# EFFECT OF SOME GROWTH SUBSTANCES ON RELATIONSHIP BETWEEN *Vicia faba* L. AND *Orobanche crenata* Forssk.

## 3- Effect of Morphactin, TIBA and Ethephon on Physiological Characteristics of infected faba bean plants with broomrape

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## ABSTRACT

Two pot experiments were conducted to study the effect of foliar application with morphactin (25, 50 and 100 ppm), TIBA (75, 150 and 300 ppm) and ethephon (125, 250 and 500 ppm) on physiological characteristics of faba bean plants parasitized by *Orobanche crenata* during the two successive seasons of 1999/2000 and 2000/2001.

The concentration of chlorophyll a and b in leaves were increased with treatments at all concentrations in infected treated plants comparing with infected untreated plants as well as N, P and K concentrations were increased in shoot and root system of infected treated faba bean plants and in broomrape plants when compared with untreated plants.

## INTRODUCTION

Many studies have shown the usefulness of morphactin (2, chloro-9-hydroxy flouren-9,-carboxylic acid), TIBA (2, 3, 5 triiodobenzoic acid) and ethephon (2, chloroethyl phosphoric acid) on many crops. El-Afry *et al.* (1987b) reported that, total plastid pigments content increased with the increase of TIBA concentration as compared to untreated soybean plants. The same results were obtained by El-Kady *et al.* (1996) on sunflower.

Omar *et al.* (1985a) indicated that, TIBA significantly increased the chlorophyll content in squash leaves.

TIBA at 1 g/liter increased N, P and K contents in the leaves and shoot system of mango plants (**Sanyal and Mitra, 1999**).

## MATERIALS AND METHODS

A pot experiment was conducted at the greenhouse of the Agricultural Botany Department, Faculty of Agriculture, Kafr El-Sheikh, Tanta University during the two successive seasons of

1999/2000 and 2000/2001. The aim of this investigation was to study the effect of some growth substances (morphactin, TIBA, ethephon) on the physiological characteristics of *Vicia faba* L. as well as the relationship between faba bean and *Orobanche crenata* parasitism.

Faba bean seeds, var. Giza 461 were obtained from the Legume Division, and *Orobanche crenata* Forsk. seeds were obtained from the Weed Division, Agricultural Research Station, Sakha, Kafr El-Sheikh.

Plastic pots used in this investigation were 35 cm in diameter, with five holes in the bottom of the pot. Each pot was provided with 9 kg loamy soil and artificially infested with pure *Orobanche crenata* seeds (0.2 gram per pot), five seeds of faba bean and *Orobanche crenata* seeds were placed 3 cm below the soil surface. Some pots was not infested with *Orobanche crenata* that used as control. Three weeks after planting the seedlings were thinned to three plants per pot. Each pot received: 2 gm superphosphate (15.5% $P_2O_5$) before planting, 1 gm ammonium sulphate (20.5% N) with the first irrigation and 1 gm potassium sulphate (48% $K_2O$) after flowering.

The experiment was made in a complete randomized design with three replicates.

Growth substances. Morphactin at the three concentrations (25, 50 and 100 ppm) were used as spray application. TIBA at the three concentrations (75, 150 and 300 ppm) as well as ethephon at the three concentrations (125, 250 and 500 ppm) were used as spray application.

**Sampling date:**

The sowing date was at 10/11/1999 in the first season and it was at 18/11/2000 in the second one. Growth substances were foliar sprayed to infected faba bean plants 45 days after sowing (flower pod stage), while the second spraying to infected faba bean plants was at 85 days after sowing. During the experimental period, two samples were taken from faba bean plants as follow: the first sample was taken at 65 days from sowing and after 20 days from the first spraying, while the second sample was taken at 105 days from sowing.

**Physiological studies:**

The chlorophyll concentrations as µg/g fresh weight (chl. a and chl. b) of one gram leaves from the plant was estimated by using spectrophotometer as described by Moran and Poreath (1982) after 65 and 105 days from sowing in both seasons. The reading in the following equations.

Chl. a = 12.64 $A_{664}$ - 2.99 $A_{649}$

Chl. b = 2.6 $A_{664}$ + 23.26 $A_{647}$

Mineral elements (N, P and K) were performed on faba bean shoot, root and broomrape plants which were dried in an electric oven at 70°C for 48 hours and the following determinations were conducted:

A. Nitrogen concentration was estimated as mg/g dry weight in the digestion product, using the microkjeldahl method outlined in the A.O.A.C. (1985).
B. Phosphorus concentration was estimated as mg/g dry weight by using spectrophotometer as described by Piper (1947).
C. Potassium concentration was also estimated as mg/g dry weight in the above mentioned digestion product, by using flame photometer according to Jackson (1967).

## RESULTS AND DISCUSSION

### 1. Chlorophyll concentrations:

### A. Effect of Orobanche parasitism:

The presented data in Table (1) indicate that, the infection with Orobanche led to significant decrease in chl. a and chl. b concentrations in the two successive samples and seasons when compared with control plants. The reduction in chl. a and chl. b concentrations of infected plants may be due to withdrawal of various nutrients and metabolites by the developing parasite.

### b. Effect of morphactin:

Data in Table (1) show that, the treated plants with morphactin at 25, 50 and 100 ppm significant decreased chl. a concentration especially at 25 and 50 ppm in the first sample of the two seasons and by all morphactin concentrations in the second sample of the second season, but the reduction was significant at all

**Table (1):** Effect of infection with *Orobanche crenata* Forsk and application of some growth substances on chlorophyll (a) and (b) concentrations (µg/g fresh weight) of faba bean leaves during 1999/2000 and 2000/2001 seasons.

| Treatments | Chlorophyll (a) concentration | | | | Chlorophyll (b) concentration | | | |
|---|---|---|---|---|---|---|---|---|
| | Season | | | | Season | | | |
| | 1999/2000 | | 2000/2001 | | 1999/2000 | | 2000/2001 | |
| | Days from sowing | | Days from sowing | | Days from sowing | | Days from sowing | |
| | 65 | 105 | 65 | 105 | 65 | 105 | 65 | 105 |
| Morphactin 25ppm | 436.60 cd | 419.47 abc | 430.47 de | 429.57 bc | 212.42 bc | 199.87ab | 211.67 ab | 214.30 ab |
| Morphactin 50 ppm | 464.67 bc | 429.8 abc | 450.8 cde | 439.10 b | 239.10 abc | 215.7 ab | 228.37 ab | 215.93 ab |
| Morphactin 100 ppm | 506.27 a | 426.53 abc | 500.37 ab | 437.9 b | 243.0 ab | 216.13 ab | 228.07 ab | 220.2 ab |
| TIBA 75 ppm | 473.23 b | 416.20 abc | 464.4 bcd | 421.70 bc | 224.90 abc | 200.87 ab | 224.20 ab | 207.23 ab |
| TIBA 150 ppm | 449.70 bcd | 416.40 abc | 440.1 de | 414.67 bc | 218.30 abc | 199.13 ab | 214.27 ab | 203.33 ab |
| TIBA 300 ppm | 505.50 a | 437.73 ab | 488.67 abc | 480.0 a | 240.10 abc | 219.43 ab | 214.93 ab | 213.07 ab |
| Ethephon 125 ppm | 421.27 de | 386.97 c | 416.13 e | 414.4 bc | 212.03 bc | 209.0 ab | 215.10 ab | 221.33 ab |
| Ethephon 250 ppm | 420.80 de | 413.9 0bc | 420.33 de | 415.93 bc | 203.0 c | 202.70 ab | 208.33 ab | 210.63 ab |
| Ethephon 500 ppm | 439.87 cd | 449.47 a | 420.60 de | 483.57 a | 218.10 abc | 207.13 ab | 212.50 ab | 217.30 ab |
| Infected-untreated plants | 399.83 e | 387.5 c | 407.8 e | 407.47 bc | 204.90 bc | 189.17 b | 184.0 c | 195.13 b |
| Control | 515.83 a | 457.97 a | 511.33 a | 485.3 a | 252.43 a | 222.83 a | 232.30 a | 225.20 a |
| L.S.D. 5% | 30.69 | 38.71 | 40.46 | 29.41 | 33.33 | 28.12 | 20.12 | 23.29 |

concentrations in the second sample of the first season when compared with the control plants. On the other side, application of morphactin at 25, 50 and 100 ppm increased chl. a concentration in the second sample of the two seasons by all treatments and in the second sample of the second season at 25 and 50 ppm, but the increasing was significant in the first sample and season by the three different rates (25, 50 or 100 ppm) and in the first sample of the second season at 100 ppm when compared with infected-untreated plants. These results are in harmony with those obtained by Zayed *et al.* (1985a) on okra plants and El-Nady (1994) on eggplant.

The data also show that, morphactin did not significantly affect chl. (b) concentration in the two successive samples and seasons, except at the lowest concentration of morphactin in the first sample and season when compared with control plants but when compared with infected-untreated plants at 25, 50 or 100 ppm increased chl. (b) concentration in both samples and seasons, the increment was significant at all concentrations in the first sample of the second season. These results are in agreement with those obtained by El-Kady and Abou-Shoba (1990) on soybean and El-Zawily *et al.* (1985) on faba bean. This effect may be due to the increasing of cytokinin contents as well as number of chloroplast in the leaves.

**c. Effect of TIBA:**

The results in Table (1) clearly reveal that, application of TIBA did not significantly affect chl. a concentration in the second sample of the first season at all TIBA concentrations and in the two successive seasons at 300 ppm, but in the first sample of the two seasons at 75 and 150 ppm as well as in the second sample and season at 75 and 150 ppm significant decreases were observed in chl. a when compared with control plants, but when compared with infected-untreated plants TIBA led to increase in chl. (a) concentration in the second sample of the two seasons at 75 and 300 ppm and in the second sample and season at 300 ppm, but the increment was significant in the first sample and season at 300 ppm. Similar results were reported by Omar *et al.* (1985b) they stated that, TIBA significantly increased chlorophyll contents in squash leaves.

These results may be due to increase in cytokinin contents which increase number of chloroplast (Borzenkova and Mokronosov, 1976).

The obtained data in Table (1) showed that, application of TIBA did not significantly affect chl. (b) concentration in the two successive samples and seasons when compared with control plants. However, in comparison with infected-untreated plants TIBA increased chl. (b) concentration in both samples and seasons at all concentrations except in the first sample of the second season at all concentrations in which the increment was significant. These results are in agreement with those obtained by El-Kady *et al.* (1996) on sunflower plants.

**d. Effect of Ethephon:**

Data recorded in Table (1) indicate that, ethephon at 125, 250 and 500 ppm significantly decreased chl. a in the two successive samples and seasons except at the rate of 500 ppm in the second sample of the two seasons which was not significant when compared with control plants, but when compared with infected-untreated plants ethephon at all levels increased chl. a concentration in both samples and seasons These results are in agreement with Ibrahim *et al.* (1990) on lupine, Sakr and Leilah (1996) on soy bean and El-Zawily *et al.* (1984) on onion. They reported that this effect may be attributed to the increase in biosynthesis of these pigments and their enzymes activity. In addition ethrel increased cytokinin content in leaves.

Data in Table (1) also show that, the treated plants with ethephon did not significantly affect chl. b concentration in the second sample of the first season and in both samples of the second season, except ethephon at 250 ppm in the first sample of the second season and in the first sample and season at 500 ppm when compared with control plants. On the other side, ethephon at all levels increased chl. b concentration in both seasons, while in the first sample of the second season at all levels the increment was significant, when compared with infected-untreated plants. Similar results were obtained by Sakr and Leilah (1996) and Ateya (2001) on soy bean plants. This effect may be due to increasing cytokinin

which stimulated chlorophyll synthesis and delayed chlorophyll destruction.

**2. Nutrient elements:**

**2.1. Shoots and roots nutrient elements:**

**a. Effect of Orobanche parasitism:**

Data in Tables (2 and 3) illustrate that, Orobanche ý parasitism significantly decreased N, P and K concentrations of shoots and roots when compared with control plants. This effect may reveal that the parasite not only withdraws various nutrients metabolites from the host but also decrease the ability of nitrogen uptake by the host. Similar results were obtained by Ahmed (1981) and El-Ghamrawy (1968) on horse bean plants.

**b. Effect of morphactin:**

Data in Tables (2 and 3) indicate that, in the two successive samples and seasons, morphactin at 25, 50 or 100 ppm increased N, P and K concentrations in the shoots and roots when compared with infected-untreated plants. These results are in accordance with those obtained by El-Nady (1994) on eggplant and El-Emary (1995) on okra plants.

**c. Effect of TIBA:**

Data presented in Tables (2 and 3) also show that TIBA at all concentrations increased N, P and K concentrations in the two seasons. These results are in line with those reported by Sivagami *et al.* (1989) as well as Sanyal and Mitra (1999) on mango plants.

**d. Effect of ethephon:**

Data in Tables (2 and 3) demonstrate that ethephon at all concentrations increased N, P and K concentrations in the shoots and roots when compared with control plants. These results are agreement with those reported by Nowak *et al.* (1997) on faba bean and Ateya (2001) on soybean.

**2.2. Broomrape nutrient elements:**

**a. Effect of morphactin:**

The obtained data in Table (4) show that treated broomrape with morphactin at all concentrations increased N, P and K

**Table (2):** Effect of infection with *Orobanche crenata* Forssk and application of some growth substances on N, P, K concentrations (mg/g dry weight) in shoot system of faba bean during 1999/2000 and 2000/2001 seasons.

| Treatments | Nitrogen concentration | | | | Phosphorus concentration | | | | Potassium concentration | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Season | | | | Season | | | | Season | | | |
| | 1999/2000 | | 2000/2001 | | 1999/2000 | | 2000/2001 | | 1999/2000 | | 2000/2001 | |
| | Days from sowing | | Days from sowing | | Days from sowing | | Days from sowing | | Days from sowing | | Days from sowing | |
| | 65 | 105 | 65 | 105 | 65 | 105 | 65 | 105 | 65 | 105 | 65 | 105 |
| Morphactin 25ppm | 23.8 a-d | 30.8 ab | 25.6 ab | 35.6 a | 4.9 de | 5.9 b | 5.9 ab | 6.5 b | 28.71 a | 28.8 a-d | 25.5 a | 29.4 a |
| Morphactin 50 ppm | 18.8 d | 28.0 ab | 22.2 ab | 33.4 a | 5.4 be | 6.3 b | 6.0 ab | 6.1 b | 23.19 ab | 24.0 d | 27.5 a | 28.7 a |
| Morphactin 100 ppm | 20.8 cd | 37.0 a | 27.2 ab | 39.4 a | 5.1 cde | 6.4 ab | 5.0 bc | 6.4 b | 22.59 abc | 30.09 a-d | 24.0 a | 31.8 a |
| TIBA 75 ppm | 22.2 bcd | 30.2 ab | 23.8 ab | 29.8 ab | 5.5 bcd | 6.5 ab | 5.4 ab | 5.9 b | 19.80 bcd | 25.8 bcd | 21.6 ab | 30.2 a |
| TIBA 150 ppm | 22.6 bcd | 33.4 ab | 30.2 a | 34.8 a | 5.5 bcd | 6.2 b | 6.1 ab | 6.4 b | 19.2 0bcd | 32.4 ab | 22.5 ab | 31.8 a |
| TIBA 300 ppm | 23.6 a-d | 33.1 ab | 25.8 ab | 37.0 a | 5.9 ab | 6.5 ab | 6.3 a | 6.6 b | 21.69 bc | 33.0 a | 21.3 ab | 31.2 a |
| Ethephon 125 ppm | 25.4 abc | 28.8 ab | 27.6 ab | 34.6 a | 5.7 bc | 7.1 ab | 6.3 a | 6.2 b | 16.29 cd | 30.3 a-d | 20.7 b | 26.7 a |
| Ethephon 250 ppm | 27.2 ab | 35.0 ab | 25.2 ab | 35.4 a | 5.4 b-e | 6.6 ab | 5.4 ab | 6.2 b | 22.59 abc | 30.9 abc | 18.9 bc | 31.5 a |
| Ethephon 500 ppm | 22.2 bcd | 36.2 ab | 22.6 ab | 35.2 a | 5.6 bc | 7.0 ab | 5.7 a | 6.3 c | 24.9 ab | 30.9 abc | 24.9 a | 31.2 a |
| Infected untreated plants | 18.2 d | 24.2 b | 19.8 b | 22.8 b | 4.8 e | 4.9 c | 4.1 c | 4.9 c | 14.49 d | 25.2 cd | 15.9 c | 28.7 a |
| Contol | 28.6 a | 39.2 a | 29.8 a | 40.0 a | 6.4 a | 7.5 a | 6.6 a | 7.7 a | 28.71 a | 35.4 a | 25.2 a | 32.4 a |
| L.S.D. 5% | 5.2 | 11.2 | 8.0 | 9.6 | 0.57 | 1.02 | 1.08 | 0.80 | 5.70 | 5.70 | 4.2 | 5.70 |

**Table (3):** Effect of infection with *Orobanche crenata* Forssk and application of some growth substances on N, P, K concentrations (mg/g dry weight) in root system of faba bean during 1999/2000 and 2000/2001 seasons.

| Treatments | Nitrogen concentration | | | | Phosphorus concentration | | | | Potassium concentration | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Season | | | | Season | | | | Season | | | |
| | 1999/2000 | | 2000/2001 | | 1999/2000 | | 2000/2001 | | 1999/2000 | | 2000/2001 | |
| | Days from sowing | | Days from sowing | | Days from sowing | | Days from sowing | | Days from sowing | | Days from sowing | |
| | 65 | 105 | 65 | 105 | 65 | 105 | 65 | 105 | 65 | 105 | 65 | 105 |
| Morphactin 25ppm | 27.8 abc | 27.6 abc | 26.8 abc | 25.8 ab | 4.4 c | 6.5 a | 5.4 ab | 5.8 b | 21.6 a | 29.4 ab | 24.9 ab | 27.9 b |
| Morphactin 50 ppm | 25.6 a-d | 25.4 abc | 25.4 abc | 26.8 ab | 5.2 b | 6.3 a | 6.0 a | 6.4 b | 25.2 a | 31.5 ab | 25.2 ab | 28.8 b |
| Morphactin 100 ppm | 23.6 a-d | 25.6 abc | 24.6 abc | 26.2 ab | 5.3 ab | 6.3 a | 5.6 ab | 6.0 b | 27.0 a | 32.1 ab | 26.4 a | 34.8 ab |
| TIBA 75 ppm | 20.2 cd | 26.4 abc | 25.4 abc | 27.2 ab | 5.6 ab | 6.4 a | 5.3 ab | 5.8 b | 20.1 a | 31.5 ab | 23.1 ab | 36.9 ab |
| TIBA 150 ppm | 18.0 d | 22.8 bc | 20.6 c | 28.6 ab | 5.5 ab | 6.5 a | 6.0 a | 6.0 b | 21.9 a | 30.0 ab | 24.0 ab | 30.9 ab |
| TIBA 300 ppm | 24.4 a-d | 35.6 a | 24.4 abc | 34.0 a | 5.6 ab | 6.4 a | 6.2 a | 6.1 b | 27.0 a | 33.3 a | 24.0 ab | 31.2 ab |
| Ethephon 125 ppm | 19.8 d | 28.2 abc | 22.8 c | 32.8 a | 5.6 ab | 6.1 a | 5.4 ab | 5.8 b | 23.7 a | 29.4ab | 21.3 ab | 32.4 ab |
| Ethephon 250 ppm | 22.4 bcd | 22.6 bc | 23.8 bc | 30.0 ab | 5.8 ab | 6.2 a | 5.3 ab | 6.1 b | 21.3 a | 31.5 ab | 22.5 ab | 32.4 ab |
| Ethephon 500 ppm | 29.0 ab | 29.4abc | 32.0 a | 32.4 a | 5.5 ab | 6.5 a | 2.8 ab | 6.2 b | 24.3 a | 32.1 ab | 16.5 bc | 44.1 a |
| Infected untreated plants | 19.6 d | 20.6 c | 20.0 c | 20.8 b | 3.6 c | 5.1 b | 4.4 b | 5.8 b | 12.9 b | 25.2 b | 12.3 c | 23.1 b |
| Contol | 30.6 a | 32.2 ab | 30.8 ab | 33.0 a | 6.2 a | 7.1 a | 5.8 ab | 8.6 a | 22.2 a | 34.2 a | 21.9 ab | 34.8 ab |
| L.S.D. 5% | 7.0 | 9.2 | 7.0 | 10.0 | 0.80 | 0.88 | 1.20 | 0.82 | 6.09 | 6.60 | 8.40 | 12.30 |

Table (4): Effect of infection with *Orobanche crenata* Forssk and application of some growth substances on N, P, K concentrations (mg/g dry weight) in broomrape during 1999/2000 and 2000/2001 seasons.

| Treatments | Nitrogen concentration | | | | Phosphorus concentration | | | | Potassium concentration | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Season | | | | Season | | | | Season | | | |
| | 1999/2000 | | 2000/2001 | | 1999/2000 | | 2000/2001 | | 1999/2000 | | 2000/2001 | |
| | Days from sowing | | Days from sowing | | Days from sowing | | Days from sowing | | Days from sowing | | Days from sowing | |
| | 65 | 105 | 65 | 105 | 65 | 105 | 65 | 105 | 65 | 105 | 65 | 105 |
| Morphactin 25ppm | 21.0 | 23.8 ab | 22.8 | 21.4 b | 5.4 a | 6.3 ab | 4.5 ab | 5.7 ab | 50.7 ab | 29.70 | 18.9 abc | 29.7 ab |
| Morphactin 50 ppm | 21.0 | 22.6ab | 21.4 | 23.4 b | 5.2 a | 6.6 a | 4.4 ab | 5.6 ab | 13.80 d | 31.50 | 15.9 bc | 31.2 ab |
| Morphactin 100 ppm | 198.0 | 21.8 ab | 21.0 | 23.2 b | 5.4 a | 6.1 ab | 5.6 a | 6.0 a | 21.60 ab | 30.60 | 24.3 a | 31.5 a |
| TIBA 75 ppm | 19.8 | 21.4 ab | 21.2 | 22.8 b | 5.4 a | 6.1 ab | 5.5 a | 6.3 a | 14.49 d | 31.80 | 21.0 ab | 30.3 ab |
| TIBA 150 ppm | 21.2 | 20.0 ab | 21.6 | 21.8 b | 5.3 a | 5.9 ab | 5.6 a | 6.2 a | 16.41 cd | 31.20 | 22.2 a | 32.2 a |
| TIBA 300 ppm | 20.8 | 26.0 a | 21.4 | 31.6 a | 5.6 a | 6.5 a | 5.3 a | 6.0 a | 22.71 ab | 33.0 | 24.9 a | 32.1 a |
| Ethephon 125 ppm | 20.4 | 21.4 ab | 20.0 | 22.8 b | 5.6 a | 6.3 ab | 5.9 a | 6.2 a | 24.09 a | 30.0 | 21.0 ab | 32.4 a |
| Ethephon 250 ppm | 21.2 | 22.0 ab | 21.6 | 22.6 b | 5.7 a | 6.4 ab | 5.5 a | 5.9 ab | 22.80 ab | 31.80 | 24.0 a | 32.7 a |
| Ethephon 500 ppm | 20.8 | 22.8 ab | 22.2 | 23.2 b | 5.7 a | 6.3 ab | 6.0 a | 6.4 a | 19.41 bc | 30.90 | 23.10 a | 29.1 ab |
| Control | 17.2 | 19.4 b | 19.8 | 19.4 b | 4.6 b | 5.5 b | 3.7 b | 5.0 b | 14.49 d | 21.30 | 15.0 c | 23.1 b |
| L.S.D. 5% | N.S | 4.2 | N.S | 5.6 | 0.57 | 0.80 | 1.4 | 0.91 | 3.9 | N.S | 5.4 | 7.5 |

concentrations when compared with the control in the two successive samples and seasons. The increment of P and K concentrations was significant at 100 ppm morphactin in all samples.

**b. Effect of TIBA:**

Data in Table (4) indicate that N, P and K concentration increased in treated broomrape at all rates and the K increment was significant at TIBA 300 ppm, but P concentration was significantly increased at all concentrations specially in the second season.

**c. Effect of ethephon:**

Data recorded in Table (4) show that treated broomrape plants with ethephon at three levels increased N, P and K concentrations when compared with control plants in the two successive samples and seasons, the increment in P concentration was significant at all concentrations in the first sample and two seasons, but K concentration was significantly increased in the first sample in the two seasons and in the first sample of the first season.

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# تاثير بعض منظمات النمو على العلاقة التطفلية بين نبات الفول والهالوك.
# ٢- تاثير المورفاكتين ، التيبا ، الاثيفون على الخصائص الفسيولوجية لنباتات الفول المصابه بالهالوك

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أجرى هذا البحث بقسم النبات الزراعى ــ كلية الزراعة بكفرالشيخ خلال موسمى ١٩٩٩/٢٠٠٠ ، ٢٠٠٠/٢٠٠١ لدراسة تاثير بعض منظمات النمو على نباتات الفول البلدى النامية تحت ظروف الاصابة بالهالوك.

وكانت منظمات النمو المستخدمة كالاتى:

١- المورفاكتين بتركيزات ٢٥ ، ٥٠ ، ١٠٠ جزء فى المليون.
٢- التيبا بتركيزات ٧٥ ، ١٥٠ ، ٣٠٠ جزء فى المليون.
٣- الإثيفون بتركيزات ١٢٥ ، ٢٥٠ ، ٥٠٠ جزء فى المليون.

تم الرش بمنظمات النمو الثلاث بالتركيزات السابقة مرتين عند عمرى (٤٥ ، ٨٥ يوم) وتم أخذ العينات عند عمرى (٦٥ ، ١٠٥ يوم) من تاريخ الزراعة واوضحت النتائج ما يلى:

١- تميزت النباتات المصابة بالهالوك والمعاملة بمنظمات النمو الثلاثة بجميع تركيزاتها الى زيادة تركيز صبغات كلوروفيل أ ، ب فى الاوراق وذلك مقارنة بالنباتات المصابة والغير معاملة بمنظمات النمو.
٢- أدت المعاملة بجميع منظمات النمو المستخدمة الى زيادة تركيز النيتروجين والفوسفور والبوتاسيوم فى كلا من المجموع الخضرى والجذرى لنباتات الفول البلدى المصابة بالهالوك والمعاملة بمنظمات النمو وذلك بالمقارنة بالنباتات المصابة والغير معاملة.