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EFFECT OF TRANSPLANT AGE AND SOME GROWTH REGULATORS ON PRODUCTIVITY OF CANOLA CROP.

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ABSTRACT

Two field experiments were carried out at El-Gemmeiza Agric. Res. Station, Gharbia Governorate, during 2005 / 2006 and 2006 / 2007 seasons, to study the effect of transplanting canola seedling at different ages (30, 45 and 60 days as well as direct seeding) and preplanting soaking canola transplants, in GA3, IAA and NAA and without dipping (control treatment), on growth, yield and yield attributes of canola seeds (Srew 4). The treatment took of stages of 30 days from seeding the seeding were soaked for 24 hours just before transplanting using control without soaking. Results indicated that, the differences between transplanting treatments as well as direct seeding for number of days to 50% flowering, plant height (cm), number of branches / plant, fruiting zone length, seed yield / plant (g), 1000 – seed weight (g), seed yield kg/fad. and oil seed percentage were significant in the two seasons. Transplanting canola plants at 45 days old gave the highest values for all attributes studied in both seasons, except No. of branches/plant and oil percentage. While, transplanting after 30 days produced the highest values for number of branches / plant and seed oil percentage in the two seasons. The minimum values of the above attributes studied were obtained by sowing seed directly. IAA application significantly increased all attributes studied in first and second seasons. Interaction between transplanting and soaking treatments showed significant increase for all attributes studied except number of branches / plant, 1000 – seed weight (g) and seed oil percentage in both seasons.

INTRODUCTION

Canola (*Brassica napus*, L.) is quiet genetically differ than rapeseed with low erucic acid (< 20 g/kg) in the oil and < 30 umol of aliphatic glucosinolate/g in the defatted meal (Thomas, 1994). As well as its lowest content of saturated fatty acids (< 70 g/kg) among major oil seeds. Canola seed oil is the third largest source of edible oil following soybean and palm oil (Nowlin, 1991). Very early sowing, one month before the current date, could be of interest to improve economical, energetic and environmental balancesheets of the crop. Transplanting technique may be also useful to evade the stress conditions prevailing during canola growing period. Transplanting canola plants of different growth stages may help to coincide the peak of flowering and seed development growth stage with the period of adequate moisture availability the period where vapor transpiration is high by adjusting of transplanting time at the proper stage. The widespread use of growth regulators as stimulators of vegetative growth of the plant in different crops encouraged researchers to use some of them to induce changes in the vegetative and nutritive characters of oil crops.

With respect to transplant treatments, Sorour *et al.,* (1992) in cotton contradictory results were detected by the investigators concerning the yield and other traits of transplanting plants compared with late direct sowing at the time of transplanting. Sharma and Thakur (1993) and Yadavet *et al*., (1994) found that, plant height, branches and siliquae /plant reduced significantly in the late sown crop as compared to early sowing. Brar *et al*., (1998), studied on the influence of sowing dates, nitrogen and planting geometry on the performance of gobhi sarson (*Brassica napus*, L.), they elucidated that seed and oil yields were increased by 30 October sowing compared with 15 and 30 November and 15 December. Thakur and Singh (1998) elucidated that plant height decreased with delayed sowing, however, early planting crop had more primary branches but significant variation was observed during the 2nd growing season only. Singh *et al*., (1999) found that, maximum values of plant height, head weight/plant and head yield were recorded by transplanting on 27 Oct. They concluded that the best time for transplanting broccoli was between 20 Oct. and 30 Nov. in Himachal Pradesh, India. Yadav *et al*., (1999) found that, delay in sowing of canola caused a significant reduction in growth characters. The highest values were recorded in early sowing. Momoh and Zhou (2001) found that growth and yield of oil seed rap (*Brassica* L.) responded to the stage of transplanting at 30, 35 and 40 days after sowing. They revealed that leaf area per plant, number of effective branches and siliquae per branche were decreased with delaying stage of transplanting. However, no significant differences in the mean seed weight between treatments were detected. Although the average number of seeds per siliqua was significantly low for delayed transplanting, the highest seeds yields of 1730.7 and 1748.1 kg ha with no significant differences were observed for transplanted at 35 and 30 days after sowing. Bavec *et al*., (2002) found that seeds sown 15 – 19 days after the optimal date decreased crop yields by 45%. Hopkinson *et al*., (2002) studied the effect of two sowing dates (27 Oct. and 10 Oct.) in 1998 and three sowing date (20 Sep., 1 and 15 Oct.) in 1999 on yield, pods per plant and percentage oil in rapeseed. The highest average seed growing were obtained with 10 and 1 Oct. in 1998 and 1999 growing seasons, respectively. The seed oil contents did not vary significantly among the treatments during both growing seasons. Hassany *et al*., (2003) reported that transplanting canola seeding at any age (4, 6 or 8 weeks), under rainfed conditions, increased significantly seed, oil yields/fad, and rain use efficiency as well as yield attributes, except number of seed/siliqua as compared with the traditional sowing by direct seed. Moreover, 1000 – seed weight (g) and seed weight/siliqua (g) of canola transplanting at 8 week surpassed significantly the other seeding ages. While, canola transplanting at 6 or 8 weeks with two or three supplementary irrigation produced the highest values of seed yield, yield attributes, oil yield and rain use efficiency. Adamsen and Coffelt (2005) found that, the highest yields were obtained when rape and crambe were planted in Nov. which would fit well with cotton harvest dates. Reproductive efficiency appeared to change with planting date and in general, Oct. and Nov. planting days produced seed with higher oil content and seed weights than Dec. planting dates. El-Sandany (2005) and Haasany (2005) they found that planting canola with transplant of any ages (4, 6 or 8

weeks) increased significantly yield and yield components as compared with the direct seeding in the both seasons.

Sankhla and Mathur (1968) reported that germination growth and yields of some crops can be enhanced by soaking seeds for 24 hr in the solutions of different concentrations of some growth regulators. Mohammed (1979) revealed that 50 ppm of g Gibberellic acid (GA3) was optimum for Egyptian clover which gave maximum increase in its productivity. Midan *et al*., (1982) found in onion, that dipping in IAA and NAA solutions significantly improved the above mentioned bulb characters. Abu-Grab (1983) noticed that GA3 had no significant effect on onion bulb fresh weight, diameter, dry matter, TSS and total bulbs yield. Abu-Grab and Fahmy (1991) found that the dipping onion transplants in GA3 significantly decreased onion yield by about 10 – 20% and increased bulb doubling. However, IAA and NAA insignificantly increased total and marketable bulbs yield and decreased bulb doubling. Abu-Grab and Kandeel (1992) concluded that, GA3 application significantly decreased plant length and leaves, blub and total plant dry weight, IA and NAA at either 20 or 40 µq/L increased, leaves, bulb and total plant dry weight at both assessed times. Abdel-Messih and Eid (1999) reported that, the folier spray of 500 ppm ascorbic acid on wheat plant significantly increased yield and its components.

The present investigation aimed to study the effect of transplant treatments as well as direct seeding and some growth regulators on productivity of canola.

MATERIALS AND METHODS

Two field experiments were carried out at El-Gemmeiza Agric. Res. Station, Gharbia Governorate, in 2005/2006 and 2006/2007 seasons, to study the effect of canola transplant age and some growth regulators, on yield and yield components as well as seed oil percentage of canola c.v. Serw 4. The mechanical and chemical analysis of the soil at experimental site according to standard methods of Page (1982) and Arnold (1986) are presented in Table (1).

Factors studied:

A- Canola transplant age:

Three different ages of canola seedling were used in the two growing seasons as follow.

1- Control was seeded treatment where the plants were sown by direct seed (3-5 seeds/hill and thinned sowing 2 plants/hill after 3 weeks later).
2- Canola transplant age after 30 days from sowing.
3- Canola transplant age after 45 days from sowing.
4- Canola transplant age after 60 days from sowing.

Nursery soil well prepared and leveling after addition of 15.5 kg P_2O_5/feddan as super phosphate (15.5% P_2O_5). Seeds of canola c.v. Serw 4 were sown in the nursery on 27/9, 12/10 and 27/10 in the first season 2/10, 17/10 and 1/11 in the second seasons, respectively. The nursery was

irrigated every 10 days. However when transplants were 30, 45 or 60 days, they were transplanted in the permanent filed along with direct seeding.

B- Soaking canola seedling in some growth regulators substances (R) as follow:

1- Control treatment (without soaking in regulators substances).
2- Indole actetic acid (IAA).
3- Naphthalene actetic acid (NAA).
4- Gebberellic acid (GA3).

Transplanting canola seedling at different ages as well as direct seeding were soaked for 24 hours in aqueous solutions (40mg/L) of IAA, NAA and GA3.

These treatments were arranged in split plot design with three replications. Three replications were devoted for sanoley to study growth parameters, yield and its attributes. Canola transplant age treatments were arranged in the main plots, while regulators substance were allocated in the sub plots. The plot area was 21m^2 (6m x 3.5 m) containing 12 ridges (3.5 long and 50 cm apart). Before transplanting and during soil preparation was fertilized by calcium super phosphate (15.5% P_2O_5) were added at the rate of 30 kg P_2O_5. While, nitrogen as ammonium nitrate (33.5% N) and potassium as potassium sulphate (48% K_2O), fertilizers were added at a rate 67 kg N and 24 kg K_2O per feddan. Such N and K rates were splitted in two equal doses and added after 60 and 90 days from sowing date. All agronomic practices, except the studied factors, were adopted as the recommendation of Agric. Res. Center Ministry of Agric.

Table 1 : Mechanical and chemical analysis of soil the experimental site in 2005/2006 and 2006/2007 seasons.

Analysis	2005 / 2006 season	2006 / 2007 season
Mechanical analysis:		
Sand %	29.30	28.70
Silt %	31.60	32.18
Clay %	39.10	39.12
Soil texture	Clay loam	Clay loam
Chemical analysis:		
pH (1:2.5 soil water suspension)	7.92	7.90
Ec (ds/m) in soil: water ext c(1 : 5)	0.39	0.42
Caco3 (%)	1.58	1.43
Organic matter (%)	2.31	2.39
Available N (pmm)	32.43	33.01
Available P (pmm)	19.01	19.56
Available K (pmm)	344.00	361.00
Soluble ions (ppm)		
Fe	8.30	8.37
Mn	5.18	4.86
Zn	1.37	1.09

Characters studied:

1- Number of days to 50% flowering.

At harvesting ten individual plants were chosen at random from the middle ridge of each plot in both seasons and the following data were recorded.

2- Plant height (cm).
3- Number of branches / plant.
4- Fruiting zone length (cm).
5- 1000 – seed weight (g).
6- Seed yield / plant (g).
7- Plants in the ten ridges were harvested, dried, threshed and seed plot, was determined then.
8- Seeds oil percentage:Oil percentage in seed was determined using the improved Soxholet's apparatus and petroleum ether as a solvent method of Association of Official Agriculture Chemists (A.O.A.C., 1980).

Data obtained were analyzed according to Snedecor and Cochran (1981) and the treatments were compared by the least significant difference test (L.S.D) at 5% level.

RESULTS AND DISCUSSION

Effect of transplant age and some growth regulators application on growth, yield and yield components as well as seed oil percentage of canola are presented in Tables 2, 3, 4 and 5.

Results showed that there were significant differences between studied transplants ages and direct seeding for number of days to 50% flowering, plant height, number of branches/plant, fruiting zone length, seed yield/plant (g), 1000 – seed weight (g), seed yield/fad (kg) and seed oil percentage in the two seasons. Results also, indicated that transplanting canola at any age of seedling gave highest values for all studied traits as compared with the direct seeding in the two seasons.

Canola transplantsat 45 days age resulted in an increase in number of days to 50% flowering, plant height, fruiting zone length, seed yield/plant, 1000 – seed weight and seed yield/fad. by 31.35, 17.59, 21.99, 39.21, 40.20 and 44.26% in the first season and by 31.01, 14.89, 22.98, 41.78, 36.12 and 38.53% in the second season, while, canola transplanting at 30 days age of seedling resulted in an increase in number of branches/plant and oil percentage by 62.76 and 9.51% in the first season and by 59.88 and 7.92% in the second season, as compared with the direct seeding as traditional sowing method. These results may be attributed to the following reasons one or more of different growth stages of canola crop completed its vegetative phase in favorable climatic conditions by early planting dates. So that results may be due to the advantages of early planting dates by transplanting versus direct seeding as common practice of canola planting. In this respect, Gupta (1994) found that the increments in seed yield of Gobhi sarson (*Brassica napus*, L.) over the direct sown crop were 52.30, 64.32, 84.52 and 111.76% when transplanted at 30, 40, 50 and 60 days, respectively.

Table 2: Effect of transplant age and some growth regulators on number of days to 50% flowering and plant height (cm) of canola in 2005/2006 and 2006/2007 seasons.

Transplanting Treatments (T)	Number of days to 50% flowering					Plant height (cm)				
	Growth regulators substances (R)				Mean	Growth regulators substances (R)				Mean
	Con.	I.AA	NAA	GA3		Con.	I.AA	NAA	GA3	
2005 / 2006 season										
Direct seeding	66.33	73.66	71.33	67.33	69.66	116.00	128.33	124.66	110.33	119.83
30 days	80.33	86.66	84.00	82.66	83.41	137.66	143.66	139.66	129.33	137.58
45 days	82.66	99.00	93.66	90.66	91.50	138.00	147.33	144.33	134.00	140.92
60 days	73.33	75.33	75.00	72.15	73.95	126.66	140.33	133.66	123.66	131.08
Mean	75.66	83.66	80.99	78.20	79.63	129.58	139.91	135.58	124.33	132.35
L.S.D. at 5% for										
	T	**R**	**T.R**			**T**	**R**	**T.R**		
	1.62	**2.19**	**3.01**			**2.78**	**3.20**	**4.01**		
2006 / 2007 season										
Direct seeding	65.66	74.33	72.66	63.66	69.08	113.00	131.00	126.33	111.00	120.33
30 days	78.33	85.33	84.00	82.00	82.42	134.00	137.00	136.66	126.33	133.50
45 days	85.00	97.00	92.00	88.00	90.50	135.00	143.66	143.00	131.33	138.25
60 days	72.66	74.66	75.00	70.33	73.16	130.00	136.00	128.33	120.33	128.67
Mean	75.41	82.83	80.92	75.99	78.79	128.00	136.91	133.58	122.25	130.19
L.S.D. at 5% for										
	T	**R**	**T.R**			**T**	**R**	**T.R**		
	1.13	**1.61**	**3.07**			**2.33**	**2.79**	**3.00**		

Table 3: Effect of transplant age and some growth regulators on Number of branches / plant and Fruiting zone length (cm) of canola in 2005/2006 and 2006/2007 seasons.

Transplanting Treatments (T)	Number of branches / plant					Fruiting zone length (cm)				
	Growth regulators substances (R)				Mean	Growth regulators substances (R)				Mean
	Con.	I.AA	NAA	GA3		Con.	I.AA	NAA	GA3	
2005 / 2006 season										
Direct seeding	3.00	4.00	4.00	2.33	3.33	98.60	103.13	100.00	96.33	99.52
30 days	5.00	6.66	6.00	4.00	5.42	113.00	127.33	116.33	105.66	115.58
45 days	4.33	5.00	4.33	3.33	4.25	121.33	129.66	124.66	110.00	121.41
60 days	4.33	5.33	4.67	4.44	4.69	122.00	123.00	122.66	111.33	119.74
Mean	4.17	5.25	4.75	3.53	4.43	113.73	120.78	115.91	105.83	114.06
L.S.D. at 5% for										
	T	**R**	**T.R**			**T**	**R**	**T.R**		
	1.04	**N.S.**	**N.S.**			**4.12**	**7.97**	**11.13**		
2006 / 2007 season										
Direct seeding	3.00	4.33	3.8	2.66	3.44	96.80	107.33	100.13	93.33	99.40
30 days	5.33	6.33	6.33	4.00	5.50	105.00	116.66	115.00	105.00	110.42
45 days	3.66	5.00	4.66	3.33	4.16	124.33	126.00	125.00	113.66	122.25
60 days	4.00	5.66	4.33	4.00	4.50	117.00	123.00	117.66	111.66	117.33
Mean	**3.99**	**5.33**	**4.78**	**3.50**	**4.40**	**110.78**	**118.25**	**114.45**	**105.91**	**112.35**
L.S.D. at 5% for										
	T	**R**	**T.R**			**T**	**R**	**T.R**		
	1.01	**N.S.**	**N.S.**			**3.33**	**6.28**	**9.13**		

Table 4: Effect of transplant age and some growth regulators on Seed yield / plants (gm) and 1000 – seed weight (gm) of canola in 2005/2006 and 2006/2007 seasons.

Transplanting Treatments (T)	Seed yield / plants (gm)					1000 – seed weight (gm)				
	Growth regulators substances (R)				Mean	Growth regulators substances (R)				Mean
	Con.	I.AA	NAA	GA3		Con.	I.AA	NAA	GA3	
2005 / 2006 season										
Direct seeding	28.33	33.00	31.20	31.00	30.88	2.33	3.75	3.14	2.42	2.91
30 days	33.66	40.00	37.66	34.00	36.33	3.52	4.33	4.11	2.77	3.68
45 days	40.00	52.00	43.66	36.33	42.99	3.89	5.03	4.17	3.23	4.08
60 days	30.11	36.70	33.20	32.00	33.00	3.07	4.42	3.64	3.22	3.58
Mean	33.03	40.43	36.43	33.33	35.80	3.20	4.38	3.77	2.91	3.56
L.S.D. at 5% for										
	T	**R**	**T.R**			**T**	**R**	**T.R**		
	2.01	**2.93**	**5.83**			**0.32**	**0.46**	**N.S.**		
2006 / 2007 season										
Direct seeding	27.00	34.00	30.00	29.80	30.20	2.91	3.44	3.36	2.24	2.99
30 days	33.33	39.60	34.50	30.00	34.36	3.36	4.52	4.09	2.97	3.73
45 days	40.60	50.80	42.30	37.56	42.82	3.72	5.12	4.22	3.20	4.07
60 days	29.40	36.19	34.70	31.78	33.02	3.42	4.45	3.90	3.76	3.88
Mean	32.58	40.15	35.38	32.29	35.10	3.35	4.38	3.89	3.04	3.67
L.S.D. at 5% for										
	T	**R**	**T.R**			**T**	**R**	**T.R**		
	2.15	**2.29**	**6.16**			**0.36**	**0.42**	**N.S.**		

Table 5: Effect of transplant age and some growth regulators on Seed yield/feddan (kg) and Seed oil percentage (%) of canola in 2005/2006 and 2006/2007 seasons.

Transplanting Treatments (T)	Seed yield/feddan (kg)					Seed oil percentage (%)				
	Growth regulators substances (R)				Mean	Growth regulators substances (R)				Mean
	Con.	I.AA	NAA	GA3		Con.	I.AA	NAA	GA3	
2005 / 2006 season										
Direct seeding	773.00	991.00	931.60	873.00	892.15	40.28	40.86	40.16	36.37	39.42
30 days	1068.00	1292.00	1162.20	1021.40	1135.90	43.19	44.00	43.34	42.15	43.17
45 days	1132.00	1536.30	1341.00	1139.00	1287.08	41.66	43.27	42.00	39.22	41.54
60 days	946.20	1103.00	1023.00	933.00	1001.30	42.82	42.39	43.43	42.95	42.90
Mean	979.80	1230.58	1114.45	991.60	1079.11	41.99	42.63	42.23	40.17	41.76
L.S.D. at 5% for										
	T	**R**	**T.R**			**T**	**R**	**T.R**		
	56.39	**103.47**	**119.19**			**0.65**	**1.03**	**N.S.**		
2006 / 2007 season										
Direct seeding	795.80	1003.00	925.50	833.90	889.55	39.66	40.54	40.34	38.39	39.73
30 days	1034.90	1165.00	1095.00	953.00	1061.97	42.79	43.43	43.06	42.25	42.88
45 days	1088.00	1478.00	1286.40	1077.00	1232.35	41.36	42.36	42.66	39.57	41.49
60 days	958.00	1091.00	1019.30	843.80	978.03	42.07	42.29	42.43	41.62	42.10
Mean	969.18	1184.25	1081.55	926.93	1040.48	41.47	42.16	42.12	40.46	41.55
L.S.D. at 5% for										
	T	**R**	**T.R**			**T**	**R**	**T.R**		
	49.20	**98.16**	**122.17**			**0.43**	**0.89**	**N.S.**		

In addition, plant height, number of branches/plant and 1000 – seed weight were increased by transplanting crop pariculary when transplanted in Nov. However, Momoh and Zhou (2001) noticed that, the higher seed yields of 1730.70 and 1748.10 kg/ha were obtained from transplanted crop at 30 and 35 days, respectively, Many authers pointed out the increasing seed yield and its attributes by early planting dates (Sorour *et al*., 1992, Hassany *et al*., 2003, El-Sadany, 2005 and Hassany, 2005).

Results showed that, prep on soaking canola transplants in some growth regulators had significant effect in most studied characters in the two seasons. Results also, indicated that, preplanting soaking canola transplants of IAA significantly increased seed yield/fad. as compared with other treatments in the two seasons. On the other hand, the differences between regulators application and control treatment for number of branches/plant was not significant in the two seasons, while the differences between control treatment and GA3 for seed yield/plant, 1000 – seed weight and seed yield/fad. did not reach a significant level in the two season. Moreover, differences between control treatment and NAA, IAA also between control and GA3 for fruiting zone level length between control, IAA and NAA for seed oil percentage did not reach significant in the two seasons.

The highest values for all studied characters were obtained from IAA application in the two seasons. The lowest values for the previous characters were obtained from the GA3 application in the first and second seasons. In general, the highest values were for plant height (139.91 and 136.91, cm), fruiting zone length (120.78 and 118.25, cm), seed yield/plant (40.43 and 40.15, g), 1000- seed weight (4.38 and 4.38, g), seed yield/fad. (1230.58 and 1184.25, kg) and seed oil percentage (42.63 and 42.16, %) in the first and second seasons, respectively, while, the lowest values for plant height (124.33 and 12.25, cm), fruiting zone length (105.83 and 105.91, cm), 1000-seed weight (2.91 and 3.04, g) and seed oil percentage (40.17 and 40.46, %) were produced by GA3 application in the first and second seasons, respectively. On the other hand, control treatment gave the earliest number of days to 50% flowering (75.66 and 75.41, day) in the two season. These results may be due to the inhibition role of GA3 on root growth (Krishnamoorthy, 1981) and consequently on foliage growth and the photosynthetic substances required for plant formation and enlargement. The above results indicated that IAA and NAA some of growth regulators increased plant height, fruiting zone length, seed yield/plant and 1000 – seed weight must be reflected on increasing seed yield. Nofal *et al*., (1990) found that, the growth of cotton, corn, bean, pea and sunflower increased by organic acids external treatments especially succinct, citric and malice acids. Nofal *et al*., (1991) manifested that, maximum lettuce growth and yield were obtained by seed soaking and foliar spray with 1000 ppm ascorbic acid which significantly affected the concentration and uptake of N, P and K. El-Sayed *et al*., (2007) found that, Ascobein treatment gave the highest values for plant height, fruiting zone length and seed yield/plant and /fad. of canola crop.

The interaction between transplant age and growth regulators application had a significant effect on all characteristics studied in the both seasons, except number of branches/plant, 1000 – seed weight and seed oil

percentage in the two seasons. At first and second seasons, transplanting canola plants at 45 days with growth regulators substances (IAA) produced the tallest plant height, increase number of days to 50% flowering and fruiting zone length, also gave the highest values for seed yield/plant, 1000 – seed weight and seed yield/fad. as shown in Tables (2, 3, 4 and 5). On the other hand, direct seeding with any regulator substance produced the lowest values for all growth traits in the two seasons. comparing with the direct seeding, these increments of transplanting at 30, 45, and 60 days amounted to 11.94, 14.80 and 9.35% in plant height, 23.46, 25.72 and 19.26% in fruiting zone length; 21.21, 57.57 and 11.21% in seed yield/plant and 30.37, 55.02 and 11.30% in seed yield/fad., respectively, under IAA regulators substances in the two seasons. This result is in agreement that obtained by Gupta. These results may be due to increasing cumulative temperature above zero by canola transplanting as early sowing date and/ or the role of regulators substances in vegetative growth of canola crop. According to the observation mentioned of Brar *et al*., (1998), these results may be due to the fact that early sown crop completed its vegetative phase in favorable climatic conditions. In this concern, many authors pointed out the advantages of early sowing dates as (Kumar and Shaktawat, 1991; Thakur and Singh, 1998; Yadav *et al*., (1999); El-Sadany, 2005 and Hassany, 2005).

CONCLUSIONS

It was shown that, soaking seedling and transplanting canola plants at 45 days age with indole acid (IAA) solution significantly increase seed yield/fad., in both seasons under soil studied.

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تأثير عمر الشتله وبعض منظمات النمو على انتاجية محصول الكانولا

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أجريت تجربتان حقليتان بمزرعة محطة البحوث الزراعية بالجميزة خلال موسمى الزراعة ٢٠٠٥ / ٢٠٠٦ و ٢٠٠٦ / ٢٠٠٧ لدراسة تاثير شتلات الكانولا عند عمر ٣٠ – ٤٥ – ٦٠ يوم بالمقارنة بالزراعة المباشرة بالبذرة (كنترول) ونقع بذور وشتلات الكانولا فى بعض منظمات النمو (بدون نقع – النقع فى محاليل حمض الجبرليك و أندول حمض الخليك و نفثالين حمض الخليك) لمدة ٢٤ ساعة قبل الزراعة فى الحقل المستديم واثر ذلك على المحصول ومكوناته للكانولا سرو ٤.

وتم تصميم التجربة فى قطع منشقة مرة واحدة فى ثلاث مكررات حيث وضعت معاملات الشتل فى القطع الرئيسية ومعاملات النقع فى منظمات النمو فى القطع الشقيةز

ويمكن تلخيص النتائج فيما يلى:-

1- أظهرت النتائج اختلافات معنوية بين معاملات شتل الكانولا عند الاعمار المختلفة مقارنة بالزراعة المباشرة بالبذرة فى الحقل فى جميع الصفات المدروسة ما عدا عدد الايام حتى ٥٠% تزهير فى الموسمين, حيث أدت الزراعة بالبذرة المباشرة فى الحقل الى نقص معنوى فى عدد الايام حتى ٥٠% تزهير وادت معاملة شتل نباتات الكانولا عند عمر ٤٥ يوم الى زيادة معنوية فى طول النبات, طول المنطقة الثمرية, محصول بذور النبات ,

وزن ١٠٠٠ بذرة , محصول بذور الفدان مقارنة بالمعاملات الاخرى المدروسة. بينما ادت معاملة شتل نبات الكانولا عند عمر ٣٠ يوم الى زيادة عدد الافرع الثمرية على النبات و النسبة المئوية للزيت مقارنة بالمعاملات الاخرى المدروسة.

2- أظهرت النتائج اختلافات معنوية بين معاملات النقع المدروسة على جميع الصفات ما عدا صفة عدد الافرع الثمرية فى كلا الموسمين. وادت معاملة النقع فى اندول حمض الخليك ونفثالين حمض الخليك الى زيادة معنوية فى معظم الصفات المدروسة مقارنة بالكنترول ومعاملة النقع فى حمض الخليك فى كلا الموسمين.

3- أظهرت التائج تاثيراً معنوياً للتفاعل بين معاملات الشتل والنقع فى محاليل منظمات النمو على جميع الصفات المدروسة ما عدا صفة عدد الافرع على النبات ووزن ١٠٠٠ بذرة والنسبة المئوية للزريت فى الموسمين, وأدت معاملة نقع شتلات نبات الكانولا عند عمر ٤٥ يوم فى اندول حمض الخليك الى زيادة معنوية فى طول النبات وطول المنطقة الثمرية ووزن بذور النبات ووزن محصول الفدان مقارنة بمعاملات التفاعل الاخرى المدروسة.

بوجه عام أوضحت النتائج أن نقع شتلات نبات الكانولا عند عمر ٤٥ يوم فى محلول أندول حمض الخليك أدت الى زيادة معنوية فى محصول الكانولا تحت ظروف التجربة.