

Studies on the Soft Scale Insect *Kilifia acuminata* (Signoret) (Hemiptera: Coccidae) is a Main Insect Pest Attacking Mango Trees.

Awadalla, S. S.¹; E. S. El-Zahi² and M. A. Abdel-Fattah²

¹ Economic Entomology Department, Faculty Agriculture, Mansoura University.

² Plant Protection Research Institute, Agriculture Research Center.



ABSTRACT

The soft scale insect *kilifia acuminata* (Signoret) (Hemiptera: Coccidae) is one of the main insect pests infesting mango trees and caused the damage for leaves and fruits. The population density of the soft scale insect *k. acuminata* during the first year of study 2014/15 recorded 6 peaks and the highest peak was 1539 indiv. on 27th of March, 2015. While recorded 5 peaks during the second year 2015/16 and the highest peak was on 17th of June 2016 and represented by 1178 indiv. The highest average number and percentage in the first year was recorded during autumn season and represented by 1023.1 indiv. /100 leave (30.2%), while the highest average number and percentage was recorded during spring and represented by 994.8 indiv./100 leaves (29%) in the second year. The highest average number of the soft scale insect *K. acuminata* were recorded in the south direction during the two successive years 2014/15 and 2015/16 and represented by 225.9±19.6 and 241.4±18.3 indiv. /100 leaves, respectively. On the other hand, the lowest average number were recorded in the North direction and represented by 105.4±16.1 and 74.8±6.2 indiv. /100 leaves, respectively. Statistical analysis showed that, a highly significant differences between the different directions, during the two successive year of study.

INTRODUCTION

Mango (*Mangifera indica* L.) is an important fruit crop of the tropical and subtropical regions. Also, it is one of the most common and popular fruit and considered the king of fruits having delicious taste, captivating flavor with multifarious color, and excellent source of nutritive values (Abd-Rabou *et al.* 2012). In Egypt, Mango occupied about 110336 Feddans with total production of about 596758 tons according to the last statistics of the Ministry of Agriculture (2010).

The soft scale insect *kilifia acuminata* (Signoret) (Hemiptera: Coccidae) is one the common insect pests attacking different fruit trees and ornamental plants and the damage of this insects caused mainly to the leaves of the host plants (Elwan 1990, Hassan 1993, Atalla *et al.* 2007 and Attia and Radwan 2013).

A few studies carried out in Egypt on the effect of different direction on the population density of these insect pest as well as different season during the year (Elwan, 1990; Kwaiz, 1999; Elwan, 2007 and Abdel-Rahman *et al.* 2012).

Therefore, the present experiments aimed to study the population density during the two successive years, effect of different season and different direction on the average number of these insect pest on mango trees to serve as a basis for the use of this informations in integrated pest management programs.

MATERIALS AND METHODS

The present studies were carried out in mango orchard in Desouk district, Kafr EL-Sheikh Governorate Egypt to evaluate the population density of the soft scale insects infesting mango trees *Mangifera indica* L. during the two successive years 2014/15 and 2015/16.

Four mango trees of the same size, age, shape and vegetative growths were selected a replication. Leaf samples were taken biweekly during the two successive years from July 2014 till June 2015 in the first year and from July 2015 till June 2016 in the second year. Each sample consisted of 100 leaves were randomly collected from the four mango trees (25 leaves from each tree

when 5 leaves were collected from the four direction plus five from the middle of the tree). The collected leaves were transferred to the laboratory for identification and counting the soft scale insect to evaluate the population density on mango trees as well as evaluate the effect of different season and directions on the average number of these insect pests.

RESULTS AND DISCUSSION

1. Population density:

The population density of the soft scale insect *k. acuminata* during the first year of study recorded six peaks on mango trees during the first year 2014/15 at Desouk district. The highest peak recorded on 27th of March 2015 and represented by 1539 indiv, while the lowest one recorded on 5th June 2015 and represented by 627 indiv (Fig. 1). In the second year (2015/16), it recorded five peaks at Desouk district. The highest peak recorded on 17th of June 2016 and represented by 1178 indiv. The lowest one recorded on 22th April 2016 and represented by 922 indiv.

The obtained results are in consistent with those of Salem (1994), Atalla *et al.* (2007) and Attia and Ramadan (2013). They mentioned that, the insect pest had different peaks of abundance on mango trees. The highest peaks were recorded in April and November.

2. Effect of different seasons:

The seasonality average numbers and percentages of the coccid scale *K. acuminata* on mango trees during the two successive years 2014/15 and 2015/16 at Desouk district Kafr El-Sheikh Governorate are presented in Table (1). The highest average number and percentage in the first year was recorded during autumn season and represented by 1023.1 indiv. /100 leave (30.2%) and the lowest one was estimated during summer season and represented by 619.8 indiv. /100 leave (18.3%) Table (1). Meanwhile in the second year 2015/16 that the highest average number and percentage was recorded during spring and represented by 994.8 indiv./100 leaves (29%) while the lowest one was recorded during summer season and represented by 771.5 indiv. /100 leave (22.6%) Table (1).

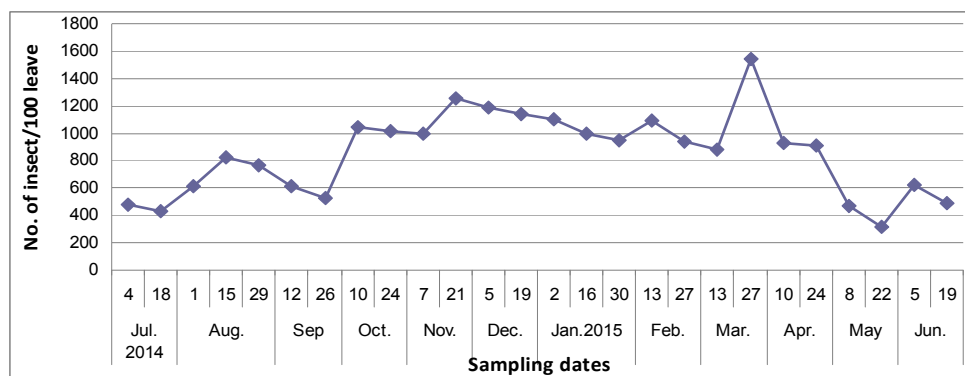


Fig. 1. Population density of *k. acuminata* during the first year 2014/15 at Desouk district, Kafr El-Sheikh Governorate.

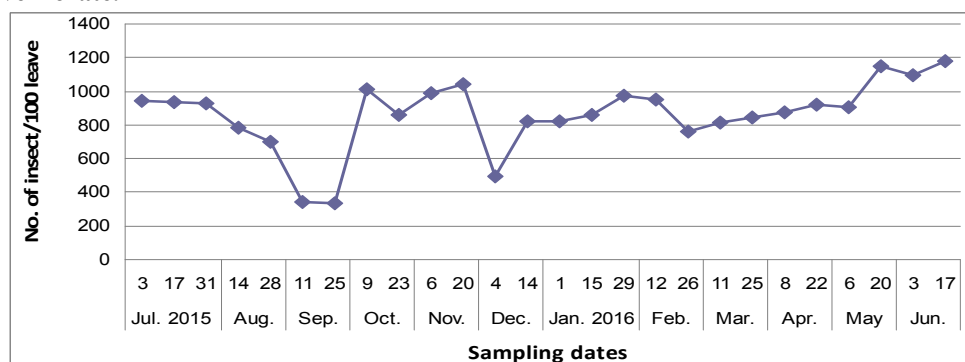


Fig. 2. Population density of *k. acuminata* during the Second year 2015/16 at Desouk district, Kafr El-Sheikh Governorate.

Table 1. Seasonality average numbers and percentage of the soft scale insect *K. acuminata* on mango trees during the two successive years 2014/15 and 2015/16 at Desouk district Kafr El-Sheikh Governorate.

Seasons	Frist year		Second year			
	NO.	%	NO.	%		
Summer	619.8	d	18.3	771.5	c	22.6
Autumn	1023.1	a	30.2	792.8	c	23.1
Winter	990.5	b	29.2	865.3	b	25.3
Spring	753.8	c	22.3	994.8	a	29
Total	3387.2		100	3424.4		100

Averages followed by the same letter in a column are not significantly different at 0.05 level of probability (Duncan's Multiple Range Test).

The obtained results are in consistent with those of Kwaiz (1999), who found that, the highest densities of the insect pest were in late autumn and early summer and Elwan (2007) who found that, the highest generation of the insect on mango trees recorded in autumn.

3. Effect of different directions

The monthly average numbers of the coccid insect, *K. acuminata* according on the different directions of mango trees during the first year 2014/15 and 2015/16 at Desouk district Kafr El-Sheikh Governorate are presented in Tables (2 and 3). The highest average number for the different directions were recorded in November 2014 for north and middle directions, March 2015 for east, December 2014 for west and March 2015 for south direction . on the other hand, the lowest average number for the different direction were recorded in May 2015 for north, east, middle and west directions, while for south direction was recorded in July 2014 (Table 2).

Table 2. Monthly average numbers of the soft scale insect *K. acuminata* according to the different directions of mango trees during the first year 2014/15 at Desouk district Kafr El-Sheikh Governorate.

Months	Different directions				
	North	East	Middle	West	South
July2014	48	108.5	70	93.5	134
August	55.6	196	103.3	176	200.3
September	45	145	91	136.5	156.5
October	140	230	203	215	238.5
November	168	253.5	215.5	227.5	262
December	160	280.5	183.5	252	286.5
January2015	138.6	241.3	152	217	266.3
February	159	320.5	175.5	200	241.5
March	166.5	345.5	189.5	151.5	358.5
April	109	202.5	159	174	264.5
May	26	101.5	43.5	69	150.5
June	50	147	100	110.6	152
Mean±SE	105.4± 16.1 c	214.3± 22.8 a	140.4± 16.3 b	168.5± 16.1 b	225.9± 19.6 a

Mean followed by the same letters are not significantly different at 0.05 level of probability (Duncan's Multiple Range Test).

During the second year (Table 3), the highest average numbers for the different directions were recorded in November 2015 for north and south directions, and June 2016 for east, middle, and west directions. On the other hand, the lowest average number for the different direction were recorded in September 2015 for all directions. Regarding to different directions, it can be observed that the highest average numbers were recorded in the south direction and represented by 241.4+18.3 indiv. /100 leaves followed by the East direction and represented by 202.2+14.4 indiv. /100 leaves, and the lowest average

number was recorded in the North direction and represented by 74.8±6.2 indiv. /100 leaves. Statistical analysis revealed that, in the different directions during the second year 2015/16.

Table 3. Monthly average numbers of the soft scale insect *K. acuminata* according to the different directions of mango trees during the first year 2015/16 at Desouk district Kafr El-Sheikh Governorate.

Months	Differnt direction				
	North	East	Middle	West	South
July2015	92	230	169	203.6	240.6
August	50.5	204	93.5	182	210.5
September	34	77	59.5	71	97.5
October	93	226	161.5	191	238
November	103	220	156.5	189	345
December	70	155.5	128.5	139	166
January2016	95.6	216.3	130	162	261.3
February	77	177.5	153	168.5	282
March	67	186.5	158.5	184.5	233.5
April	48.5	225	163	204	257.5
May	81.5	232.5	218.5	222.5	269
June	86.5	277	223	255.5	296
Mean±SE	74.8± 6.2e	202.2± 14.4b	151.2± 13.2 d	181.0± 6.2 c	241.4± 18.3 a

Mean followed by the same letters are not significantly different at 0.05 level of probability (Duncan's Multiple Range Test).

As a conclusion, data represented in Tables (2 and 3) revealed that the highest average number the soft scale insect *K. acuminata* were recorded in the south direction during the two successive years 2014/15 and 2015/16 and represented by 225.9±19.6 indiv. /100 leaves and 241.4±18.3 indiv. /100 leaves, respectively. On the other hand, the lowest average number the soft scale insect *K. acuminata* were recorded in the North direction and represented by 105.4±16.1 indiv. /100 leaves and 74.8±6.2 scales /100 leaves, respectively. There were highly significant differences between the different directions in the number of scales during the two successive year of study.

The obtained results agreement with those of (Elwan, 1990) who recorded that the lower and middle parts of the trees were preferable to the insect as compared to the upper parts.

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دراسات على حشرة المانجو القشرية الرخوة التي تهاجم أشجار المانجو كافة حشرية رئيسية . سمير صالح عوض الله¹، الزاهي صابر الزاهي² و محمد احمد عبدالفتاح² ¹ قسم الحشرات الاقتصادية كلية الزراعة - جامعة المنصورة. ² معهد بحوث وقاية النباتات-مركز البحوث الزراعية.

تعتبر حشرة المانجو القشرية الرخوة من أهم الآفات الحشرية التي تصيب أشجار المانجو وتحدث أضراراً للأوراق والثمار. حيث أظهرت النتائج أن كثافة التعداد للحشرة خلال العام الأول من الدراسة سجلت 6 ذرات من التعداد وكانت أعلى ذروه في 27 من مارس 2015 وكان تعدادها 1539 فرد. بينما سجلت 5 ذرات من التعداد في العام الثاني وكانت أعلى ذروه في 17 من يونيو 2016 وكان تعدادها 1178 فرد. أعلى متوسط تعداد ونسبة سجلت خلال فصل الخريف من الموسم الأول وكانت بمتوسط 1023.1 فرد/100 ورقة بنسبة 30.2%، بينما في العام الثاني سجلت أعلى متوسط تعداد ونسبة خلال موسم الربيع وكانت 994 فرد/100 ورقة بنسبة 29%، أعلى تعداد للحشرة سجل في اتجاه الجنوب خلال عامي الدراسة وكان بمتوسط 19.6±225.9 و 18.3±241.4 فرد/100 ورقة على التوالي، بينما أقل تعداد للحشرة سجل في اتجاه الشمال وكان 16.1±105.4 و 6.2±74.8 فرد/100 ورقة على التوالي. والتحليل الاحصائي أظهر اختلافات عالية المعنوية بين الاتجاهات المختلفة خلال عامي الدراسة.