurred between the first level of kinetin and the third nitrogen level in the first season only. In this treatment the yield per plant in May was 120.00 gram per plant versus 118.05 for kinetin 50 ppm and 77.17 gram per plant for nitrogen only in its third level.

Concerning the total yield per plant during the flowering period the synergism between kinetin and nitrogen fertilization was between the first dose of kinetin and third one of nitrogen irrespective of the higher poroduction of all treatments gained. An analogous pattern was observed with the total yield of flowers per feddan.

These results were confirmed by many works on both kinetin and nitrogen fertilization, from whom Carpenter and Carlson (1972), demonstrated that BPA increased the diameter and fresh weight of chrysanthemum flowers. Koseva et al., (1978), found that nitrogen fertilization increased the production of Kazanluk rose flowers. Ohkawo (1979), on rose found that BA increased cut flower production. Nambisan (1982), studied the effect

of nitrogen in split doses at 10, 20, 30 and 40 gram per plant, on Rosa boruboniana, he found that the mean flower yield the highest viz 53.2 over control plant (264 gram per plant) in rose receiving 40 grams nitrogen.

c.2 Combination Between Kinetin and Nitrogen Fertilization on Bud Developments

It is shown from the anatomical studies that the combination of kinetin and nitrogen had no effect on any of the tissues developed, so no clear effect was observed.

d.1 Effect of Combination between B_9 and Nitrogen Fertilizarion on Monthly and Yearly Yield of Flower

With respect to the combination between B_9 and nitrogen fertilization through different months, Tables 5 and 6 and Figure (10) summarized this effect. It was found that in March the second level of B_9 with the first and third level of nitrogen produced higher flower yield 26.15 grams per plant and 26.08 in the first season (Table 5). While in the second season treatments $B_9 N_2$ and $B_9 N_1$ and $B_9 N_2$ gave the higher flower yield. No significant effect on flower yield was occurred during April.

In May the higher levels of B_9 and nitrogen produced higher flower yield per plant 104.00 grams, however nitrogen only in its second level produced 105.18 grams in the first season. In the second one no interaction between the two elements occurred.

With respect to the total yield of flower per plant, the significant yield was produced by the

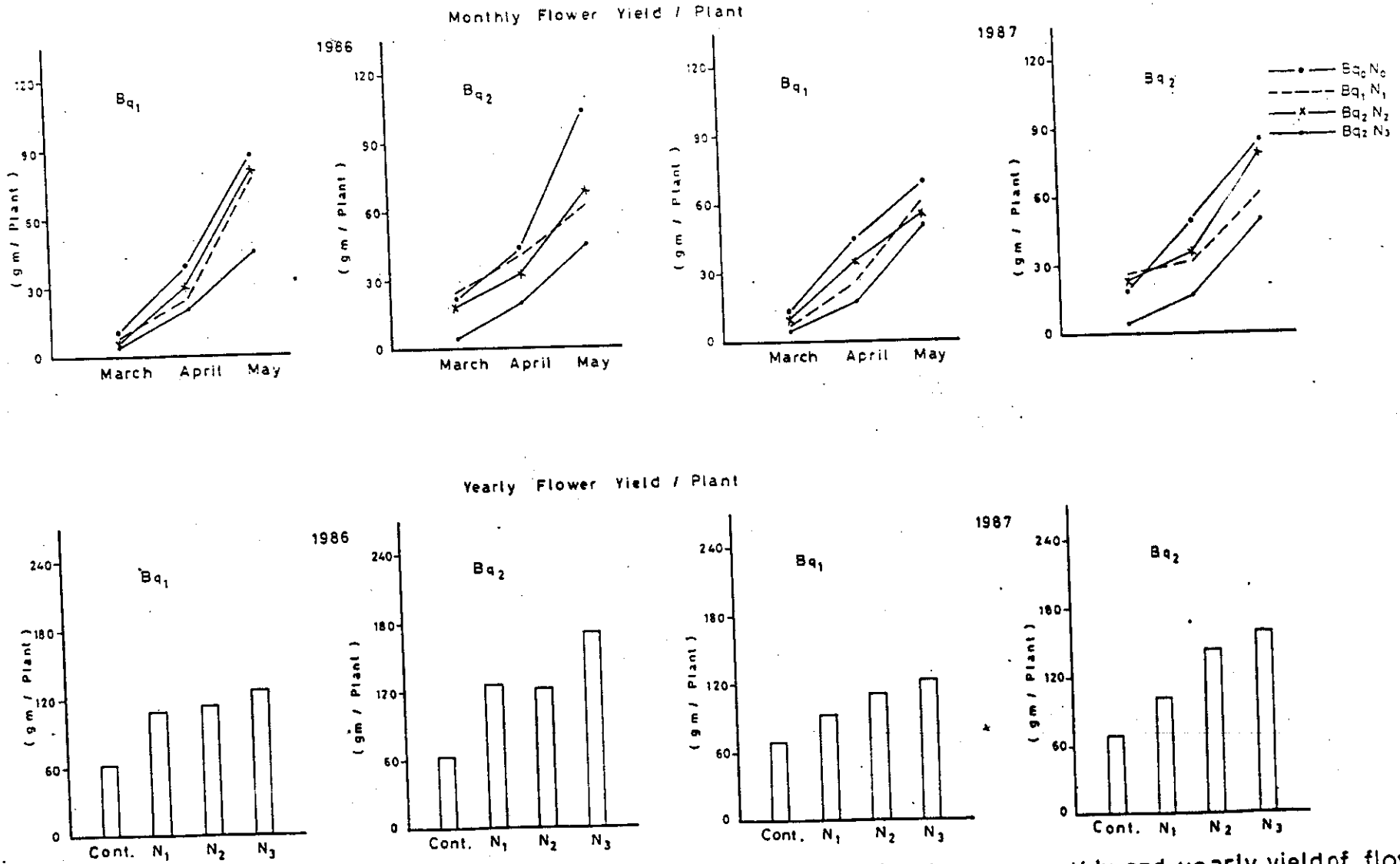


Fig.(10) Effect of combination between spraying Bq and nitrogen fertilization on monthly and yearly yield of flower of Rosa gallica var. aegyptiaca during 1986 and 1987 seasons.

treatments, that nitrogen in its third dose was combined with the second level of B_9. However, nitrogen in its second dose alone produced the higher yield of flowers, 188.61 gram in the first season, 1986. The same picture of season 1987 was repeated again, concerning the total yield per plant and the yield of flowers per feddan.

Results similar to our results were obtained by Bhattacharjee (1979), on Rosa, he found that B_9 increased flower size. Hassan et al., (1983a), on Jasminum sambac found that B_9 treatments increased flower yield.

Akabar and Roa (1982), found that sprays of nitrogen phosphorus and potassium at 2.5:1.5:1.5 gram per plant on Rosa bourboniana gave the highest flower yield as 446.20 grms per plant.

To illustrate the differences between the combination of kinetin, B_9 and nitrogen treatments, Tables 11 and 12 which translate the values to percentage can describe these effect.

Table (11) Percentage Increase in Flower Yield of Rosa gallica var. aegyptiaca (gm/plant) as Affected by Combination Kinetin, Bg, and Nitrogen fertilization assuming that control=100 in 1986 Season.

Treatments	March	April	May	Total Yield (gm/plant)
Control	100	100	100	100
K N 1 1	198.04	118.32	164.67	153.30
K N 1 2	280.39	170.89	193.33	192.91
K N 1 3	509.80	266.45	266.67	284.81
K N 2 1	476.47	132.94	113.33	145.12
K N 2 2	100.59	160.91	151.11	150.46
K N 2 3	472.94	156.51	177.78	192.60
Bg N 1 1	138.04	109.13	171.40	150.54
Bg N 1 2	119.61	142.45	173.33	160.33
Bg N 1 3	137.84	180.79	182.60	178.86
Bg N 2 1	512.75	185.04	142.47	181.61
Bg N 2 2	434.71	156.32	153.44	174.43
Bg N 2 3	511.37	190.25	231.11	239.06

Table (12) Percentage Increase in Flower Yield of Rosa gallica var. aeguptiaca (gm/plant) as Affected by Combination Kinetin, Bg, Nitrogen and Nitrogen fertilization assuming that control=100 in 1987 Season.

Treatments	March	April	May	Total Yield (gm/plant)
Control	100	100	100	100
K N 1 1	181.19	158.42	120.39	132.43
K N 1 2	317.82	198.68	148.61	170.60
K N 1 3	558.42	331.82	212.75	260.97
K N 2 1	478.22	199.34	80.89	132.70
K N 2 2	158.42	217.82	112.87	137.68
K N 2 3	478.42	199.35	137.34	173.62
Bg N 1 1	101.39	172.94	116.63	127.21
Bg N 1 2	139.61	237.82	185.38	135.89
Bg N 1 3	180.59	298.82	128.81	166.71
Bg N 2 1	535.64	218.92	128.39	169.14
Bg N 2 2	516.83	231.49	150.73	192.61
Bg N 2 3	476.24	358.03	158.15	219.67

It was found that the first level of kinetin combined with the third nitrogen level produced, higher flower yield during the three months, also the total yield through the flowering stage.

With Bg the hieghest flower yield was contributed to the treament when Bg and nitrogen in their higher levels were combined in the first season.

In the second one 1987 Table (12) indicate the values obtained.With kinetin the higher flower yield was obtained with the first level of kinetin combined with the third one nitrogen as first season.

The trend obtained with the combination of Bg and nitrogen in the first season was repeated in the second season except in March.

d.2 Effect of Combination Between Bg and Nitrogen Fertilization on Bud Developments

The anatomical studies of the bud proved no clear changing or differences in the tissues and cells of the treatments that combined Bg and nitrogen.

III Chemical Analysis

1- Growth Regulators

a. Effect of Kinetin

a.1 Concrete Percentage and Concrete Yield

Table (13) and Figure (11) described the datea obtained from the two seasons.

Kinetin increased the concrete percentage as compared to the total untreated plants. In the first season the values obtained were 0.308, 0.410 and 0.440% for 0, 50 and 100 ppm kinetin respectively. In the second season the percentage was slightly higher, but with similarity. The percentage increase go linearly with the kinetin concentration. with respect to the concrete yield per plant (flower yield per plant x concrete yield) it goes parallel to flower weight, i.e increase by adding the kinetin, however the second level did not produce the expected increase. So, it could be seen that with limits of the first level of kinetin, a benificial and economic increase in concrete yield per plant could be gained. The same picture was obtained with the concrete yield per feddan. As the yield was

Tab

Treatments
Control
K 1
K 2
Bg 1
Bg 2
N 1
N 2
N 3
K N 1 1
K N 1 2
K N 1 3
K N 2 1
K N 2 2
K N 2 3
Bg N 1 1
Bg N 1 2
Bg N 1 3
Bg N 2 1
Bg N 2 2
Bg N 2 3

L.S.D. General	0.05
	0.01
Kinetin or Bg	0.05
	0.01
Nitrogen Fer.	0.05
	0.01
Combination	0.05
	0.01

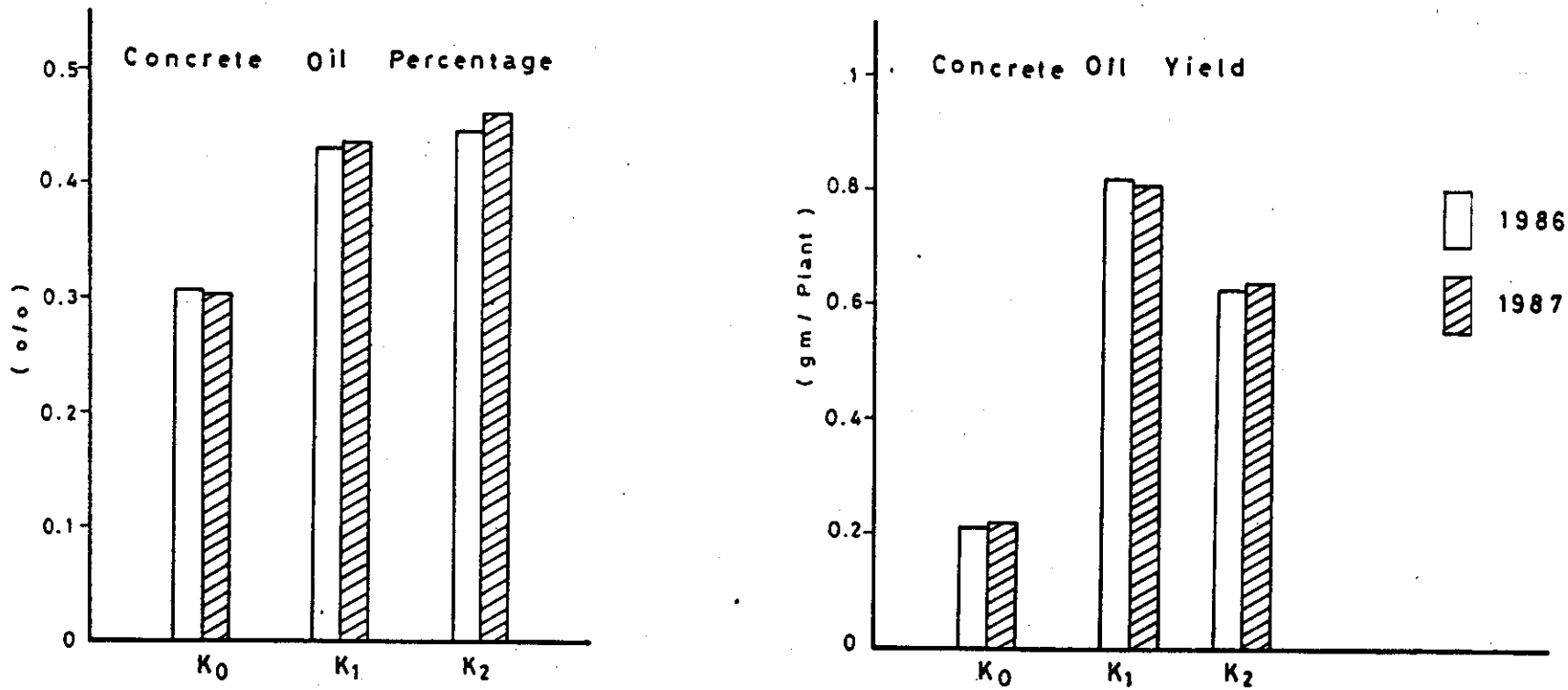


Fig.(11) Effect of spraying kinetin on concrete oil percentage and concrete oil yield per plant of Rosa gallica var. aegyptiaca flowers during 1986 and 1987 seasons.

considered through the two seasons 1986 and 1987, always the second one had a nearly the same or somewhat higher values.

These findings were supported by the results obtained by the work of El-Keltawi and Croteau (1987),who revealed that the essential oil yield of cytokinin treated plants was increased up to two fold on a fresh weight relative to the untreated control in Mentha piperita and M. Spicata. They attributed this increase to alteration in growth or development of the treated plants or to changes in oil gland population. El-Khayat (1987), found that kinetin as foliar spray favoured concrete accumulation in Tagetes patula.

a.2 Plant Pigment

1. Chlorophylls

Chlorophyll "a", "b" and the ratio between them were estimated in the leaves of rose plant as a criteria to investigate the role of kinetin on these pigments as an indirect factor in the production of flowers. The data in Table (14) revealed that kinetin application

Table

Treatments		
Control		1.
K	1	4.
K	2	4.
Bg	1	4.
Bg	2	5.
N	1	1.
N	2	2.
N	3	3.
K N	1 1	2.
K N	1 2	2.
K N	1 3	2.
K N	2 1	4.
K N	2 2	4.
K N	2 3	4.
Bg N	1 1	3.
Bg N	1 2	3.
Bg N	1 3	3.
Bg N	2 1	3.
Bg N	2 2	4.
Bg N	2 3	4.
L.S.D. General	0.05	0.
	0.01	0.
Kinetin or Bg	0.05	0.
	0.01	0.
Nitrogen Fer.	0.05	0.
	0.01	0.
Combination	0.05	0.
	0.01	0.

increased chlorophyll "a" the most suitable concentration was 50ppm which produce higher chlorophyll "a" than the higher level of kinetin. The two levels on the other hand produced higher chlorophyll contents as mg per gram leaves than the control, the increase reached three times the control.

Chlorophyll "b" increased by kinetin treatment, however the low level was the most effective, the same pattern which was found with chlorophyll "a". The ratio between the two chlorophyll fraction will follow the content of chlorophyll "a" and "b"..

Lower increase in chlorophylls was obtained due to the second level of kinetin irrespective of the known relation between kinetin and chlorophyll, which indicated that treatments of plant or leaves with cytokinins ,resulted in mobilization of amino acids and minerals from other plant parts and accumulate in the treated tissues. This helps to keep up the protein turn over in the leaves leading to retain chlorophylls and delay senscence. Therfore its possible role may be through its effect on prevention of the degradative process of protein, chlorophyll and RNA rather than on

the acceleration of synthetic processes. This is also rather than reasonable when correlating the lower increase obtained in chlorophyll content due to the higher level of kinetin.

2. Carotenoids

From the previous Table (14), it was found that kinetin in its two concentrations used favours carotenoids formation. The increase was linear with concentration and was twice its content in control, which was different than the pattern obtained with chlorophyll. This may discribe two different pathways in the effect of kinetin on plant pigments.

The results obtained with plant pigment and the effect of kinetin on them coincoide with the results of Adedip et al., (1971), who stated that chlorophylls and carotenoids increased in bean leaves treated with benzyladenine. Raffat and Herwig (1975), on the same plant came to the same conclusions. Longo et al., (1978), concluded that carotenoid accumulation increased with BA (benzyl adenine) treatment. On Sinapis alba,

Zerbe and Wild (1980), found that kinetin at 6ppm induced an increase in chlorophylls "a", "b", their ratio, carotenoids and cytochrom F. They concluded that these effects resembled strong and blue light adaptation. Vidhu Murty (1985), on Tagetes erecta found that kinetin with concentration of 10-100ppm stimulated chlorophyll synthesis. The same conclusions were obtained by Zayed et al.,(1985), on Hibiscus sabdarifa, Maddawy (1981), on Polianthes tuberosa, and Radwan (1988), on Tagetes erecta.

a.3. Total Carbohydrates

From Table (14) and Figure (12), it was found that kinetin had no effect on total carbohydrates. The lower level of kinetin lowered the carbohydrate content, while the second one had no effect, the values were equal those of untreated plants.

These findings were in the contrary of Hegazy et al., (1972), Raffat and Herwig (1975), Awad et al., (1981), Hassan et al., (1984), Abou El-Ghait (1985) and Hasanain (1985), on different plants, they all concluded

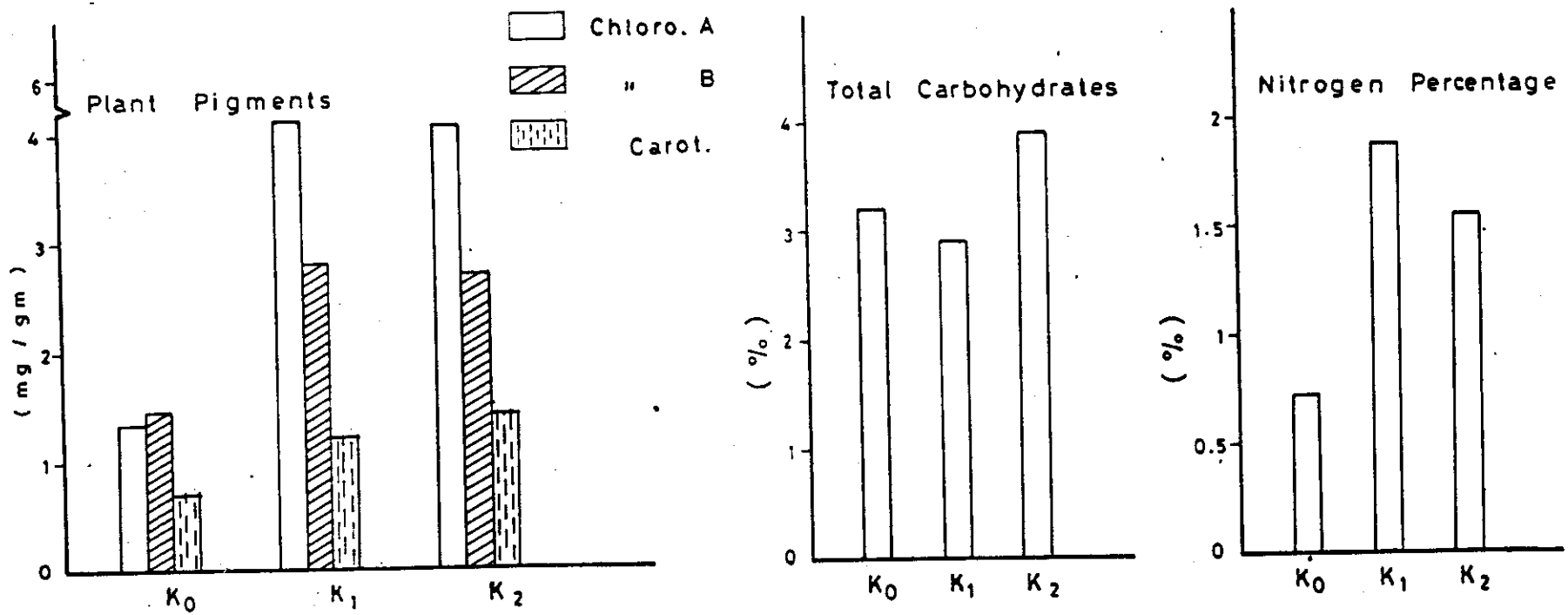


Fig.(12) Effect of spraying kinetin on chemical analysis in leaves of Rosa gallica var. aegyptiaca during 1986 season.

that kinetin increased carbohydrates either total or fractions. The results obtained in this investigations might be due to that samples taken from leaves were at late stages, at maturity, and hence no effect of kinetin may be exirted in this period. The same conclusion were obtained by Maddawy (1988), on Polianthes tuberosa and Radwan (1988) on Tagetes erecta.

a.4 Nitrogen Percentage in Leaves

Nitrogen percentage in leaves is a phenomenon of the metabolic process in the leaves. It is the net effort retain in plant which utilized in different metabolic reactions. So, the Figures obtained were the sum of the whole work or energy done by the plant. From Table (14) and Figure (12), it is clear that kinetin by its two levels used increased the ability of the plant to absorb nitrogen minerals. The increase was higher with the first level 50ppm kinetin. The second level produce higher percentage of nitrogen but smaller than the first one. These results might be described on the basis that the plant responds to the lower dose only, which stimulate cell devision and consequently initiate meristemic cell that are active and in turn absorb different soil solutes, especially nitrogen.

These results go parallel with those of Awad et al., (1981), he showed that kinetin concentration 1-10ppm increased nitrogen percentage in the leaves of gladiolus as compared to the control. Also Castro et al., (1983), on Miquel pereira found that higher level of nitrogen occurred in the stems of the plant treated with 50ppm kinetin. On the other hand, Hasanian(1985), on Pelargonium graveolens mentioned that BA treatment had no constant trend in the status of minerals in different plant parts.

Table (15) which summarize the data obtained with kinetin and its effect on concrete percentage and yield in the two seasons and which assume that control equal 100, revealed the following points:

1- Kinetin increased the percentage of concrete and yield in flowers of rose plant and the increase was dependant with concentrations.

2- Concrete percentage was higher in the second season however, the yield in the first season was the greastest.

Table (15) Percentage Increase in Concrete Percentage and Concrete Yield of *Rosa gallica* var. *aegyptiaca* (gm/plant) as Affected by Growth Regulators Assuming that Control=100 during 1986 and 1987 Seasons.

Treatments	Concrete Percentage		Concrete Yield	
	1986	1987	1986	1987
Control	100	100	100	100
K_1	133.12	142.85	371.23	265.77
K_2	142.86	152.32	289.58	288.29
Bg_1	131.49	137.42	228.55	185.59
Bg_2	136.36	144.04	303.65	302.25

Table (16) Percentage Increase in Chemical Analysis in Leaves of Rosa Gallica var. Aegyptiaca as Affected by Growth Regulators Assuming That Control=100 in 1986 Season

Treatments	Chlorophyll (mg/gm) A	B	A/B	Carotene	% Total Carbohydrates	Nitrogen %
Control	100	100	100	100	100	100
K_1	314.18	202.91	163.26	154.85	91.14	246.58
K_2	307.46	200.00	154.08	159.46	125.32	209.59
Bg_1	338.05	188.32	197.14	148.65	162.34	238.36
Bg_2	394.03	227.01	110.20	239.19	79.11	187.67

Table (16) tabulated the data of the other chemical analysis as percentage increase pointed also the following results:

1- Chlorophylls "a" and "b" responded well to the first level of kinetin.

2- Carotene increased by increasing kinetin concentrations.

3- Total carbohydrates were reduced by first kinetin treatments.

4- Nitrogen percentage in leaves increased by kinetin treatments.

b. Effect of Bg

b.1 Concrete Percentage and Concrete Yield

Table (13) and Figure (13) revealed that Bg application caused significant increase in concrete percentage due to the two levels of Bg applied. The percentge increased from 0.308 in control to 0.405 and 0.420 in the two levels of Bg . With concrete yield (gram per plant), the same pattern of concrete percentage was obtained with

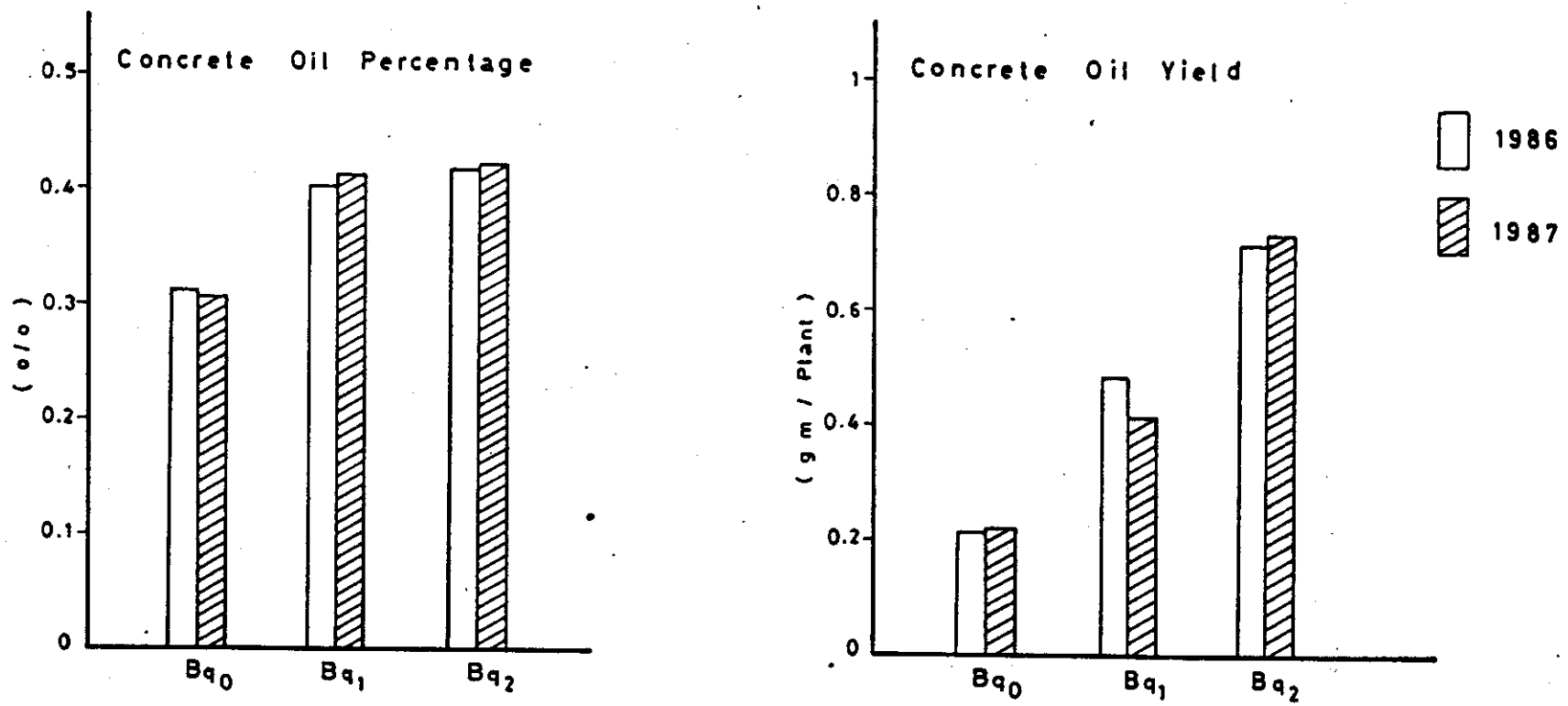


Fig. (13) Effect of spraying Bq on concrete oil percentage and concrete oil yield per plant of Rosa gallica var. aegyptiaca flowers during 1986 and 1987 seasons.

concrete yield, as it was calculated by multiplying the percentage by flower weight, which increased by B_9 application. In the second season the same behaviour was recorded however, with smaller values than the first in the concrete yield. Concrete yield as Kilograms per Feddan go parallel to the yield per plant as it was multiplied by a fixed area. The B_9 treatments increased linearly the yield of concrete for both plant and feddan.

The results with B_9 on concrete of rose was supported by the finding of Abou Zeid (1974), reported that B_9 with concentration of 4000ppm had no effect on volatile oil percentage of caraway seeds. El- Ballal and El-Gengeihi (1981), indicated that B_9 showed its highest performance at 125ppm B_9 with a deteriorated quality of caraway. El-Shamy (1982), on carnation found that the rate of B_9 500 ppm increased concrete percentage. Also he indicated that B_9 levels (500, 1000 and 2000ppm) increased the absolute oil percentage compared with control. Hassan et al., (1983a), on Jasminum sambac, they reported an increase in concrete percentage and yield as a results of B_9 treatments.

b.2 Plant Pigments

1- Chlorophylls

Data in Table (14) and Figure (14) show that B_9 with its two doses increased chlorophyll "a". This increase was highly significant. The chlorophyll content increased from 1.34 in untreated plants to 4.53 and 5.28 in plants treated with 2000 and 4000ppm. With chlorophyll "b" the contents were as follows: 1.37, 2.58 and 3.11 for 0, 2000 and 4000ppm B_9 which resembles the trend of chlorophyll "a" but with lower values. It is known that chlorophyll "b" is almost lower than "a" consequently the ratio between the two chlorophylls exhibit the same category. The linear increase in chlorophylls by increasing B_9 concentration may be described by the greater retention of chlorophylls, therefore the leaves of retardant treated plants appeared dark green and hence contained more quantity of chlorophyll

2- Carotenoids

In Table (14) and Figure (14) B_9 treatments increased the carotenoidscontent in the leaves of rose

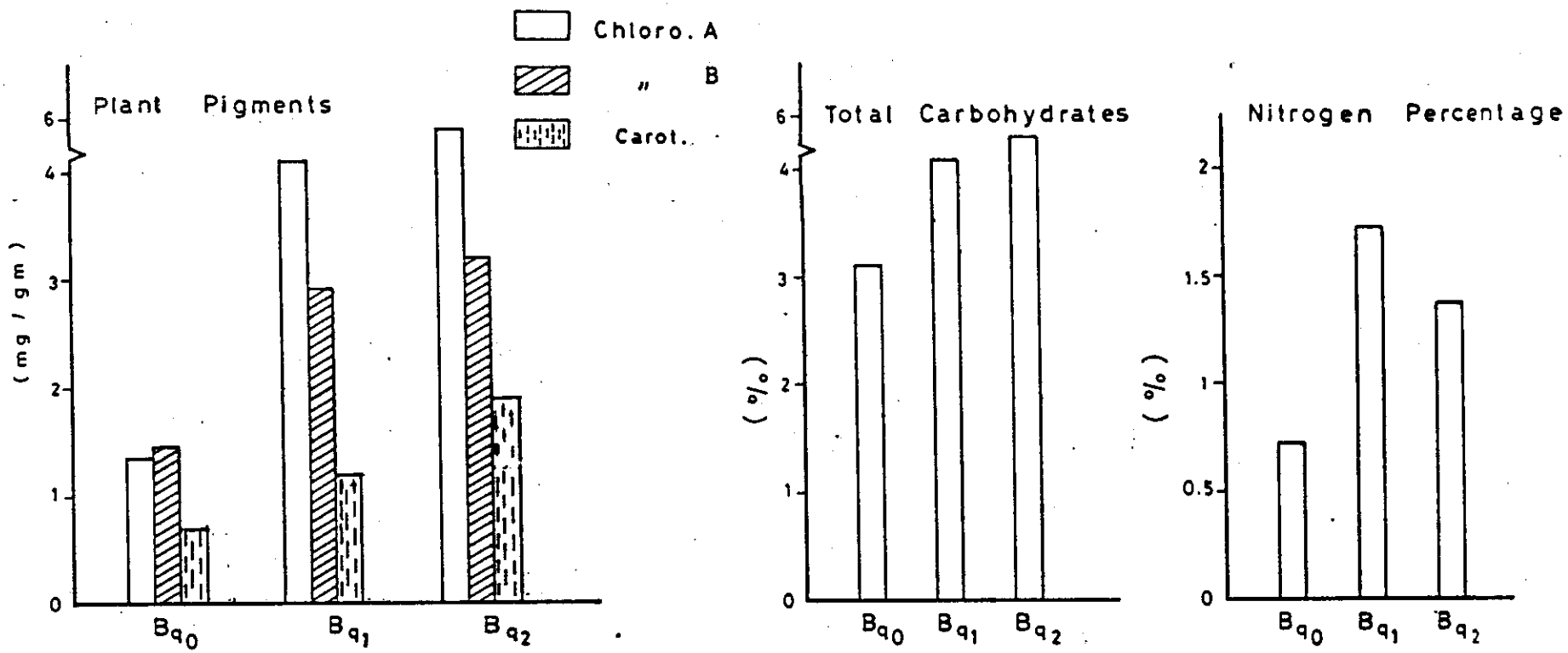


Fig.(14) Effect of spraying Bq on chemical analysis in leaves of Rosa gallica var. aegyptiaca during 1986 season.

plant. The increase due to the application of the two levels was highly significant. The content of carotene was lower than that of chlorophyll, as the site of carotene formation was not the leaves.

The results obtained in this part hold true with those obtained by Agafonov and Gubins (1981), on apple leaves, which revealed that ccc stimulated the accumulation of chlorophylls and carotenoids in the leaves. Gaber et al., (1984), on tomato leaves reported an increase in chlorophyll and carotenoids due to the treatment with ccc and Bg. On the same year, Radzhabor on grape vine came to the same conclusions.

A different results with carotenoids were reported by El-Khayat (1987), on Tagetes patula, he found that B_9 at different concentration had no constant effect on carotene.

b.3 Total Carbohydrates

Total carbihydrates were estimated in the leaves of rose, the date in Table (14) and Figure (14) indicated that B_9 in its lower level stimulated the

accumulation of carbohydrates in the leaves of rose plant. On the other hand the second one lower the content than the control. The increase due to the first level support the view that B_9 in its lower levels possessd a stimulation effect in contradict to the second one which exhibits an inhibition one. All the parameters studied reflected this effect, so, we can correlate the effect of B_9 in its first level with the results obtained with flower yield, concrete percentage and yield.

These findings were in good agreement with those reported by Abd El-Aziz (1971), on Chrysanthemum hortorum, he mentioned that B_9 in concentrations of 500, 1000 and 1500ppm increased total carbohydrates in the stems. On Roughe Meilland rose Selim (1979), indicated that B_9 300, 600 and 750ppm increased sugars as well as the total carbohydrates.

b.4 Nitrogen Percentage in Leaves

The previous Table (14) and Figure (14) summarized the data obtained. It was found that Bg applied affected greatly the nitrogen percentage in the

leaves of rose plant. The low level of Bg doubled nitrogen percentage, however the second one increased nitrogen percentage, but with lower rate. The percentage increases due to the two levels over the control were 138.35 and 87.67% respectively.

These finding go parallel with those reported by Moshin and Smith (1972), on Chrysanthemum morifolium, Hassan et al., (1976), on Rosa rouge meilland, Almulla (1985), on Zinia plants, Al-Ain (1986), on Iris tingitana and El-Khayat (1987), on Tagetes patula.

In general, it could be point that the role of Bg in the chemical analysis of rose plant. Table (15) which suppose that control gave 100 unit can bring about these effects:

In the two seaseons concrete percentages increase by increasing Bg. An analogous trend was obtained with concrete yield in the two seasons also.

Table (16) postulated also the following points:

1- With chlorophylls, the higher Bg used, the more chlorophyls "a" and "b" were obtained.

2- Carotene was increased by B_9 concentrations.

3- Total carbohydrate show a response to the first Bg level, however decreased than the control with the second one.

4- Nitrogen percentage was stimulated by the first level of Bg than the second one.

2- Effect of Nitrogen Fertilization on Chemical Analysis

2.1 Concrete Percentage and Yield

Concrete percentage was determined by petroleum ether extract of 100 grams petales of flowers. Table (13) and Figure (15) illustrate the results obtained. It was clear that nitrogen levels increased the concrete percentage. The increase go linearly with the nitrogen doses applied in the two seasons. All the differences between the different nitrogen level were significant.

The concrete yield is the sum of multiplying the concrete percentage by the flower yield per plant. Nitrogen levels increased concrete yield per plant. The second level was found to be the effective one. The yield per plant was 0.647 and 0.633 grams for first and second season respectively. On the other hand the concrete yield per plant due to the third level of nitrogen was 0.447 and 0.431 in the two seasons 1986, 1987 respectively. With respect to the concrete yield per feddan, a similar picture of concrete yield per plant was obtained, the higher yield was 5.55 and 5.43 kg per feddan obtained by applying the second nitrogen

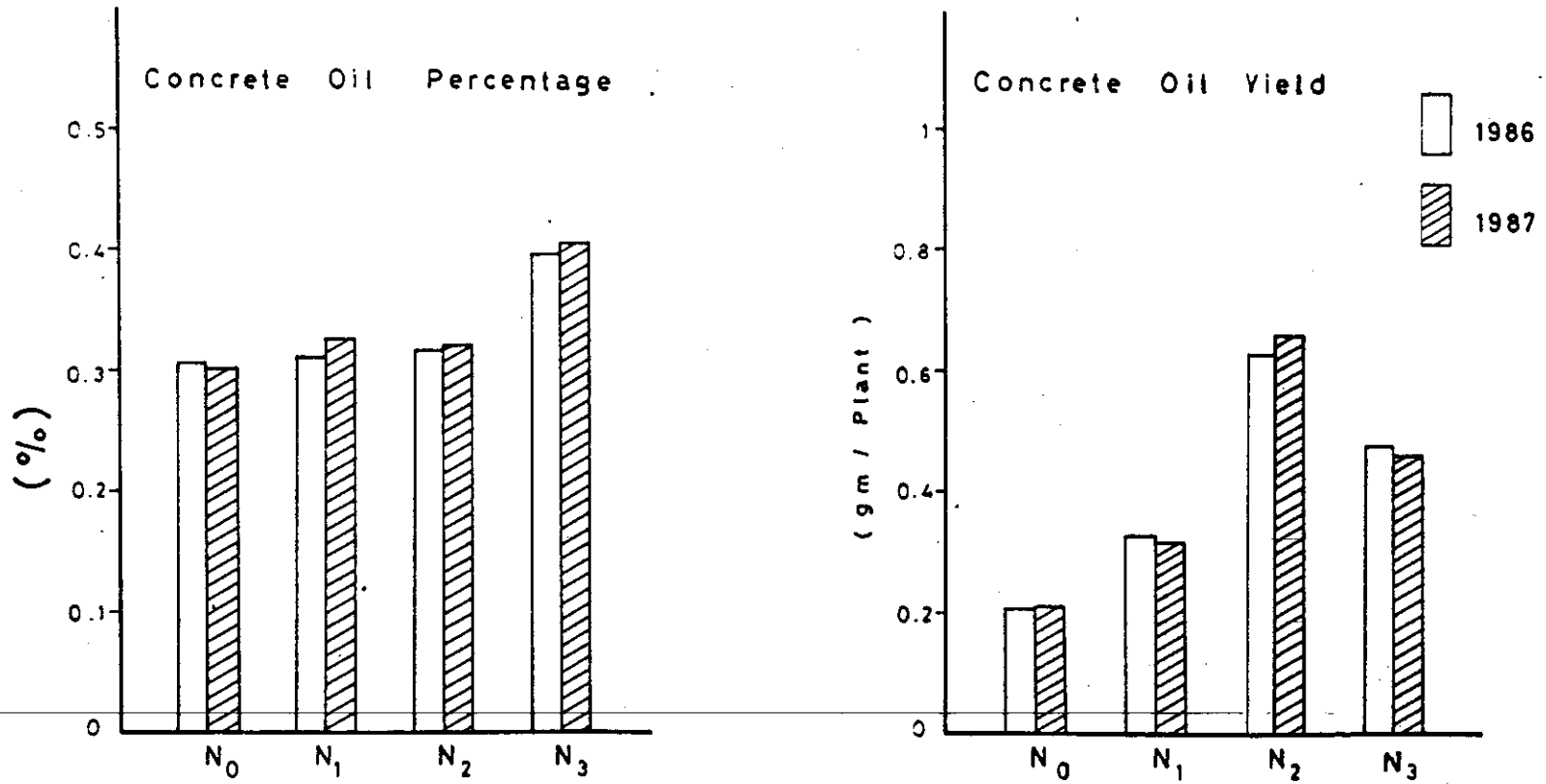


Fig. (15) Fffect of nitrogen fertilization on concrete oil percentage and concrete oil yield per plant of Rosa gallica var. aegyptiaca during 1986 and 1987 seasons.

level in the two successive seasons.

In conclusion to this part, nitrogen increased concrete percentage by increasing its doses. Concrete yield per plant and per feddan had similar trend, in which the second level of nitrogen produced the maximum yield.

The results of this part were confirmed by the data obtained by Akbar and Roa (1982), on Rosa bourboniana, they found that essential oil content was higher (0.57%) in plants receiving foliar nitrogen, potassium and phosphourus. On Jasminum sambac, Hassan et al., (1983b) reported that the highest level of nitrogen (900 kg) increased the concrete yield by 97% over the control. on the other side with Jasminum grandiflorum, Natarjan and Rao (1983), found that highest oil content was generally obtained with high nitrogen and potassium. Also with Jasminum auriculatum, Pal et al., (1984) concluded that flower yield and essential oil content increased with rising nitrogen rates.

From Table (17), it was found that nitrogen in its higher level content produced the higher concrete

Table (17) Percentage Increase in Concrete Pecentage and Concrete Yield of Rosa gallica var. aegyptiaca (gm/plant) as Affected by Nitrogen Fertilization Assuming that Control=100 in 1986 and 1987 Seasons.

Treatments	Concrete Percentage		Concrete Yield	
	1986	1987	1986	1987
Control	100	100	100	100
N_1	105.84	110.93	143.84	140.99
N_2	111.36	115.56	295.43	285.14
N_3	127.92	132.78	204.11	194.14

percentage in the two seasons, however with concrete yield per plant, the second nitrogen level was superior.

2.2 Plant Pigments

1- Chlorophylls

Photosynthetic pigments are a criteria of work done by the plant to produce the different metobolities, primary or secondary. So, it is an indirect tool in determining different factors studied. Table (14) and Figure (16) revealed an increase in different chlorophyll fractions parallel to nitrogen dose applied indicating active proccessing due to nitrogen utilization. The increase in chlorophyll "a" was greatly correlated with nitrogen fertilization. The highest level of fertilization produced the greater amount when compared with control. The percentage of increase over the control due to each addition were 14.92, 69.40 and 164.92% for N_1, N_2 and N_3 respectively. The difference between the effect of nitrogen levels was also significant.

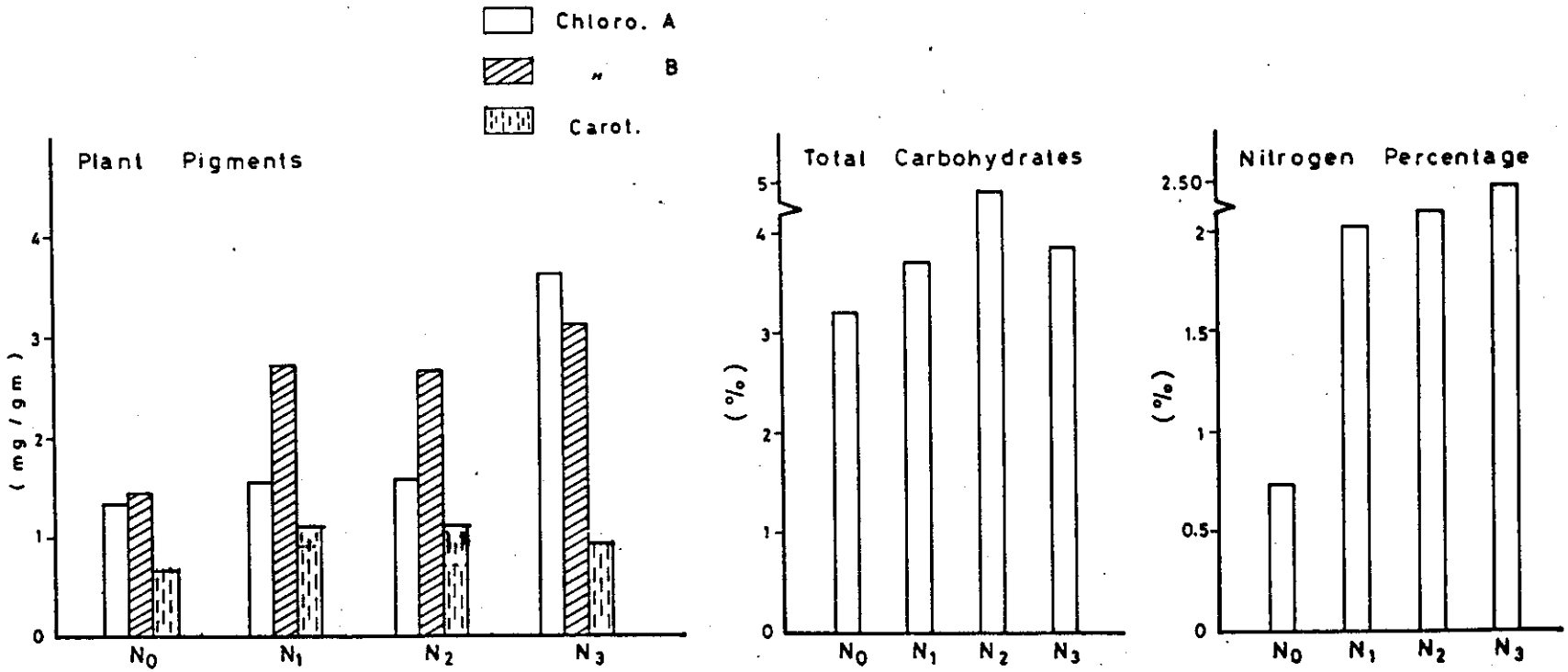


Fig.(16) Effect of nitrogen fertilization on chemical analysis in leaves of Roasa gallica var. aegyptiaca during 1986 season.

Although each nitrogen level affect chlorophyll "b" when compared with the control, yet no differences occurred between the levels of nitrogen.

The ratio between chlorophyll "a" and "b" due to nitrogen fertilization was nearly the same and reached the unity except with the second dose of nitrogen which gave 0.62.

2. Carotenoids

Carotene content in the leaves of rose was estimated and the data were summarized in Table (14) and Figure (16). From the table, all nitrogen levels increased carotene over the control, significantly. The second nitrogen level produced the higher values, however the third one had a lower value.

The results of this part were in accordance with Ramachander (1978), on Amaranthus gangeticus, he indicated that B-carotene increased by nitrogen fertilization. Slime (1980) and El-Gazzar (1982) stated that nitrogen significantly increased the content of both chlorophylls "a" and "b" in the leaves of sunflower

Katab (1985) on mint species proved that high nitrogen fertilization increased chlorophyll content in fresh mint leaves. Lezama and Lin (1986) on Lupinus albifrons they found that under low nitrogen fertilization greater chlorophyll content was obtained. Maddawy (1988), reported that nitrogen fertilization on Polianthes tuberosa increased chlorophylls "a" and "b". Consequently the total chlorophylls contents increased and also an increase in carotenoids content was observed.

2.3 Total Carbohydrates

Average percentages of total carbohydrates were determined in the leaves of rose. Table (14) and Figure (16) described these data. It was found that the only promotive nitrogen level was the second one, followed by the third. However, the first did not produce any effect on total carbohydrate. So, it could be stated that carbohydrate accumulation was enhanced by the addition of 300 kg ammonium nitrate.

In this respect Essa (1984) on rose mentioned that the total carbohydrate in leaves was affected by nitrogen treatments. The same conclusion were obtained by El-Ghawwas (1988), on Marticaria chamomilla and Mohamed (1988), on some strains of chamomile plants.

2.4 Nitrogen Percentage in Leaves

The content of nitrogen estimated in the leaves ofRosa gullica var. eagyptiaca in the fertilized and non fertilized plants was illustrated in Table (14) and Figure (16). It was obvious that nitrogen content increased highly by nitrogen fertilization which were 0.73, 2.17, 2.37 and 2.47 for N_0, N_1, N_2 and N_3 respectively. These values revealed that nitrogen in all its doses added increased the percentage in the leaves. This may be described on the basis that there was a direct correlation between soil nutrients and the composition of leaves. As soon as the plants were fertilized by nitrogen, an active process was accelerated and consequently active absorption of minerals took place, which in return reflects on the quantity of minerals accumulated in leaves.

Table (18) Percentage Increase in Chemical Analysis in Leaves of Rosa gallica var. aegyptiaca as Affected by Nitrogen Fertilization Assuming That Control=100 in 1986 Season.

	Chlorophyll (mg/gm)				% Total Carbohydrates	Nitrogen %
Treatment	A	B	A/B	Carotene		
Control	100	100	100	100	100	100
N_1	114.93	187.59	98.98	136.49	115.82	297.26
N_2	169.40	189.05	63.26	143.24	151.58	324.66
N_3	264.93	227.81	107.14	133.78	120.25	338.36

These findings were achieved by Essa (1984) on rose indicating that the level of nitrogen in leaves was affected by package fertilization (NPK). The following investigators came to the same conclusion, El-Ghawwas (1988), on Marticaria chamomilla and Hyoscyamus muticus and Maddawy (1988) on Polianthes tuberosa.

In conclusion of this part and assuming that control equal 100, Table (18) can illustrate the values obtained by nitrogen fertilization. The highest level of nitrogen produced the highest chlorophylls.

On the other hand the medium level produced the greater amount of carotene and total carbohydrates.

With regard to nitrogen percentage, it goes in line with nitrogen doses.

3. Effect of Interaction between Growth regulators and Nitrogen Fertilization

c. Effect of Combination between Kinetin and Nitrogen Fertilization

c.1 Concrete Percentage and Concrete Yield

As shown from Table (13) and Figure (17) no interaction occurred between kinetin and nitrogen fertilization with all their concentrations and doses applied.in the case of concrete percentage.

Kinetin separatly in its two concentrations produced the maximum percentage. The higher percentage was obtained with kinetin with its high level only in the two seasons, which reached 0.44 and 0.46 respectively.

With concrete yield kinetin alone in its first dose produced the highest yield in 1986 and 1987 seasons, 0.813, 0.812 g/plant respectively. The only combined treatment that produced significant yield was that which

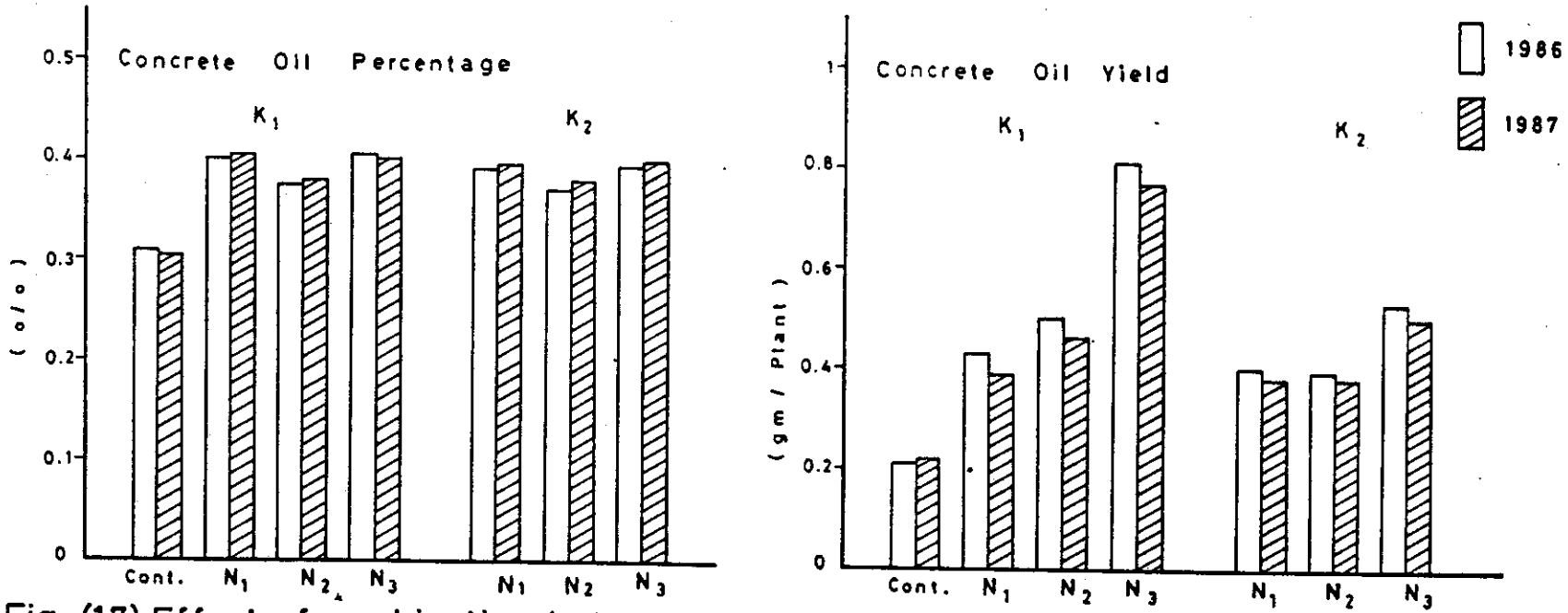


Fig. (17) Effect of combination between spraying kinetin and nitrogen fertilization on concrete oil percentage and concrete oil yield per plant of Rosa gallica var. aegyptiaca flowers during 1986 and 1987 seasons.

kinetin in its first dose was combined with the third nitrogen level which gave 0.817 g/plant concrete in 1987. Therefore no other combined treatments produced significant yield of concrete either per plant or per feddan.

In season 1987, the same trend took place either with concrete percentage or concrete yield. On the other hand all the combined treatment gave significant high yield compared with control.

Acomptition might happen between nitrogen and kinetin, as the two have a stimulative effect on the metabolic process,, so one of them can block enzyme sequence of the other to perform its role in the best way and hence there might be an antagonism. However the studies on the effect of kinetin on the secondary plant metabolism and the enzyme controlling their path ways still locking.

These findings coincide with those of Akbar and Rao (1982), on Rosa bourboniana found that the essential oil content was higher (0.57%) in plants receiving foliar nitrogen, phosphour and potassium.

Natarajan and Roa (1983) on Jasminum grandiflorum reported that the highest oil content was generally obtained with high nitrogen and phosphorus levels. Pal et al., (1984), on Jasminum auriculatum concluded that flower yield and essential oil content after nitrogen treatments was raised. El-Khayat (1987) on Tagetes patula, mentioned that kinetin increased oil percentage in comparison with the control.

c.2 Plant Pigments

Plant pigments were determined in the fresh leaves of rose plant to estimate the chlorophyll and carotenoids as an indirect effect influencing flowering and active ingredients.

1. Chlorophylls

Chlorophyll "a","b" and the ratio between them were determined and tabulated in Table (14) and illustrated in Figure (18). It was found that kinetin in the higher concentration combined with nitrogen in the second or third dose produced higher chlorophyll "a"

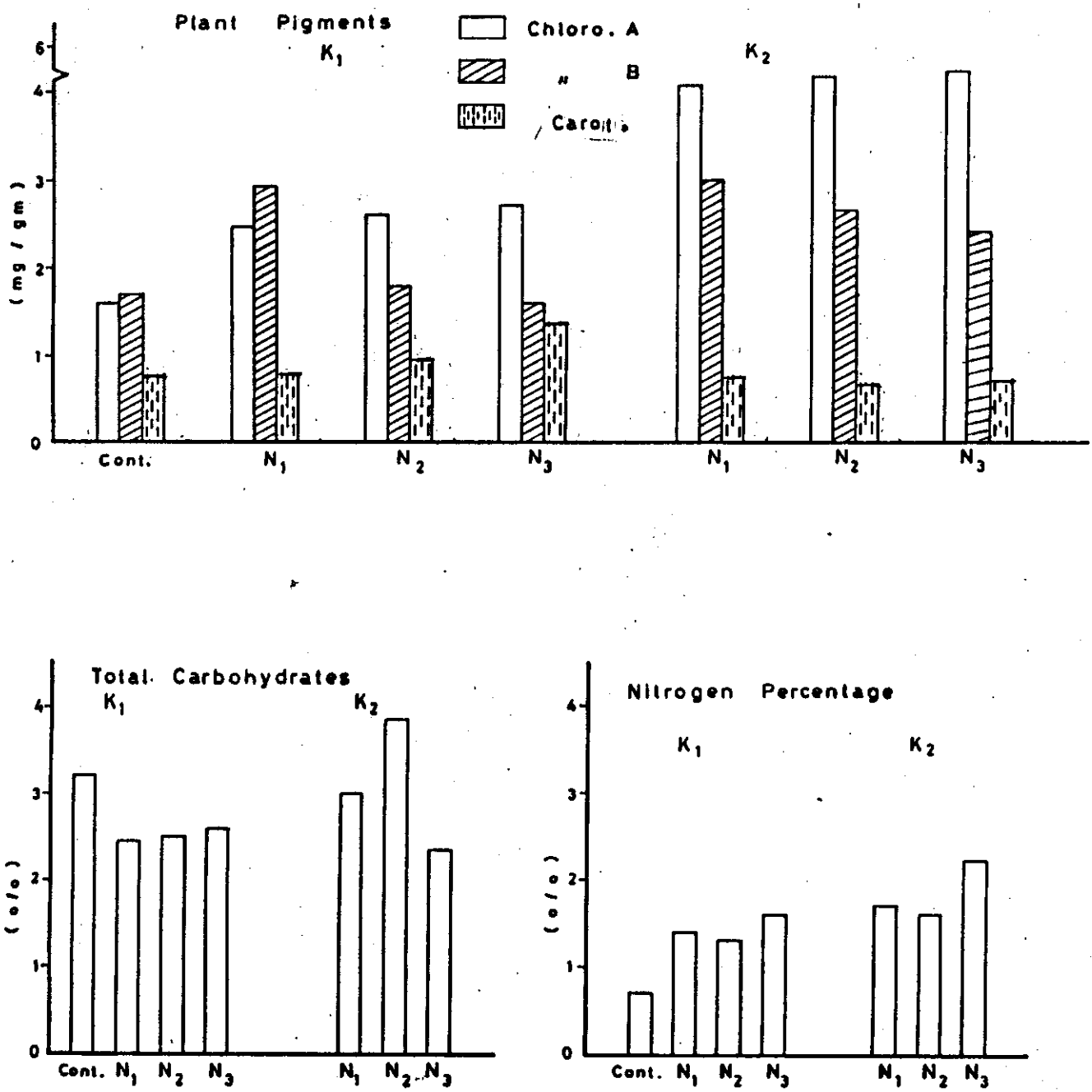


Fig.(18) Effect of combination between spraying kinetin and nitrogen fertilization on chemical analysis in leaves of Rosa gallica var. aegyptiaca during 1986 season.

content 4.29 and 4.32 versus 4.12 for kinetin alone in its higher concentration. It is well known that kinetin prevent chlorophyll degradation by inhibition of chlorophyll as enzyme so, delaying senescence. Also nitrogen, had a role in formation of protoplasm and chloroplastids and consequently and indirectly chlorophyll. With respect to chlorophyll "b" content, it was found that chlorophyll "b" have a different trend than that of "a". It was noticed that the higher level of kinetin with the first level of nitrogen gave higher quantity of chlorophyll "b", however other combination did not affect this fraction.

No consistant trend can be postulated from the table concerning the ratio between the two chlorophyll fractions. This is because no consistant relation between all the interactions and chlorophyll "a" and "b" can be traced. In all the treatments the ratioes ranged between 0.98 to 1.79 mg/g.

The results obtained were in accordance with these of Adedipe et al., (1971), Raffat and Herwig (1975), Longo et al., (1978), Zerbe and Wild (1980) and

Naito et al., (1981) on their studies of the effect of kinetin on plant pigments.

With nitrogen fertilization, the same finding of Ramachander (1978) on Amaranthus gangeticus, Slime(1980), Tawfik (980), El-Gazzar (1982) and Lezama and Lin (1986) were confirmed the results obtained in this investigation.

2. Carotenoids

Carotene was determined in the leaves of rosa plants. from Table (14) the treatment of kinetin in its first dose and nitrogen with the higher dose was the only treatments that gave the higher carotene content which produced 1.35 mg/gm.

These results hold true with those obtained by Longo et al., (1978), on Watermelon cotyledons they concluded that carotenoids accumulation increased with BA^6(6-benzylamino purine) treatments. Ramachandr (1978) on Amaranthus gangeticus indicated that B-carotene content increased by nitrogen level. Genchev et al., (1979) on tomato found that high nitrogen levels promoted chlorophyll "a", "b" and carotenoids.

c.3 Total Carbohydrates

Total carbohydrates were determined in the leaves of rose plants. From Table (14) and Figure (18) it could be stated that no synergetic effect could be seen when combining nitrogen and kinetin concerning total carbohydrates. Kinetin treatments or nitrogen ones gave more total carbohydrate content than the combined treatments.

c.4 Nitrogen percentage in Leaves

Nitrogen contents in rose leaves termed as nitrogen uptake were summarized in the previous table. It was found that no interaction between nitrogen and kinetin exirted. The slowly treatments produced the higher content either with kinetin or with nitrogen.

In conclusion of this part i.e interaction between kinetin and nitrogen and their effect on chemical analysis. Table (19) illustrate the results assuming that control plants produced 100 units.

Table (19) Percentage Increase in Concrete Percentage and Concrete Yield of *Rosa gallica* var. *aegyptiaca* (gm/plant) as Affected by Combination Kinetin, Bg, Nitrogen and Nitrogen fertilization assuming that control=100 in 1987 Season.

Treatments	Concrete Pecentage		Concrete Yield (gm/plant)	
	1986	1987	1986	1987
K N 1 1	130.52	136.09	200.46	179.73
K N 1 2	119.48	122.52	231.05	208.56
K N 1 3	131.17	133.11	373.06	346.85
K N 2 1	126.30	130.79	183.56	173.42
K N 2 2	121.75	125.83	183.10	172.52
K N 2 3	126.62	132.45	244.29	229.28
Bg N 1 1	117.21	124.17	176.71	157.66
Bg N 1 2	125.00	125.83	200.91	169.82
Bg N 1 3	131.82	129.14	236.07	214.86
Bg N 2 1	123.38	133.44	224.66	225.23
Bg N 2 2	127.60	134.11	222.83	257.66
Bg N 2 3	130.84	135.10	313.24	295.95

Regrding concrete percentage in the two seasons, it was found that the highest concrete percentage was obtained with treatment of the first level of kinetin combined with third nitrogen dose. However, in the second season 1987, it was the treatment in which kinetin with its lower concentration was combined with the first level of nitrogen.

With respect to concrete yield per plant, in the two seasons,the higher yield was obtained with treatment $K_1 N_3$.

Table (20) which represented the percentage increase of the chemical analysis revealed the following points:

Higher chlorophyl "a" content was produced with kinetin 100ppm and nitrogen 450 kg ($K_2 N_3$), while with chlorophyll "b" the greater percentage was obtained with $K_2 N_1$.

With respect to carotene the optimum requirment from nitrogen and kinetin to produce the higher quantity was $K_1 N_3$ (Kinetin 50 ppm and nitrogen 450 kg/feddan).

Table (20) Percentage Increase in Chemical Analysis in Leaves of Rosa gallica var. aegyptiaca Plants as Affected by Combination between Growth Regulators and Nitrogen Fertilization Assuming that Control=100 in 1986 Season.

Treatments	Chlorophylls (mg/gm) A	B	A/B	Carotene (mg/gm)	% Total Carbohydrates	Nitrogen %
K N 1 1	181.34	215.33	90.82	116.22	75.00	201.37
K N 1 2	197.01	130.66	151.02	133.78	79.11	195.89
K N 1 3	204.48	119.71	159.18	182.43	80.70	228.77
K N 2 1	299.25	221.17	134.69	101.35	94.94	236.99
K N 2 2	320.15	195.62	176.53	93.24	122.47	323.88
K N 2 3	322.39	171.53	182.65	97.30	183.16	381.37
Bg N 1 1	258.21	102.19	261.22	94.59	75.00	205.48
Bg N 1 2	290.30	93.43	318.37	98.65	73.73	269.86
Bg N 1 3	243.28	222.63	106.12	131.08	122.47	264.38
Bg N 2 1	261.19	109.49	237.76	105.41	75.32	219.18
Bg N 2 2	341.79	106.57	325.51	101.35	71.20	236.99
Bg N 2 3	304.48	94.89	296.94	121.62	63.29	231.51

The total carbohydrates was influenced only with the treatment of kinetin in its higher concentration when combined with nitrogen with its medium dose.

Another picture was appeared with nitrogen percentage in the leaves of rose plant. The optimum treatment for this aspect was higher kinetin level and nitrogen in the lower dose.

d. Effect of Combination Between B_9 and Nitrogen Fertilization

d.1 Concrete Percentage and Concrete Yield

Table (13) and Figure (19) described the data obtained concerning the relation between B_9 and nitrogen fertilization and concrete of rose plant. From this table and figure, it was found that no significant interaction took place between the two factors studied on concrete percentage. B_9 treatments alone gave higher concrete percentage than the combinng ones, 0.42 with B_9. In 1987 season the same trend was observed. However, higher percentage were obtained when comparing the values obtained with the control.

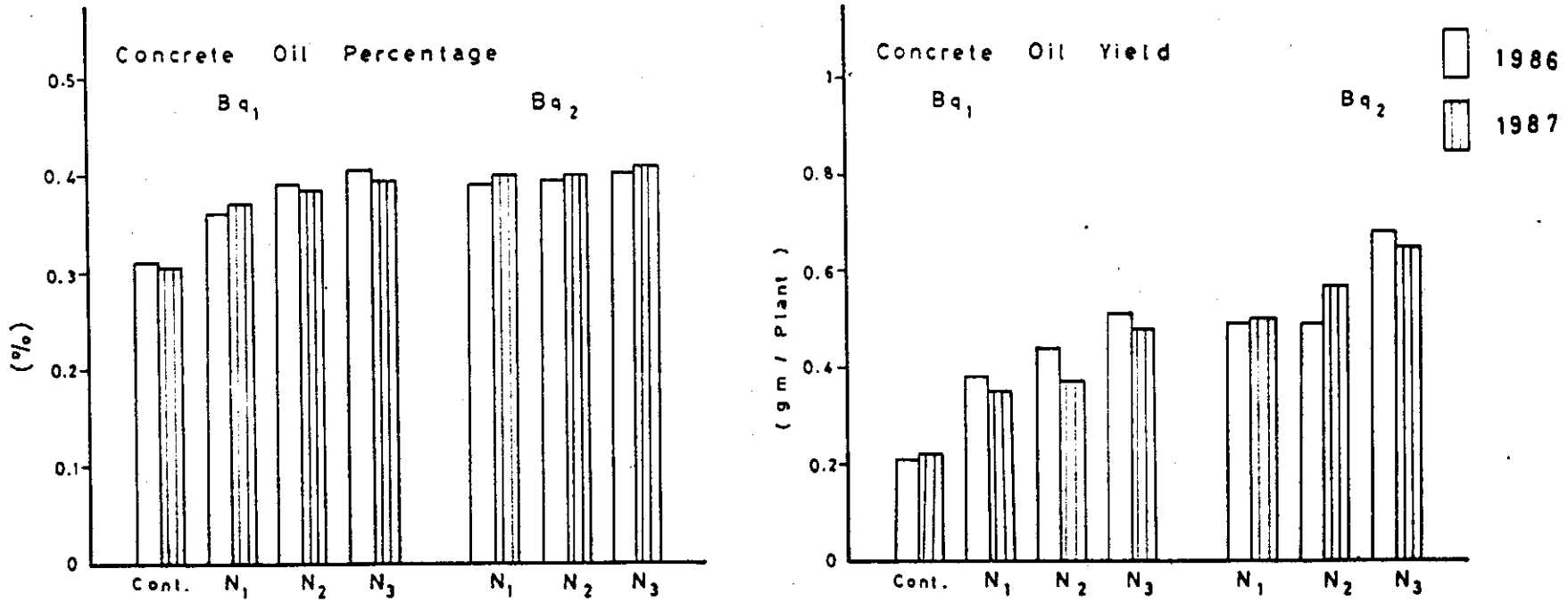


Fig.(19) Effect of combination between spraying Bq and nitrogen fertilization on concrete oil percentage and concrete oil yield per plant of Rosa gallica var. aegyptiaca flowers during 1986 and 1987 seasons.

In concrete yield which calculated by multipling concrete percentage by flower yield,it was found that some treatments exhibited synergestic effects. The combination of B_9 in its second dose with nitrogen in its higher dose (N_3) produced higher concrete yield as shown from the yield of the two seasons in Table (13) which were found to be o.686 and 0.657 g/plant respectively.

On the other hand B_9 alone in its higher concentration produced higher yield, 0.665 and 0.671 grm in the two seasons.

With regard to yield per feddan, similar category of total yield per plant was maintained in this aspect.

These findings were in good agreement with that of El-Shamy (1982), on carnation, he found that B_9 increased concrete percentage compared with control. Osman and Ahmed (1983) reported that on Sesam indicum B_9 increased oil content of seeds. Osman et al., (1984) found that Bg increased oil content of flax plant. On the other hand Pal et al., (1984), on Jasminum auriculatum concluded that essential oil content

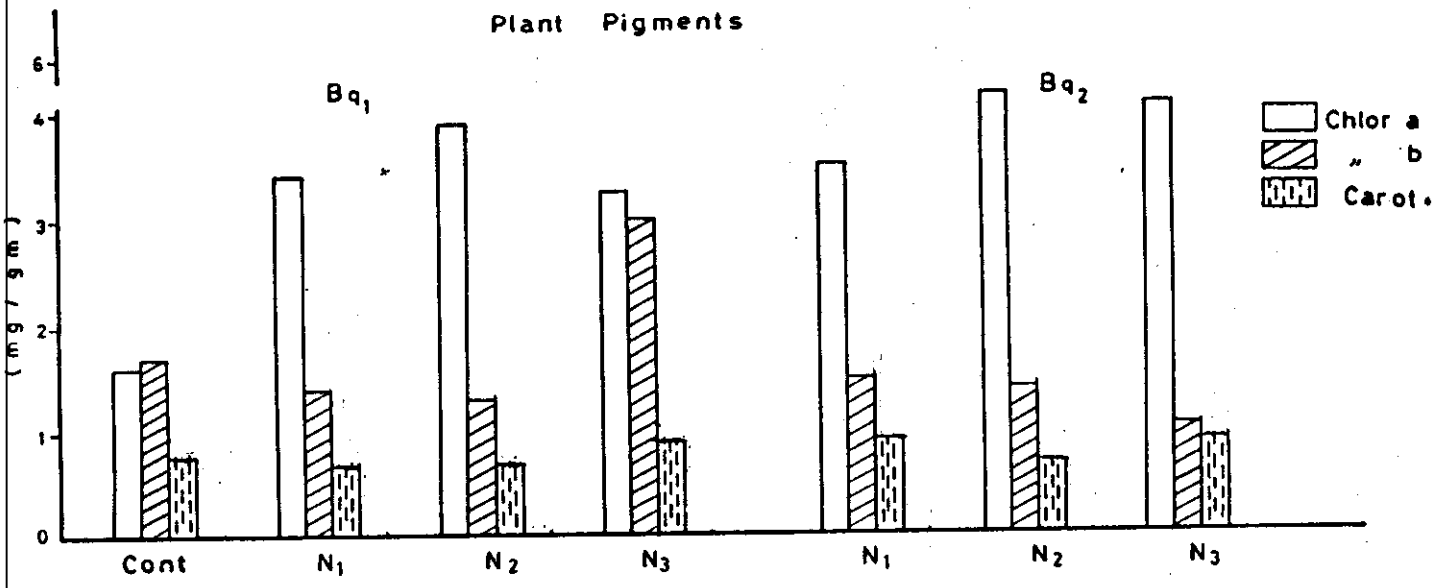
increased with rising nitrogen rates. El-Ghawwas (1988), and Mohamed (1988), on chamomile plants observed that nitrogen fertilization increased the oil percentage and yield.

In conclusion of this part, no interaction between B_9 and nitrogen was found to affect concrete percentage or concrete yield, except the treatment receiving B_9 in its two doses with the higher dose of nitrogen i.e ($B_9N_{1\ 3}$ or $B_9N_{2\ 3}$).

d.2 Plant Pigments

1. Chlorophylls

Table (14) and Figure (20) revealed that there was no interaction between B_9 and nitrogen on chlorophyll "a". All treatments gave lower chlorophyll "a" content than Bg alone, however the combination of the two factors gave higher values than nitrogen fertilization alone. As known Bg treatments darkened the leaves. So, green colour was obtained as an indication of increasing chlorophyll percentage.



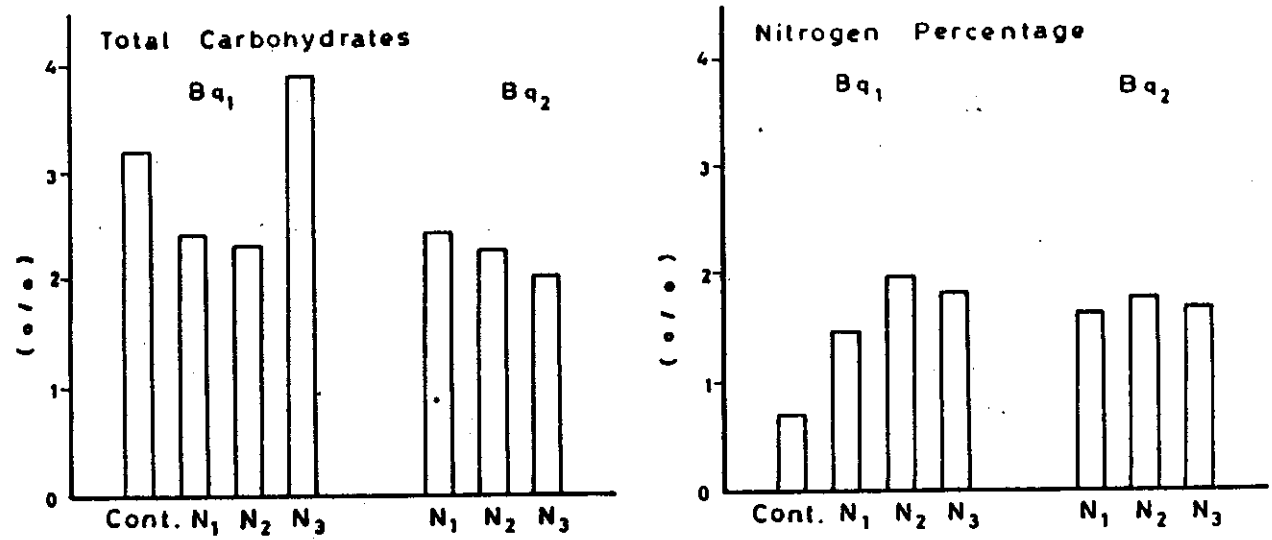


Fig.(20) Effect of combination between spraying Bq and nitrogen fertilization on chemical analysis in Leaves of Rosa gallica var. aegyptiaca during 1986 season

The same finding of chlorophyll "a" was found with "b" fraction, that there was no significant effect of all combined treatments on chlorophyll "b".

No clear trend could be obtained with the ratio of chlorophyll "a" and "b", but it was found that this ratio was higher in the combined treatments of Bg and nitrogen than that with the combined treatment of kinetin and nitrogen which reached 3.19 with B_9N_2 .

2. Carotenoids

No significant effect of B_9 and nitrogen on carotene was obtained, as revealed from Table (14) and Figure (20), Bg alone gave the higher values of carotene.

These results were in accordance with the findings of Gaber et al., (1984), on tomato, they reported that leaf chlorophyll and carotenoid content were increased by Bg. El-khayat (1987) found that nitrogen fertilization increased carotene of Tagetes patula.

No data could be found on the interactions between kinetin on one hand and B_9 on the other hand with nitrogen on the different chemical analysis, chlorophyll, carotenoids and others, to emphasize our results. So, we put any finding with each factor alone to confirm our results.

d.3 Total Carbohydrates

No significant values of crbohydrates were obtained due to the combined treatments of B_9 and nitrogen in all the combinations available, for example B_9 in the first level gave 5.13% of total carbohydrate.

If B_9 was combined with N_1, it gave 2.37 with $B_9N_{1\,2}$ it produced 2.33%, while it gave 3.87% in the treatment receiving B_9 in the first dose combined with the third dose of nitrogen. Concerning the combination of the second level of Bg with nitrogen it might be illustrated the following values $B_{9\,2}$, $B_9N_{2\,2}$ and $B_9N_{2\,3}$ produced 2.50, 2.25 and 2.00 respectively.

This means no interaction had occurred between the two elements.

So, in conclusion no significant effect could be produced due to the combination of Bg in its two doses with nitrogen with its doses applied on carbohydrate content.

These findings were in good agreement with Slime (1979) on Rouge Meilland rose. who found that B_9 treatments increased the total carbohydrates in the leaves.

El-Shamy (1982) on carnation mentioned that B_9 increased total carbohydrate in the leaves. Essa (1984) on rose recorded that carbohydrate content in the leaves was affected by nitrogen fertilization treatments.

d.4 Nitrogen Percentage in Leaves

As shown from Table (14) and Figure (20), it was found that the treatments which received the first level of B_9 combined with the second or the third level nitrogen attained higher nitrogen percentage. It was noticed also that the second level of B_9 combined with any nitrogen levels, contained nitrogen percentage less

than the percentage produced by the treatment with the first level of B_9 alone higher than the treatments of higher Bg combined with any nitrogen levels.

Our results were in accorrdance with the results reported by Kandell (1982), on chamomile plants showed that nitrogen percentage in the plant tissues were increased with raising the nitrogen level added. Hassan et al., (1983b), mentioned that nitrogen fertilization increased nitrogen percentage in leaves of Jasminum sabac. Al-Ani (1986) found that B_9 increased nitrogen percentage in the leaves of Iris tingitana.

Generally, when considering the treatments of the combination between B_9 and nitrogen, Table (19) pointed out these results supposing that the control equal on hundred.

The higher doses of B_9 and nitrogen produced the highest concrete percentage and yield per plant in the two seasons.

Table (20) illustrated the data of the treatments of combination of B_9 and nitrogen on the chemical analysis when supposing that the untreated plants equal 100 units.

Chlorophyll "a" the higher increase was obtained by treatment of higher concentration of B_9 with medium nitrogen level "b" require higher nitrogen level with low B_9. The same also for carotene and carbohydrates.

With nitrogen percentage, the treatment having the medium dose of nitrogen with lower dose of B_9 was optimum.

4. Chromatographic Analysis of Absolute Oil of Rosa Gallica var. Aegyptiaca

The obtained absolute oil was analyzed chromatographically gas liquid chromatography using the conditions reported in materials and methods. The Glc chart revealed 26 compounds, about 8 of them formed a considerable amount as shown from Table (21) and Figure

Table (21) Chemical Composition of Rose Oil

Analysis by G.L.C.

Compound No.	Name	Area	%
1		0.12	0.87
2		0.045	0.33
3		0.020	0.15
4	Phenyl-ethyl-Alcohol	4.280	31.14
5	Cetronellol	0.81	5.89
6	Nerol	0.33	2.40
7	Geraniol	1.76	12.80
8		0.075	0.55
9		0.040	0.29
10		0.060	0.44
11	B-Caryophyllene	0.12	0.87
12	Eugenol-ethyl-ether	0.005	0.036
13	Sesquiterpene6cH	0.76	5.53
14		0.004	0.029
15		0.03	0.22
16	Sesquiterpene-alcohol	3.6	26.19
17		0.03	0.22
18		0.05	0.36
19		0.06	0.44
20		0.48	3.49
21		0.18	1.31
22		0.16	1.16
23		0.075	0.55
24		0.14	1.02
25		0.24	1.75
26		0.27	1.96

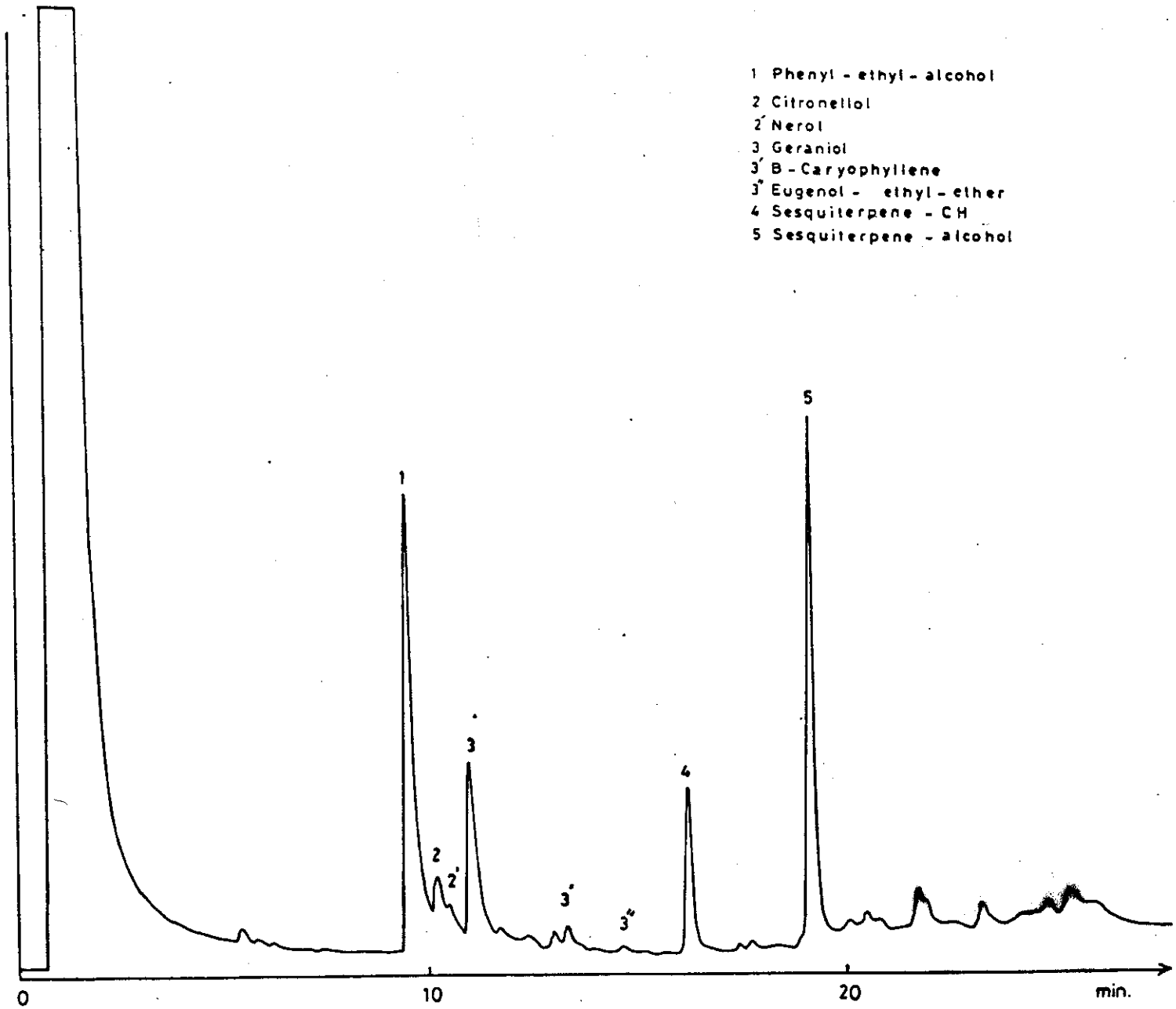


Fig. (21) G.L.C. Analysis of Rosa gallica var. aegyptiaca oil.

(21). From these compounds only 8 compunds could be identified as phenyl ethyl alcohol (4) which comprised about 31.14% of the absolute oil, citronellol (5) 5.89%, nerol (6) 2.40, geraniol (7)12.80% B-caryophyllene (11) 0.87%, eugenol methyl aster (12) 0.036%, sesquiterpene (13) 5.53% and sesquiterpene-alcohol 26.19%. The other remainder compounds were not identified. The indentification was established by using the relative retention time of the available authentic substances or by injecting the authentic compounds with the oil and compare the peaks appeared. The major compound was found to be phenyl ethyl alcohol 31.14% followed by the sesquiterpene alcohol which amounted to 26.19 when came after it geraniol being 12.80% comparing the compounds identified, it was nearly like the absolute oil obtained from the Bulgarian rose.

The results obtained were in accordance with these of Guenther (1952)., according to the same auther the chemical composition of the volatile constituents percent in the concrete and absolute of Rosa centifolia were idenified as follows:

Phenylethyl alcohol, geraniol, citronellol,

nerol, farnesol and small quantities of eugenol, eugenol acetate and traces of a ketone with a minty oder. Also, in Bulgarian rose oil obtained by hydrodistillation, a number of other compnents have been identified arranged according to its importance.

Citronellol, geraniol, nerol, 2-linalool, phenylethyl alcohol, farnesol, esters, nonyl aldehyde and other higher aldehydes, citral, eugenol, eugenol methyl alcohol extract will be closer to those found in the actual flower. Mihailova et al., (1977), stated that the principals of essential oil components of fresh Rosa damascena semperflorens flowers were citronellol, nerol, geraniol and phenylethyl alcohol identified in all petals, irrespective of their position in the flower.

Nofal (1982) found that the flower of Rosa gallica var. aegyptiaca yielded 0.29% of rose concrete and 17% absolute. Alcohols were by far the major constituents of the absolute. Citronellol and 2-phenylethanol predominating in the oil. Another new compund, digeranly ether, was the only ether identified.