

Effect of Some Chemical Thinning Agents on Fruit Set of Manzanillo and Eggizi Shami Olive Cultivars

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Abstract: This investigation was conducted during two successive seasons (2009-2010) on two olive cultivars (Manzanillo and Eggizi Shami) in a private orchard in the Alex desert road. The aim of this study is to investigate the effect of some chemical thinning agents GA3 (100,150 and 200 ppm), NAA (100,150 and 200 ppm) and Urea (4,6,8 and 10%) which sprayed at full bloom, five days after full bloom, ten days after full bloom and fifteen days after full bloom on initial fruit set (21 days after full bloom), final fruit set (forty five days after full bloom) and at harvest date. The results showed that all chemical thinning agents reduced fruit set significantly compared with control (sprayed with water only). Urea spray was the most effective in reducing fruit set compared with GA3 and NAA. The highest concentration was more effective than the lower concentration in each chemical component. Fruiting at different time of estimation with Manzanillo cv. was significantly lower than Eggizi Shami cv. Gibberellic acid showed moderate effect in reducing fruit set (between Urea and NAA). The most effective date was in reducing fruiting was at full bloom while the lowest was at fifteen day after full bloom. It could be recommended that spraying with Urea or NAA at moderate concentration (4% and 150 ppm) was effective in reducing fruit set in both cultivars of study.

Key words: Olive • Thinning • NAA • GA3 • Urea • Fruit Set

INTRODUCTION

Olive (*Olea europaea* L.) is a species of the oldest cultivated fruits since its fossilized leaves dating to around 37,000 years ago.

The olive belongs to the *oleaceae* family, which comprises of 22 genera and the genera *Olea* is one of them with 35 species [1]. The domesticated olives belong to the genus *Olea*, species *europaea*, sub species *sativa* and number of the cultivated species is estimated more than 2500 cultivars.

Olive cultivation plays an important role in the economy of many countries in the Mediterranean basin, it isn't only increase the land value where the soil is unsuitable for other crops, but also contributes to soil conservation and helps to overcome environmental problems [2]. Olive fruit is, of major agricultural importance in the Mediterranean region as a source of olive oil. The world production of olive was 20,344,342 tons. The major producer countries are Spain, Italy, Greece, Turkey, Morocco, Syria, Tunisia, Egypt, Algeria, Portugal and others [3].

In Egypt, olive cultivation increased considerably during the last two decades due to the great efforts paid for expanding olive cultivated areas in new reclaimed areas at El Nobaria, Marsa Matroh, El Fayoum, Esmalia and Sinai are the most important areas of olive production.

The Egyptian olive production reached about 563,070 tons produced from acreage 202,743 Feddan (Feddan =0.42 Hectare), most of which are processed mainly as table olive and the rest is extracted to olive oil [4].

The thinning of olive fruit in intensively irrigated orchards is a prerequisite for obtaining more suitable fruits heavy cropping years (on years). Olive growers are advised to do fruit thinning during "on" year crop to reduce the occurrence of alternate bearing [5].

Some olive cultivars are characterized by alternative bearing. The condition of heavy crop results in limb breakage and produces fruits of poor quality. Martin *et al.* [6] found that year following excessive production might be so depressed that harvest wouldn't be economical on cv. Manzanillo olives.

Hartmann [7] showed that naphthalene acetic acid (NAA) was active in thinning olive fruits. Different cultural methods are commonly applied in the world in order to decrease the severity of alternation and improve the fruit quality in olive as well in many fruit cultivars showing alternation. These methods can be summarized as breeding, fertilization, pruning, girdling, thinning, using of plant growth regulators and applying convenient harvest [8-10]. Barranco and Krueger, [11] and Elizabeth, [12] found that NAA is an effective. Post bloom thinning agent of olive fruits resulting in a reduction in final fruit set, increase in size and quality of the remaining fruit and an improvement in return bloom.

Using the concentration of 200 ppm NAA at FB+5 resulted in a strong reduction in fruit set and increase in fruit size and return bloom. Treatments later than FB+15 with concentrations of 200 ppm and higher should be avoided [11].

The effect of different spray solutions of NAA at 100,150 and 200 ppm, on Chemlali following shoots, 15 days after full bloom, were studied. The NAA at 200 ppm proved superiority as olive fruit thinners, without leaf injuries over other concentrations. Such concentrations decreased fruit set [13].

Different cultural methods are commonly applied in the world in order to decrease the severity of alternation and improve the quality in olive as well as in many fruit species showing alternation. These methods can be summarized as breeding, fertilization, pruning, girdling, thinning, using of plant growth regulators and applying convenient harvest [8,10].

Using various concentrations (2, 4 and 6%) of Urea as chemical thinner. Urea reduced fruit set significantly. Final fruit set was reduced by about 50% as compared to the control plants treated with 6% Urea [14].

Various concentrations (2, 4 and 6%) of Urea as chemical thinner were applied to 'Nocellara del Belice' olive cv. at full bloom (FB), FB+10, FB+20 Urea reduced fruit set significantly only when applied at FB+20, at fruitlet stage. Final fruit set was reduced by about 50% as compared to the control plants treated with 6% urea at FB+20. Crop load and fruit characteristics were affected by treatments [14].

This work aimed to study the effect of suitable time and concentration of some chemical thinning agent on fruit set of Eggizi Shami and Manzanillo olive cultivars.

MATERIALS AND METHODS

This work was carried out through the period (2009 – 2010) on 13 years old of two olive cultivars (Eggizi Shami and Manzanillo cvs.) grown in sandy soil of a private orchard named Fifa orchard in 50 the kilo in the desert Alex desert road. The trees that had been selected for this study were of growth spaces 4x5 meters and subjected to the same management practices such as fertilization, irrigation, pruning and pest control.

Cultivars under Study: Manzanillo: One of the Spanish cultivars which are spread cultivated in most of the world countries. Medium sized fruit (4-6 g). Fruits used for extracting oil and green, black pickling. Oil percentage is 16-20%.

Eggizi Shami: One of the local cultivars which are spread cultivated in Fayoum and Giza. Large-sized fruit (7-10 g), the fruits used for green pickling only. Oil percentage is 8.80 % fruits ripened from September to October.

Three trees had been selected for every treatment; on every tree 10 branches were labeled. The flowers had been counted on the branches which had been selected, before spraying the experiment materials; the leaves had been counted on the branches before spraying to make sure no burning leaves after spraying. All selected trees were in the on year.

Treatments: Trees were sprayed with Gibberellic acid (GA3) at 100,150 and 200 ppm, Naphthalene acetic acid (NAA) at 100,150 and 200 ppm, Urea at 4,6,8, 10% and control trees were sprayed with water only.

Time of Application: Full bloom (FB): when 50-70% of flowers were opened, full bloom+5 days after full bloom, full bloom+10 days after full bloom and full bloom+15 days after full bloom.

Measurements: Number of fruits/m at initial fruit set (21 days after full bloom), number of fruits/m at final fruit set (45 days after full bloom) and number of fruits/m at harvest time.

Experiment Design: The experiment was laid out as a randomized complete design with three factors (cultivars * dates * treatments) used for analysis, all data with three replications. The treatment means were compared by least

significant difference (L.S.D.) test as significance level of 0.05 as given by Snedecor and Cochran [15] by using Mstat-C program [16].

RESULTS AND DISCUSSION

Effect of Some Chemical Compounds on Number of Fruits/m at Initial Fruit Set (FB+21): In the first season (2009), it was noticed that the number of fruits per meter at (FB+ 21 days) was significantly higher (45.76 fruits/m) with control treatment while, it was the lowest (21.49 fruits/m) with treatment Urea at 10% concentration (Table 1).

It was showed that the number of fruits per meter at initial fruit set (FB+ 21days) was significantly higher (32.11 fruits/m) on Eggizi Shami cv. compared with Manzanillo cv. which recorded (30.42 fruits/m).

It was observed that the number of fruits per meter at (FB+ 21 days) was significantly higher (38.98 fruits/m) with treatment sprayed at (FB +15 days) while, it was the lowest (22.46 fruits/m) with treatment sprayed at (FB).

It was illustrated that the number of fruits per meter at (FB+ 21 days) was the highest (68.53 fruits/m) with treatment NAA 200 ppm on Manzanillo cv. at (FB+15 days), while it was the lowest (8.58 fruits/m) with treatment GA3 200 ppm with Manzanillo cv. at (FB).

In the second season (2010), it was showed that the number of fruits per meter at (FB+21days) was significantly higher (47.61 fruits/m) with control treatment. While, it was the lowest (24.80 fruits/m) with Urea 8% treatment (Table 2). It was noticed that the number of fruits per meter at (FB+ 21 days) was significantly higher (35.36 fruits/m) on Manzanillo cv. compared with Eggizi Shami cv. which recorded (28.71 fruits/m).

The number of fruits per meter at (FB+ 21 days) was significantly higher (36.05 fruits/m) with treatment sprayed at (FB +10 days) while, it was the lowest (27. 67 fruits/m) with treatment sprayed at (FB).

It was observed that the number of fruits per meter at (FB+ 21 days) was the highest (63. 35 fruits/m) with control treatment on Manzanillo cv. at (FB +10 days), while it was the lowest (8.95 fruits/m) with treatment NAA 200 p.p.m with Manzanillo cv. at (FB +5 days).

These results are in line with finding of Dag *et al.*, [17], Elizabeth, [12] and Crous and Steyn, [18] who found that using NAA in Barouni and Manzanillo olive cvs. is important to decrease alternate bearing by reducing fruit set and increase fruit set in both cultivars also, using NAA decrease harvesting costs account for roughly 50% of the input costs.

Naphthalene acetic acid concentration at 200 ppm applied 10-15 days after full bloom is recommended for local conditions.

Dag *et al.* [17] found that NAA at 100 ppm at 10 days after full bloom, on Barnea and Picual oil olive cvs. caused significant influence on the number of fruit was evident solely in Barnea and Picual seemed less susceptible than Barnea to biennial bearing.

Effect of Some Chemical Compounds on Number of Fruits/m at (FB+45): In the first season (2009), it was observed that the number of fruits per meter at (FB+ 45 days) was significantly higher (28.67 fruits/m) with control treatment. While, it was the lowest (13.89 and 14.72 fruits/m) with treatments Urea 10% and 6% (Table 3).

It was showed that the number of fruits per meter at (FB+ 45days) was significantly higher (20.08 fruits/m) of Eggizi Shami cv. compared with Manzanillo cv. which recorded (16.15 fruits/m).

It was observed that the number of fruits per meter at (FB+ 45 days) was significantly higher (22.22 fruits/m) with treatment sprayed at (FB+15 days) while, it was the lowest (13.08 fruits/m) with treatment sprayed at (FB).

It was illustrated that the number of fruits per meter at (FB+ 45 days) was the highest (48.28) with treatment control with Eggizi Shami cv. at (FB), while it was the lowest (4.25 fruits/m) with treatment GA3 200 ppm with Manzanillo cv. at (FB).

In the second season (2010), it was showed that the number of fruits per meter at (FB+ 45 days) was significantly higher (28.90 fruits/m) with control treatment. While, it was the lowest (14.18 fruits/m) with treatment Urea 6% (Table 4).

It was noticed that the number of fruits per meter at (FB+ 45days) was significantly higher (19.45 fruits/m) of Eggizi Shami cv. compared with Manzanillo cv. which recorded (18.30 fruits/m).

It was illustrated that the number of fruits per meter at (FB+ 45days) was significantly higher (21.53 and 21.01 fruits/m) with treatments sprayed at (FB+10 and FB+15 days) while, it was the lowest (27. 67 fruits/m) with treatment sprayed at (FB).

It was observed that the number of fruits per meter at (FB+ 45days) was the highest (40.20 fruits/m) with treatment GA3 at 150 ppm with Manzanillo cv. at (FB +10 days), while it was the lowest (7.07, 8.13 and 9.27 fruits/m) with treatments NAA 200 ppm, Urea 8% and GA3 150 ppm with Manzanillo cv. at (FB +5, FB+5 and FB+10 days).

Table 1: Effect of some chemical compounds on number of fruits/m at (FB+21) after full bloom of Manzanillo and Eggizi Shami olive cvs. season (2009).

		Treatments											Mean
Cultivars	Dates	GA3 100	GA3 150	GA3 200	NAA 100	NAA 150	NAA 200	Urea 4%	Urea 6%	Urea 8%	Urea 10%	Control	
Manzanillo	FB	11.40	18.59	8.58	17.65	16.38	22.37	22.90	33.78	24.13	19.00	45.13	21.81
	FB + 5	35.88	30.50	35.88	52.13	26.80	14.45	48.28	24.24	27.50	27.90	51.60	34.10
	FB + 10	53.38	28.63	23.61	32.53	16.36	24.25	31.63	23.00	23.84	19.89	28.30	27.76
	FB + 15	31.20	44.96	48.35	25.18	25.48	68.53	29.70	46.30	44.94	14.13	39.28	38.00
	Mean	32.96	30.67	29.10	31.87	21.25	32.40	33.13	31.83	30.10	20.23	41.08	30.42
Eggizi Shami	FB	28.08	12.20	12.93	16.10	30.28	17.59	20.10	10.85	18.55	17.34	70.33	23.12
	FB + 5	33.48	29.65	30.68	36.38	31.73	23.15	32.95	33.38	24.63	19.36	42.03	30.67
	FB + 10	45.00	35.63	33.68	45.28	41.03	27.25	41.98	25.80	29.88	26.13	30.10	34.70
	FB + 15	37.90	60.63	41.53	37.25	28.18	49.66	39.40	26.93	30.43	28.23	59.33	39.95
	Mean	36.11	34.53	29.70	33.75	32.80	29.41	33.61	24.24	25.87	22.76	50.44	32.11
	FB	19.74	15.39	10.75	16.88	23.33	19.98	21.50	22.31	21.34	18.17	57.73	22.46
	FB + 5	34.68	30.08	33.28	44.25	29.26	18.80	40.61	28.81	26.06	23.63	46.81	32.39
	FB + 10	49.19	32.13	28.64	38.90	28.69	25.75	36.80	24.40	26.86	23.01	29.20	31.23
	FB + 15	34.55	52.79	44.94	31.21	26.83	59.09	34.55	36.61	37.68	21.18	49.30	38.98
	Mean	34.54	32.60	29.40	32.81	27.03	30.91	33.37	28.03	27.98	21.49	45.76	

LSD value at 0.05: Cultivars(C):0.7725, Dates (D): 1.0924, C&D: 1.5449, Treatments (T):1.8116, C&T: 2.5619, D&T: 3.6231, C&D&T: 5.1239.

Table 2: Effect of some chemical compounds on number of fruits/m at (FB+21) after full bloom of Manzanillo and Eggizi Shami olive cvs. season (2010).

		Treatments											Mean
Cultivars	Dates	GA3 100	GA3 150	GA3 200	NAA 100	NAA 150	NAA 200	Urea 4%	Urea 6%	Urea 8%	Urea 10%	Control	
Manzanillo	FB	25.88	35.95	31.58	35.70	34.08	43.96	57.60	25.50	17.00	9.10	37.35	32.15
	FB + 5	30.90	22.13	30.39	39.00	25.08	8.95	33.78	26.25	19.19	43.70	60.00	30.85
	FB + 10	29.18	59.33	41.13	45.58	34.38	41.58	43.23	31.58	28.00	36.75	63.35	41.28
	FB + 15	43.83	44.45	42.48	31.20	35.33	41.10	31.35	25.10	31.00	40.90	42.20	37.18
	Mean	32.44	40.46	36.39	37.87	32.21	33.90	41.49	27.11	23.80	32.61	50.73	35.36
Eggizi Shami	FB	21.29	23.58	12.53	20.59	21.36	20.44	32.80	19.38	23.26	20.84	39.10	23.20
	FB + 5	36.40	26.14	17.50	31.13	24.31	25.03	29.28	24.33	22.70	23.57	42.45	27.53
	FB + 10	30.43	30.10	34.83	31.20	34.65	20.34	35.18	22.78	24.36	24.00	51.28	30.83
	FB + 15	34.20	38.65	25.08	37.90	25.70	31.28	38.93	31.83	32.90	24.39	45.13	33.27
	Mean	30.58	29.62	22.48	30.20	26.51	24.27	34.04	24.58	25.81	23.20	44.49	28.71
	FB	23.58	29.77	22.05	28.15	27.72	32.20	45.20	22.44	20.13	14.97	38.23	27.67
	FB + 5	33.65	24.13	23.94	35.06	24.70	16.99	31.53	25.29	20.94	33.64	51.23	29.19
	FB + 10	29.80	44.71	37.98	38.39	34.51	30.96	39.20	27.18	26.18	30.38	57.31	36.05
	FB + 15	39.01	41.55	33.78	34.55	30.51	36.19	35.14	28.46	31.95	32.64	43.66	35.22
	Mean	31.51	35.04	29.44	34.04	29.36	29.08	37.77	25.84	24.80	27.91	47.61	

LSD value at 0.05: Cultivars (C): 0.6641, Dates (D): 0.9392, C&D: 1.3283, Treatments (T): 1.5576, C&T:2.2027, D&T: 3.1151, C&D&T: 4.4054.

Table 3: Effect of some chemical compounds on number of fruits/m at (FB+45) after full bloom of Manzanillo and Eggizi Shami olive cvs. season (2009).

		Treatments											Mean
Cultivars	Dates	GA3 100	GA3 150	GA3 200	NAA 100	NAA 150	NAA 200	Urea 4%	Urea 6%	Urea 8%	Urea 10%	Control	
Manzanillo	FB	6.84	11.16	4.25	8.80	8.50	10.58	17.33	14.80	11.88	11.12	28.78	12.18
	FB + 5	17.32	21.85	22.23	25.15	12.18	7.78	19.57	12.08	13.75	17.99	24.18	17.64
	FB + 10	23.27	20.58	12.48	20.79	8.72	13.95	15.70	13.38	10.40	13.18	17.43	15.44
	FB + 15	16.05	15.04	29.66	10.65	11.89	42.33	13.05	17.93	25.55	5.30	25.25	19.34
	Mean	15.87	17.16	17.15	16.35	10.32	18.66	16.41	14.54	15.39	11.90	23.91	16.15
Eggizi Shami	FB	18.99	7.83	7.63	10.27	16.27	9.91	11.98	5.99	7.23	9.30	48.28	13.97
	FB + 5	22.89	16.86	19.20	21.40	18.57	13.95	19.99	19.18	14.65	12.95	25.35	18.64
	FB + 10	32.95	19.67	24.40	31.83	25.03	15.08	25.04	16.55	18.57	18.08	21.61	22.62
	FB + 15	20.29	36.33	22.39	24.14	18.75	33.33	21.67	17.88	19.83	23.19	38.48	25.11
	Mean	23.78	20.17	18.40	21.91	19.65	18.06	19.67	14.90	15.07	15.88	33.43	20.08
	FB	12.92	9.49	5.94	9.54	12.38	10.24	14.65	10.40	9.55	10.21	38.53	13.08
	FB + 5	20.11	19.36	20.71	23.28	15.37	10.86	19.78	15.63	14.20	15.47	24.76	18.14
	FB + 10	28.11	20.12	18.44	26.31	16.87	14.51	20.37	14.96	14.49	15.63	19.52	19.03
	FB + 15	18.17	25.68	26.03	17.40	15.32	37.83	17.36	17.90	22.69	14.24	31.86	22.22
	Mean	19.82	18.66	17.78	19.13	14.99	18.36	18.04	14.72	15.23	13.89	28.67	

LSD value at 0.05: Cultivars (C):0.6026, Dates (D): 0.8522, C&D: 1.2052 Treatments (T): 1.4132, C&T: 1.9986, D&T: 2.8264 C&D&T: 3.9972

Table 4: Effect of some chemical compounds on number of fruits/m at (FB+45) after full bloom of Manzanillo and Eggizi Shami olive cvs. season (2010).

		Treatments											Mean
Cultivars	Dates	GA3 100	GA3 150	GA3 200	NAA 100	NAA 150	NAA 200	Urea 4%	Urea 6%	Urea 8%	Urea 10%	Control	
Manzanillo	FB	13.45	14.53	22.70	18.20	14.48	24.18	16.00	13.83	8.13	7.35	21.20	15.82
	FB + 5	16.59	9.27	21.14	17.32	9.13	7.07	18.80	10.28	13.43	16.50	21.28	14.62
	FB + 10	19.40	40.20	25.33	19.18	15.04	24.60	20.67	20.90	18.31	12.63	32.85	22.64
	FB + 15	21.35	18.05	13.70	19.01	21.25	19.50	17.33	12.08	21.67	27.08	30.33	20.12
Mean		17.70	20.51	20.72	18.43	14.97	18.84	18.20	14.27	15.38	15.89	26.41	18.30
Eggizi Shami	FB	14.14	15.09	8.35	13.98	14.13	13.95	22.55	12.82	15.38	15.25	26.78	15.67
	FB + 5	33.15	22.40	10.29	19.35	14.13	15.93	18.08	17.08	17.64	15.75	34.00	19.80
	FB + 10	21.13	22.94	22.49	23.31	20.79	15.23	22.37	10.24	17.25	15.20	33.73	20.42
	FB + 15	23.70	22.19	16.21	26.00	20.57	17.90	29.38	16.21	22.35	15.38	31.05	21.90
Mean		23.03	20.65	14.33	20.66	17.40	15.75	23.09	14.08	18.15	15.39	31.39	19.45
	FB	13.79	14.81	15.52	16.09	14.30	19.06	19.28	13.32	11.75	11.30	23.99	15.75
	FB + 5	24.87	15.84	15.72	18.33	11.63	11.50	18.44	13.68	15.53	16.12	27.64	17.21
	FB + 10	20.26	31.57	23.91	21.24	17.91	19.91	21.52	15.57	17.78	13.91	33.29	21.53
	FB + 15	22.52	20.12	14.96	22.51	20.91	18.70	23.35	14.14	22.01	21.23	30.69	21.01
Mean		20.36	20.58	17.52	19.54	16.19	17.29	20.65	14.18	16.77	15.64	28.90	

LSD value at 0.05: Cultivars (C): 0.5571, Dates (D): 0.7879, C&D: 1.1143, Treatments (T): 1.3066, C&T: 1.8478, D&T: 2.6132 C&D&T: 3.6956

Table 5: Effect of some chemical compounds on number of fruits/m at harvest of Manzanillo and Eggizi Shami olive cvs. season (2009).

		Treatments											Mean
Cultivars	Dates	GA3 100	GA3 150	GA3 200	NAA 100	NAA 150	NAA 200	Urea 4%	Urea 6%	Urea 8%	Urea 10%	Control	
Manzanillo	FB	3.81	6.08	4.28	4.80	4.10	3.86	8.30	8.95	6.18	7.32	19.17	6.98
	FB + 5	8.25	8.75	14.05	14.43	5.18	3.85	14.45	5.30	6.23	8.27	15.36	9.46
	FB + 10	16.58	11.85	5.53	6.78	4.33	6.95	7.02	10.25	4.98	6.50	9.77	8.23
	FB + 15	7.40	13.46	7.98	5.30	5.89	32.72	5.65	7.28	9.95	5.30	13.73	10.42
Mean		9.01	10.03	7.96	7.83	4.87	11.85	8.86	7.94	6.83	6.85	14.51	8.78
Eggizi Shami	FB	6.85	3.48	3.95	4.43	6.11	4.38	9.12	3.03	3.60	4.63	33.53	7.55
	FB + 5	16.23	11.45	13.08	14.70	6.25	7.65	14.81	6.85	10.43	4.85	17.48	11.25
	FB + 10	27.80	14.28	15.70	17.28	16.78	6.25	15.88	11.78	13.18	13.03	16.91	15.35
	FB + 15	14.43	26.08	14.88	15.63	12.15	22.09	14.38	6.40	10.45	13.60	29.92	16.36
Mean		16.33	13.82	11.90	13.01	10.32	10.09	13.54	7.01	9.41	9.03	24.46	12.63
	FB	5.33	4.78	4.11	4.61	5.11	4.12	8.71	5.99	4.89	5.97	26.35	7.27
	FB + 5	12.24	10.10	13.56	14.56	5.71	5.75	14.63	6.08	8.33	6.56	16.42	10.36
	FB + 10	22.19	13.06	10.61	12.03	10.55	6.60	11.45	11.01	9.08	9.76	13.34	11.79
	FB + 15	10.91	19.77	11.43	10.46	9.02	27.41	10.01	6.84	10.20	9.45	21.82	13.39
Mean		12.67	11.93	9.93	10.42	7.60	10.97	11.20	7.48	8.12	7.94	19.48	

LSD value at 0.05: Cultivars (C): 0.3695, Dates (D): 0.5226, C&D: 0.7391, Treatments (T): 0.8666, C&T: 1.2256, D&T: 1.7333 C&D&T: 2.4513

Table 6: Effect of some chemical compounds on number of fruits/m at harvest of Manzanillo and Eggizi Shami olive cvs. season (2010).

		Treatments											Mean
Cultivars	Dates	GA3 100	GA3 150	GA3 200	NAA 100	NAA 150	NAA 200	Urea 4%	Urea 6%	Urea 8%	Urea 10%	Control	
Manzanillo	FB	10.60	7.25	11.88	12.15	6.28	7.73	14.65	9.27	3.60	3.90	12.78	9.10
	FB + 5	9.28	5.10	14.45	17.93	4.06	3.06	7.15	5.70	6.50	16.93	13.18	9.39
	FB + 10	7.78	18.50	14.73	10.30	10.35	20.53	17.10	11.55	11.08	7.56	17.23	13.34
	FB + 15	6.88	13.78	10.40	12.10	7.72	12.80	6.50	5.33	6.88	10.70	15.40	9.86
Mean		8.63	11.16	12.86	13.12	7.10	11.03	11.35	7.96	7.01	9.77	14.64	10.42
Eggizi Shami	FB	9.85	5.35	4.15	11.48	5.88	4.85	16.58	8.79	10.28	5.38	25.68	9.84
	FB + 5	24.87	14.20	5.18	13.33	10.83	7.28	12.53	12.93	12.93	9.06	13.78	12.44
	FB + 10	14.60	11.45	14.88	12.90	13.78	16.00	14.85	4.68	11.50	4.73	25.24	13.14
	FB + 15	17.15	15.70	11.20	20.04	15.10	11.95	21.67	11.20	14.88	10.28	21.09	15.48
Mean		16.62	11.68	8.85	14.43	11.39	10.02	16.40	9.40	12.39	7.36	21.45	12.73
	FB	10.22	6.30	8.01	11.81	6.08	6.29	15.61	9.03	6.94	4.64	19.23	9.47
	FB + 5	17.07	9.65	9.81	15.63	7.44	5.17	9.84	9.31	9.71	12.99	13.48	10.92
	FB + 10	11.19	14.98	14.80	11.60	12.06	18.26	15.98	8.11	11.29	6.14	21.23	13.24
	FB + 15	12.01	14.74	10.80	16.07	11.41	12.38	14.08	8.26	10.88	10.49	18.24	12.67
Mean		12.62	11.42	10.86	13.78	9.25	10.52	13.88	8.68	9.70	8.57	18.04	

LSD value at 0.05: Cultivars (C): 0.6390, Dates (D): 0.9037, C&D: 1.2780, Treatments (T): 1.4986, C&T: 2.1193, D&T: 2.9971 C&D&T: 4.2386

These results are in parallel with findings of Krueger *et al.* [19] whose found that NAA was effective on Manzanillo olive cv. Thinning with 150 ppm conc. Also Martin *et al.* [6] found that the date of application of NAA was 12-18 day after full bloom.

Effect of Some Chemical Compounds on Number of Fruits/m at Harvest: In the first season (2009), it was observed that the number of fruits per meter at harvest was significantly higher (19.48 fruits/m) with control treatment. While, it was the lowest (7.48 and 7.60 fruits/m) with treatments of Urea 6 % and NAA 150 ppm (Table 5).

It was showed that the number of fruits per meter at harvest was significantly higher (12.63 fruits/m) on Eggizi Shami cv. compared on Manzanillo cv. which recorded (8.78 fruits/m).

It was observed that the number of fruits per meter at harvest was significantly higher (13.39 fruits/m) with treatment sprayed at (FB +15 days) while, it was the lowest (7.27 fruits/m) with treatment sprayed at (FB).

It was illustrated that the number of fruits per meter at harvest was the highest (33.53 fruits/m) with treatment control with Manzanillo cv. at (FB+5 days), while it was the lowest (3.81 and 3.86 fruits/m) with treatments GA3 100 ppm and NAA 200 ppm with Manzanillo cv. at (FB).

In the second season (2010), It was showed that the number of fruits per meter at harvest was significantly higher (18.04 fruits/m) with control treatment. While, it was the lowest (8.57 and 8.68 fruits/m) with treatments Urea 10% and 8% (Table 6).

It was noticed that the number of fruits per meter at harvest was significantly higher (12.73 fruits/m) with Eggizi Shami cv. compared with Manzanillo cv. which recorded (10.42 fruits/m).

It was illustrated that the number of fruits per meter at harvest was significantly higher (13.24 fruits/m) with treatment sprayed at (FB+15 days) while, it was the lowest (9.47 fruits/m) with treatment sprayed at (FB).

It was observed that the number of fruits per meter at harvest was the highest (25.24 and 25.68 fruits/m) with treatment control with Eggizi Shami cv. at (FB and FB+10 days), while it was the lowest (3.60 and 3.90 fruits/m) with treatments Urea 8% and 10 % with Manzanillo cv. at (FB).

Results are in line with Prolongs and Voyatzis [20] that GA3 applied after full bloom on self pollination partly self incompatible olive cv. Chalkidikis did not affect the sets of normal seeded fruits. Also, Eris and Barut [21] found that application of NAA (100 and 150 ppm) 10 days after full bloom and GA3 (25,50 and 100 ppm) at fruitlet to

decrease the severity of alternation in Gemlik olive cv. by improving the yield. This was found with GA3 which increase fruit set but NAA decrease fruit set.

Barranco and Krueger, [11] found that NAA is effective as post bloom thinning agent in Manzanillo olive cv. Application prior to FB+15 results in a strong reduction in fruit set, increase in fruit size and return bloom. Treatments later than FB+15 and with concentrations of 200 ppm and higher should be avoided.

It could be concluded that: Using chemical thinning agents GA3, NAA and Urea are effective in reducing fruit set in both studied cultivars (Manzanillo and Eggizi Shami). The highest conc. of each chemical thinning agent was more effective compared to lower conc. Urea spray was more effective in reducing fruiting compared to GA3 and NAA in both studied cultivars. In general, Manzanillo fruit set was lower than Eggizi Shami at the same conc. and time of application. Spraying chemical thinning agents at full bloom reducing fruit set significantly compared with spraying at five days after full bloom, ten days after full bloom and fifteen days after full bloom but it is not usable because sometimes fruit drop increased after that by environmental factors thus spraying at ten days after full bloom and fifteen days after full bloom was preferable that fruits was resistance to fruit drop. It is applicable to spray Urea as chemical thinning agent at 4% at ten days after full bloom because it is cheap, effective and it is a nutrient as a source of nitrogen supply to olive leaves.

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