

## THE EFFECT OF POST HARVEST PRUNING, GA<sub>3</sub> AND ETHREL CONCENTRATIONS ON SOME FLOWERING ATTRIBUTES AND YIELD OF SOME MANGO CULTIVARS

(Received: 23.4.2009)

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### ABSTRACT

The present study was carried out on On year trees of mango cultivars Ewais and Sedik during 2005/2006 and 2006/2007 seasons to study the effect of pruning severity after harvest, GA<sub>3</sub> and Ethrel on the total number of panicles, perfect flowers %, average number of flowering shoots, average number of vegetative shoots and yield in the next off year season. Pruning severity were as follows: no pruning, heading back (Removing half of fruiting terminal flush) and removing the intact terminal flushes, GA<sub>3</sub> (0, 50 and 100 ppm) and GA<sub>3</sub> was applied 15-21 days after pruning and Ethrel was sprayed in the first week of November. Results of mango cv. Sedik indicated that heading back and removing the intact terminal flushes have the highest value of total number of panicles, perfect flowers %, the average number of flowering shoots and yield compared to control trees while there was no significant difference among all pruning severity and the number of vegetative shoots. Removing the intact terminal flushes with Ethrel application at 500 ppm resulted in the highest value of total number of panicles, flowering shoots and yield, while using 500 ppm alone recorded the highest average of perfect flowers % but removing the terminal flushes with 100 ppm of GA<sub>3</sub> attained the highest number of vegetative shoots. Results of mango cv. Ewais indicated that removing the intact terminal flushes with 1000 ppm of Ethrel has recorded the highest total number of panicles, flowering shoots and yield while the highest perfect flowers % was accomplished with Ethrel at 500 ppm with heading back. The highest vegetative shoots in heading back was obtained with 100 ppm of GA<sub>3</sub>.

**Key words:** *ethrel, flowering, , GA<sub>3</sub>, , Mangifera indica , mango, , pruning, yield.*

### 1. INTRODUCTION

Mango (*Mangifera indica* L.) production may be dramatically improved with improving cultural practices. Most of mango cultivars specially Ewais and Sedik suffer from low productivity due to some reasons such as alternate bearing. Alternate bearing is a serious problem affecting mango production (Shaban, 2004). Numerous investigations reported that pruning increase fruited panicles and yield (Schaffer and Gauye 1989). Ethrel considered to be an effective floral promoter of some mango cultivars (Chacko *et al.*, 1972; Rath and Das, 1979 and Galila and El Masry, 1991). Pruning of Dashehari mango trees during July, August and December doubled the number of panicles and the fruited panicles appeared in almost equal proportion in both years except in Un-pruned trees (Mohan *et al.*, 2001 and Sharma *et al.*, 2001). Post harvest pruning had a significantly larger number of panicles and increased the yield and the number of fruits (Yeshitela *et al.*,2003). Pruning intensity promote the number of panicles and yield (Sharma and Singh 2006). Pruned trees which received

different doses of paclobutazol recorded the highest percentage of perfect flowers and yield over untreated pruned trees (Shu and Sheen, 1987 and Burondkar *et al.*, 1997). Both of GA<sub>3</sub> and Ethrel increased the percentage of perfect flowers and increased the yield (Abou-Rawash *et al.*, 1998). October pruning resulted in maximum flowering shoots (Shinde *et al.*, 2003). Ethrel increased flowering shoots (%) over the untreated trees also Ethrel application increased yield compared to untreated trees. (Shaban, 2004).

This investigation aimed at testing pruning severity, GA<sub>3</sub> and Ethrel application after harvest on the trees of mango cultivars Ewais and Sedik on On year to lessen the alternate bearing in the off year.

### 2. MATERIALS AND METHODES

This experiment was carried out to assess the effect of pruning severity of the flushes that were bearing fruits in the current year, GA<sub>3</sub> and Ethrel treatments on lessening alternate bearing in mango cultivars Sedik and Ewais. Pruning treatments were applied after fruit harvesting in

August in the two successive seasons 2005/2006 and 2006/2007 in private orchard located at Cairo-Alex desert road. GA<sub>3</sub> was sprayed at the 3<sup>rd</sup> week after pruning, while Ethrel was applied at the first half of November. Chosen trees were 216 trees in each season for both cultivars of nine year old On year. Each treatment (6 trees) was replicated, twice 3 trees for taking samples for physical and chemical analysis and the other three for measurements in the orchard. The present experiment comprised the following treatments.

- 1- No pruning + Zero ppm GA<sub>3</sub>
- 2- No pruning + 50 ppm GA<sub>3</sub>
- 3- No pruning + 100 ppm GA<sub>3</sub>
- 4- No pruning + Zero ppm Ethrel
- 5- No pruning + 500 ppm Ethrel
- 6- No pruning + 1000 ppm Ethrel
- 7- Heading back + Zero ppm GA<sub>3</sub>
- 8- Heading back + 50 ppm GA<sub>3</sub>
- 9- Heading back + 100 ppm GA<sub>3</sub>
- 10- Heading back + Zero ppm Ethrel
- 11- Heading back + 500 ppm Ethrel
- 12- Heading back + 1000 ppm Ethrel
- 13- Removing the intact flushes + Zero ppm GA<sub>3</sub>
- 14- Removing the intact flushes + 50 ppm GA<sub>3</sub>
- 15- Removing the intact flushes + 100 ppm GA<sub>3</sub>
- 16- Removing the intact flushes + Zero ppm Ethrel
- 17- Removing the intact flushes + 500 ppm Ethrel
- 18- Removing the intact flushes + 1000ppm Ethrel

These treatments were applied to the trees in the On year, which received the same nutrition then the experiment was completely repeated in the other season on other trees also on the On year trees. The flowering measurements were taken on the trees in the off year in both seasons.

#### **2.1. Average number of flowering shoots**

Average number of flowering shoots among the emerged shoots were counted in April in both seasons per pruned shoots.

#### **2.2. Average number of vegetative shoots**

Average number of vegetative shoots among the emerged shoots were counted in April in both seasons per each pruned shoots.

#### **2.3. Total number of panicles:**

Total number of panicles in the spring following were counted per tree by the end of flowering (in the second week of April) in both seasons.

#### **2.4. Perfect flowers %**

The percentage of perfect flowers per panicles were calculated as follows:  
% perfect flowers

$$= \frac{\text{No. of perfect flowers}}{\text{Total No. of flowers}} \times 100$$

#### **2.5. Yield (Kg/Tree)**

Yield per tree in Kg was estimated by multiplying the number of fruits per tree X average fruit weight at harvest.

#### **2.6. Analysis of variance:**

Data were subjected to a normal analysis of variance of the randomized complete block design (RCBC) according to Sendecor and Cochran (1967) for each season and over seasons if the homogeneity test was not significant for all studied traits. The least significant difference (LSD) 0.05 was used to detect significance between treatments.

### **3. RESULTS**

It seems from the data in Table (1) that the application of Ethrel by 500 ppm to Sedik trees in On year after harvest without pruning increased significantly the total number of panicles compared to those the non pruned or GA<sub>3</sub> and Ethrel treated. Also, this treatment increased significantly the perfect flowers% but it was of no significance on both flowering shoots or average number of vegetative shoots. Ethrel at 1000 ppm increased significantly the total number of panicles and perfect flowers % while this treatment increased, but it was not significantly flowering shoots and vegetative shoots. Application of GA<sub>3</sub> at 50 ppm without pruning increased the total number of panicles, flowering shoots and vegetative shoots. Also this treatment increased significantly the perfect flowers %. GA<sub>3</sub> at 100 ppm resulted in the same former results. Heading back after harvest increased significantly the total number of panicles and perfect flowers % while both of flowering shoots and vegetative shoots have increased but not significantly. Heading back with the application of Ethrel at 500 ppm increased significantly compared to control trees regarding total number of panicles, perfect flowers % and flowering shoots, this treatment did not prove any effect on number of vegetative shoots. Ethrel at 1000 ppm with the same pruning severity resulted in the same former results. Using GA<sub>3</sub> at 50 ppm with heading back has a noticeable increase in the total number of panicles but it was not significant while this treatment has a significantly increase in perfect flowers % while this treatment has resulted in less flowering shoots compared to the control with non significance difference. Data also revealed that vegetative shoots were less with this treatment than in the control. GA<sub>3</sub> at 100 ppm with the same pruning severity increased, with no significant for total number of panicles, flowering shoots and vegetative shoots. Also this treatment increased perfect flowers %. Remove the whole terminal

shoots after fruit harvest increased the total number of panicles, perfect flowers % and flowering shoots significantly compared to the control. The same result was recorded in the number of vegetative shoots. Application of Ethrel at 500 ppm with the former pruning severity has increased the total number of panicles, perfect flowers % and the flowering shoots significantly compared to the control. This treatment significantly decreased vegetative shoots compared to control trees. Ethrel at 1000 ppm with the same pruning severity significantly increased the total number of panicles, perfect flowers % and flowering shoots compared to the control. GA<sub>3</sub> at 50 ppm significantly increased total number of panicles, perfect flowers % and flowering shoots compared to control trees but it did not increase vegetative shoots. GA<sub>3</sub> at 100 ppm with the same pruning severity significantly increased by all the flowering attributes.

Data in Table (2) reveal that the application of Ethrel at 500 ppm has a significant increase in all flowering attributes of mango cv. Sedik compared to the control trees. Ethrel at 1000 ppm without pruning achieved the same former results compared to control. Application of GA<sub>3</sub> without pruning at 50 ppm has a significant increase in both of total number of panicles and perfect flowers % while it increased but not significantly both of flowering shoots and vegetative shoots. Heading back increased both of the total number of panicles and perfect flowers % while decreased significantly both of flowering shoots and vegetative shoots compared to control trees. Using the same pruning severity with Ethrel at 500 ppm significantly increased total number of panicles, perfect flowers % and flowering shoots compared to control trees while it had no affect on vegetative shoots. Ethrel at 1000 ppm accomplish the same former results. Application of GA<sub>3</sub> at 50 ppm with the same pruning severity increased total number of panicles, perfect flowers % and flowering shoots compared to control trees significantly, while this treatment significantly decreased number of vegetative shoots. GA<sub>3</sub> at 100 ppm increased all studied flowering attributes compared to control trees. Remove all terminal shoot. only significantly increased total number of panicles, perfect flowers % and flowering shoots. Application of Ethrel at 500 ppm with the former pruning severity significantly increased total number of panicles, perfect flowers % and flowering shoots but it decreased vegetative shoots. Ethrel at 1000 ppm resulted the same former results compare to control trees. Application of GA<sub>3</sub> at 50 ppm with the same pruning severity has increased significantly all

flowering attributes. GA<sub>3</sub> at 100 ppm gave the same former results.

Data in Table (3) prove that the application of Ethrel to mango cv. Ewais only without pruning at 500 ppm increased significantly the total number of panicles, perfect flowers and flowering shoots compared to control trees while it decreased vegetative shoots. Ethrel at 1000 ppm gave the same results. Application of GA<sub>3</sub> only at 50 ppm significantly increased both of the total number of panicles and perfect flowers % but it did not increase the flowering shoots and decreased vegetative shoots. GA<sub>3</sub> at 100 ppm with the same pruning severity has significantly increased total number of panicles and both of perfect flowers % and flowering shoots but it significantly decreased vegetative shoots significantly. Heading back has increased total number of panicles significantly. Perfect flowers % increased significantly and also flowering shoots, contrarily vegetative shoots decreased. Ethrel at 500 ppm significantly increased total number of panicles, perfect flowers % and flowering shoots. Decreasing vegetative shoots significantly. Ethrel at 1000 ppm with the same pruning severity significantly increased both of total number of panicles and perfect flowers % while the increase in flowering shoots was insignificant but there is a significantly decreased with respect vegetative shoots. Application of GA<sub>3</sub> at 50 ppm with the former pruning severity accomplished significant increase total number of panicles, perfect flowers % and flowering shoots compared to control trees. An insignificant decrease of vegetative shoots compared to the control trees was noted. GA<sub>3</sub> at 100 ppm resulted in Zero value of total number of panicles, perfect flowers % and flowering shoots while the highest vegetative shoots was recorded. Remove all the terminal shoot has achieved a significant increase of total number of panicles, perfect flowers % and flowering shoots while a significant decrease compare to control trees was recorded. Application of Ethrel at 500 ppm with the former pruning severity increased significantly the total number of panicles, perfect flowers % and flowering shoots while this treatment a significant decrease of vegetative shoots. Ethrel at 1000 ppm with the same pruning severity had the same results. Application of GA<sub>3</sub> at 50 ppm with the same pruning severity accomplished a significant increase of the total number of panicles, perfect flowers % and flowering shoots, while it recorded the same result compared with the control. GA<sub>3</sub> at 100 ppm significantly increased both of the total number of panicles and perfect flowers % but the increase in flowering shoots was not significant,

**Table (1): Effect of post harvest pruning, GA<sub>3</sub> and Ethrel concentrations on some flowering attributes in off year of mango cv. Sedik Season 2005/2006**

Treatments		Total No. of panicles per tree	Perfect flowers % per panicle	Av. No. of flowering shoots per pruned shoot	Av. No. of vegetative shoots per pruned shoot	
0 S	Ethrel	0	43.0f	22.90h	0.23fg	0.47bcd
		500	203.7c	36.63abc	0.73d-g	0.17de
		1000	158.3cd	35.07bcd	0.50efg	0.10de
	GA <sub>3</sub>	0	43.0f	23.20h	0.23fg	0.47bcd
		50	95.33ef	26.77g	0.43efg	0.37cde
		100	97.67ef	22.60h	0.63d-g	0.47bcd
½ S	Ethrel	0	126.3de	27.37g	0.73f-g	0.70bc
		500	287.7b	36.53abc	1.50bc	0e
		1000	276.7b	37.07ab	0.93b-e	0e
	GA <sub>3</sub>	0	126.3de	27.67fg	0.73d-g	0.07e
		50	74.33ef	33.60cde	0.13g	0.06e
		100	98.67ef	33.0de	0.83c-f	0.58bc
1 S	Ethrel	0	120.3de	28.23fg	1.27bcd	0.47bcd
		500	421.3a	37.30ab	3.10a	0e
		1000	269.0b	39.83a	2.53a	0.17de
	GA <sub>3</sub>	0	120.3de	28.03fg	1.27bcd	0.47bcd
		50	173.7cd	30.83ef	2.50a	0.80b
		100	119.3de	30.87ef	1.53b	1.77a
<b>LSD</b>		58.16	3.429	0.6821	0.3927	

LSD at 0.05

0S = No pruning

½ S= Removing half of the terminal shoots

1 S= Removing the intact terminal shoots

**Table (2): Effect of post harvest pruning, GA<sub>3</sub> and Ethrel concentrations on some flowering attributes in off year of mango cv. Sedik Season 2006/2007**

Treatments		Total No. of panicles per tree	Perfect flowers % per panicle	Av. No. of flowering shoots per pruned shoot	Av. No. of vegetative shoots per pruned shoot	
0 S	Ethrel	0	47.67i	22.50f	0.07i	0.30def
		500	227.7d	35.87a	0.73efg	0.10gh
		1000	151.7e	36.00a	0.80ef	0.13fgh
	GA <sub>3</sub>	0	47.67i	21.80f	0.07i	0.30def
		50	101.3fgh	26.40de	0.27hi	0.37de
		100	72.33ghi	23.50ef	0.20i	0.27d-g
½ S	Ethrel	0	106.0fg	26.87de	0.40ghi	0.20efg
		500	302.0bc	36.73a	1.47bc	0h
		1000	280.7c	36.63a	1.20cd	0h
	GA <sub>3</sub>	0	106.0fg	28.00cd	0.40ghi	0.20efg
		50	65.67fgh	27.83cd	0.60fgh	0.20efg
		100	97.0fgh	32.13b	1.00de	0.57bc
1 S	Ethrel	0	110.3fg	28.13cd	1.10cde	0.40cd
		500	40.7a	36.67a	2.43a	0.13fgh
		1000	321.3b	36.13a	2.27a	0.20efg
	GA <sub>3</sub>	0	110.3fg	27.97cd	1.10cde	0.40cd
		50	157.3e	31.0bc	2.47a	0.73b
		100	116.0ef	30.70bc	1.60b	1.07a
<b>LSD</b>		39.38	3.511	0.3856	0.1740	

LSD at 0.05

0S = No pruning

½ S = Removing half of the terminal shoots

1 S = Removing the intact terminal shoots

Table (3): Effect of post harvest pruning, GA<sub>3</sub> and Ethrel concentrations on some flowering attributes in off year of mango cv. Ewais Season 2005/2006

Treatments		Total No. of panicles per tree	Perfect flowers % per panicle	Av. No. of flowering shoots per pruned shoot	Av. No. of vegetative shoots per pruned shoot	
0 S	Ethrel	0	12.34i	10.93j	0.10ef	1.03b
		500	135.0de	23.13bcd	0.83bcd	0.17ef
		1000	165.3cd	23.60b	0.73cd	0.40def
	GA <sub>3</sub>	0	12.34i	11.03j	0.10ef	1.03b
		50	79.33fg	13.73hi	0.43def	0.83bc
		100	112.0ef	12.77ij	0.60c-f	0.20ef
½ S	Ethrel	0	18.67hi	14.30ghi	0.10ef	0.27ef
		500	164.7cd	23.40bc	1.00bcd	0.47cde
		1000	216.3ab	25.97a	0.57c-f	0.14ef
	GA <sub>3</sub>	0	18.67hi	14.43f-i	0.10ef	0.27ef
		50	138.7de	21.30cde	0.80cd	0.70bcd
		100	0i	0k	0f	1.73a
1 S	Ethrel	0	62.33g	15.83fgh	0.97bcd	0.43cde
		500	173.7cd	24.17ab	1.07bc	0.07ef
		1000	234.0a	24.97ab	2.53a	0f
	GA <sub>3</sub>	0	62.33g	15.93fg	0.97bcd	0.43cde
		50	183.3bc	16.47f	1.43b	1.03b
		100	57.34gh	21.13de	0.67cde	1.63a
LSD		40.23	2.120	0.6051	0.4030	

LSD at 0.05

0S = No pruning

½ S = Removing half of the terminal shoots

1 S = Removing the intact terminal shoots

Table (4): Effect of post harvest pruning, GA<sub>3</sub> and Ethrel concentrations on some flowering attributes in off year of mango cv. Ewais Season 2006/2007

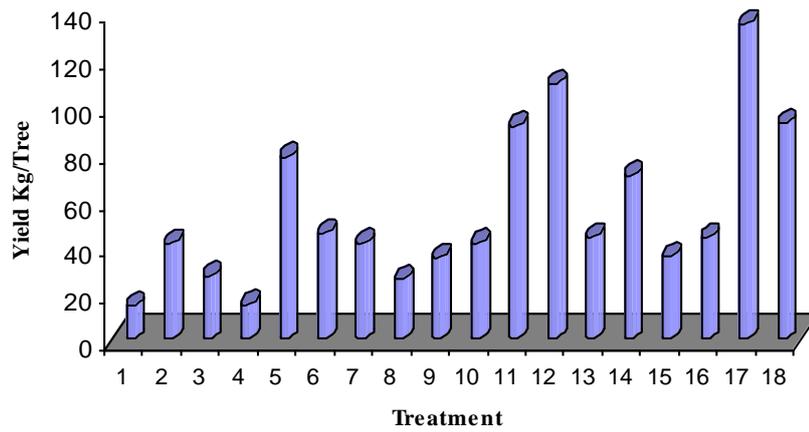
Treatments		Total No. of panicles per tree	Perfect flowers % per panicle	Av. No. of flowering shoots per pruned shoot	Av. No. of vegetative shoots per pruned shoot	
0 S	Ethrel	0	40.0g	11.17ij	0.27h	0.37efg
		500	154.0de	23.07cd	1.10d	0.07ij
		1000	152.7de	23.80abc	1.40c	0.27f-i
	GA <sub>3</sub>	0	40.0g	10.30j	0.27h	0.37efg
		50	84.33fg	13.70gh	0.60efg	0.50cde
		100	60.33g	13.07hi	0.33gh	0.17g-j
½ S	Ethrel	0	34.67g	13.80gh	0.27h	0.14hij
		500	169.3cd	23.60bc	0.83def	0.30e-h
		1000	216.3abc	25.87a	0.87de	0.20g-j
	GA <sub>3</sub>	0	34.67g	14.37fgh	0.27h	0.14hij
		50	148.0de	21.23de	0.93d	0.60cd
		100	72.0fg	20.63e	0.57fg	1.33a
1 S	Ethrel	0	111.3ef	15.50fg	1.03d	0.43def
		500	220.3ab	24.30abc	1.73b	0.07ij
		1000	264.0a	25.50ab	2.30a	0.04j
	GA <sub>3</sub>	0	111.3ef	16.07f	1.77b	0.70bc
		50	165.3d	16.07f	1.77b	0.70bc
		100	173.3bcd	20.80e	1.67bc	0.83b
LSD		50.41	2.193	0.2777	0.2163	

LSD at 0.05

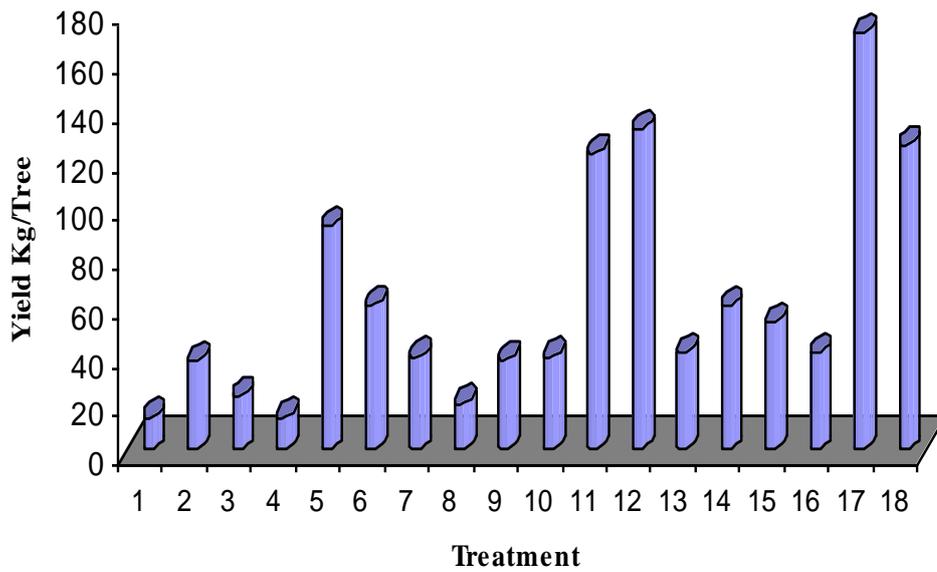
0S = No pruning

½ S = Removing half of the terminal shoots

1 S = Removing the intact terminal shoots



**Fig. (1):** Effect of post harvest pruning, GA<sub>3</sub> and Ethrel concentrations on the yield in off year of mango cv. Sedik Season 2005/2006.



**Fig. (2):** Effect of post harvest pruning, GA<sub>3</sub> and Ethrel concentrations on the yield in off year of mango cv. Sedik Season 2006/2007.

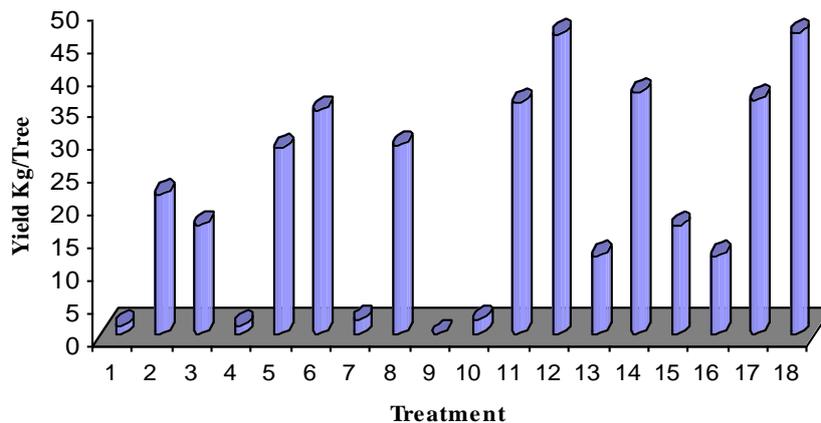


Fig. (3): Effect of post harvest pruning, GA<sub>3</sub> and Ethrel concentrations on the yield in off year of mango cv. Ewais Season 2005/2006.

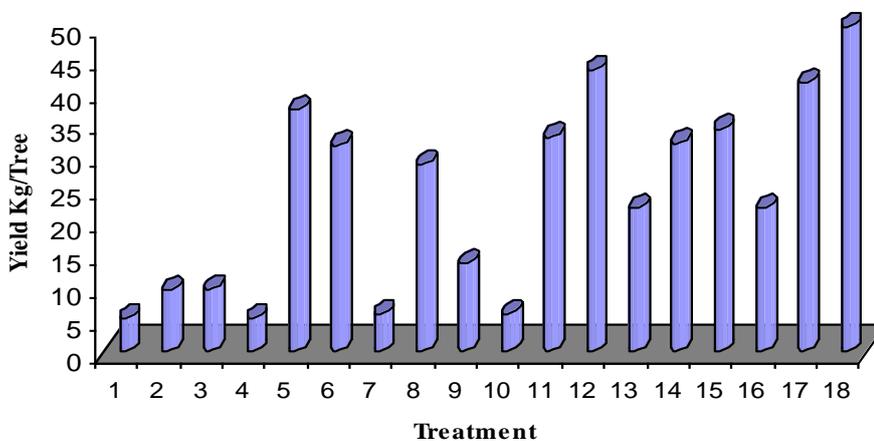


Fig. (4): Effect of post harvest pruning, GA<sub>3</sub> and Ethrel concentrations on the yield in off year of mango cv. Ewais Season 2006/2007.

although a significant increase in vegetative shoots was recorded.

As shown in Table (4) in the season 2006/2007 for mango cv. Ewais. Ethrel at 500 ppm without pruning revealed a significant increase in the total number of panicles, perfect flowers % and the while there was a significant decrease in the vegetative shoots compared to the control. Ethrel to 1000 ppm had the same former results.

#### 4. DISCUSSION

These results confirm the findings of Galila and El Masry (1991) on mango cv. Ewais and Shaban (2004) on mango cv. Zebd except for the vegetative shoots which recorded a non significant decrease. Application of GA<sub>3</sub> only increased significantly both of the total number of panicles and vegetative shoots, while there were significant increases in both of perfect flowers % and flowering shoots. GA<sub>3</sub> at 100 ppm increased insignificantly both of the total number of panicles and flowering shoots and a significant increase in perfect flowers %, an insignificant decrease in vegetative growth. These results confirm the findings of (Abou-Rawash *et al.*, 1998). Removing half of the terminal shoots after fruit harvest has insignificant decrease in the total number of panicles compared to the control, but it increased perfect flowers % significantly, the same results were with the flowering shoots. These results are in line with Sharma and Singh (2006) who reported a significant decrease in the vegetative shoots. Ethrel at 500 ppm with the former pruning severity resulted in a significant increase in total number of panicles, perfect flowers % and flowering shoots. Although an insignificant decrease in the vegetative shoots was noticed using Ethrel at 1000 ppm with the same pruning severity has the same former results. Application of GA<sub>3</sub> at 50 ppm with the same pruning severity increased significantly all the studied results compared to control trees. GA<sub>3</sub> at 100 ppm with the same pruning severity an insignificant increase the total number of panicles and the other attributes. Remove all terminal shoot after harvest only has increased total number of panicles, perfect flowers % and flowering shoots significantly. These results agree with the findings by Yeshitela *et al.* (2003). But the increase in the vegetative shoots was insignificant. Application of Ethrel at 500 ppm with the former pruning severity increased the total number of panicles, perfect flowers % and the flowering shoots significantly compared to the control it decreased the vegetative shoots. The higher concentration

1000 ppm with the same pruning severity recorded the same results. Application of GA<sub>3</sub> at 50 ppm with the same pruning severity increased all the flowering tested attributes significantly. GA<sub>3</sub> with the higher concentration with the same pruning severity resulted in the same former results.

As shown in Figure (1) about mango cv. Sedik season 2005/2006 all treatments had significant increase compared to the control trees except both of GA<sub>3</sub> at 100 ppm alone and heading back with GA<sub>3</sub> at 50 ppm had insignificant increase.

It is clear from Figure (2) about mango cv. Sedik season 2006/2007 that the same trend of yield was repeated in the second season.

It is proved from Figure (3) about mango cv. Ewais season 2005/2006 that all treatments had significant increase in yield compared to the control trees expect heading back only and heading back with GA<sub>3</sub> at 100 ppm had no significant difference with control trees.

As shown in Figure (4) about mango cv. Ewais season 2006/2007 that the same trend of yield was found in the second season.

#### Conclusion

It is concluded that the promising treatments to overcome alternate bearing in mango cv. Sedik trees is removing the intact terminal flushes after fruit harvest with Ethrel at 500ppm to increase the total the number of panicles, perfect flowers %, number of flowering shoots and yield, while the former pruning with 1000 ppm of Ethrel on mango cv. Ewais trees increases the total number panicles, perfect flowers % flowering shoots and yield in off year to overcome alternate bearing.

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### تأثير التقليم بعد الحصاد والرش بالجبرلين والاثريل على بعض الصفات الزهرية والمحصول لبعض أصناف المانجو

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#### ملخص

أجرى هذا البحث خلال موسمي (2005-2006) و (2006-2007) لدراسة تأثير ثلاث درجات من شدة التقليم بعد الحصاد في سنة الحمل الغزير وهي ترك الأفرع دون تقليم- إزالة نصف البرج الطرفي- إزالة الأفرع الطرفية كاملة وذلك للأفرع التي كانت تحمل الثمار والرش بالجبرلين بتركيزات صفر -50-100 جزء من المليون أو الرش بالاثريل بتركيزات صفر -500-1000 جزء في المليون ومتابعة كل من الصفات التالية في سنة الحمل الخفيف وهي العدد الكلي للنورات- عدد الأفرع الزهرية- النسبة المئوية للأزهار الكاملة - عدد الأفرع الخضرية والمحصول.

أوضحت النتائج أن التقليم بإزالة الفرع الطرفي كاملاً بعد الحصاد مع الرش بالاثريل بتركيز 500 جزء في المليون في سنة الحمل الغزير لصنف الصديق زاد من عدد النورات الكلية في سنة الحمل الخفيف بالمقارنة بأشجار غير معاملة في نفس الظروف و كذلك فإن نفس المعاملة قد زادت وبشكل ملحوظ من عدد الأفرع الزهرية في سنة الحمل الخفيف بدرجة كبيرة عن تلك الأشجار غير المعاملة وكذلك المحصول في حين أن نفس معاملة التقليم مع الرش بـ 1000 جزء في المليون من الاثريل زاد وبشكل كبير من نسبة الأزهار الكاملة. تأكدت هذه النتائج في السنة الثانية وبالنسبة لصنف العويس فكان أكبر عدد من النورات الكلية وأكبر عدد من الأفرع المزهرة قد سجل مع التقليم بإزالة البرج الطرفي كاملاً مع الرش بالاثريل بتركيز 1000 جزء في المليون وكذلك المحصول في حين أن أحسن نسبة للأزهار الكاملة قد سجل مع التقليم بإزالة نصف البرج الطرفي والرش بالاثريل 1000 جزء في المليون وأكدت تلك النتائج في السنة الثانية من التجربة وتجدر الإشارة إلى أن المعاملات سابقة الذكر يمكن استخدامها وبشكل فعال في تحسين كفاءة التزهير والمحصول في سنة الحمل الخفيف.

المجلة العلمية لكلية الزراعة - جامعة القاهرة - المجلد (60) العدد الثالث (يوليو 2009): 306-314.