

ESTIMATION OF THE FAVOURITE FLIGHT DIRECTION AND FLIGHT DISTANCE OF *TROPINOTA SQUALIDA* SCOP. (COLEOPTERA: SCARABAEIDAE)

EL-DEEB M.A.¹, M.M. ELZHAIRY¹, E.A.H. SHERIEF² AND W.M.H. DESUKY²

1. Faculty of Agriculture, Zagazig University, Egypt

2. Plant Protection Research Institute, Agricultural Research Centre, Dokki, Giza, Egypt

(Manuscript received May 2002)

Abstract

This experiment was carried out in navel orange orchard at El-Khattara region during two successive flowering seasons 1994 & 1995. Four releases of *Tropinota squalida* Scop. adults were carried out in each season, adults were collected, sexed and marked by fixed varnish colours, one colour for each releases (200 adults; 100 ♂ + 100 ♀). The releasing was applied at the flowering period which extended from March – May.

It was found that, the majority of beetles were more attracted in descending order to the western, southern, S/W and S/E. These results may help in selecting the suitable sites for monitoring or control of *T.squalida*. The female adults longer distances than males, 68.4% males, 56.4% females flew to 50m., while 29.3% male, 40.7% female flew a distance of 100m. A percentage of 2.3% males and 2.9% females recorded at distance of 170m. In general, 61.4% of the total released adults flew a distance of 50m., 36% flew to 100m. and 2.6% flew to a distance of 170m.

INTRODUCTION

In last years, *Tropinota suqalida* Scop. caused damage to various fruit trees and some field crops, in the newly reclaimed areas of the Arab Republic of Egypt.

In newly reclaimed areas *T.suqalida*. attack flowers of all plants which emerge during the period extended from mid January until mid of May causing considerable damage and great losses. Therefore, the aim of this work is to select the suitable sites to distribute funnel and pan blue traps by studying the distance of flight and favourite direction of *T. squalida*. adults in navel orchards.

Many authors studied the flight distance and flight direction of *T. squalida* such as, El-Deeb M.A. (1992), Isshak *et al.* (1994), El Bassiouny (1996).

MATERIALS AND METHODS

The experiments, were carried out at El-Khattara Farm of Faculty of Agriculture, Zagazig Univ., on navel orange orchard, during the flowering period, which extended from March until May, 1994 and 1995. Three-pan water blue and three traps funnel blue were distributed at the four cardinal direction (North, South, East, West) and there sub original directions (North/East (N/E), North/ West (N/W)). The distance apart in orchard was (5m) and one trap on the distance of five trees was sited (25m). The flight range was estimated from the releasing center South /East (S/E), South / West (S/W) as shown in Fig 1. The distances between traps were about 25 m. apart and alternatively distributed. Adults were collected, sexed and marked by using certain fixed varnish colour for each release (red, white, golden and green). Four adult releases were carried out. In each case 200 adults (100 ♂ +100 ♀) were released from the field center, at mid-noon. The number of attracted adults for both flowers and traps were calculated and sexed at different directions for 6 weeks after releasing.

RESULTS AND DISCUSSION

a. Flight direction: Results tabulated in Table 1 and illustrated in Fig., 2, showed that the majority of released marked 43 adults were captured in the west direction, represent 22.7% and 17.6 % (45 adults) of total released adults, and 21.7 % (41 adults), 17.9 % (46 adults) for southern direction during 1994 and 1995, respectively.

The mean values of the two seasons were 19.8 % (11 adults), 19.6 % (10.8 adults) for western, southern direction, respectively, while these values dropped to 9.5 % (18 adults), 10.9 % (28 adults) at eastern site of the field with mean of 10.3 % for the two seasons (5.75 adults).

The occurrence of insect population on trees located on the sub original directions were intermediate.

Generally, the majority of beetles were more attracted in descending order to the western & southern & (South/West) & (South/ East).

Similar results were reported by Bohm (1950) who found that the activity of *T.squalida*, increased in warm sunny days and beetles sheltered in the ground at night and also under cold or cloudy weather conditions, whereas Ali and Ibrahim (1988) and Mohamed (1992) stated that the duration of sunshine was the most influencing factor that affected the activity of *T. squalida* beetles.

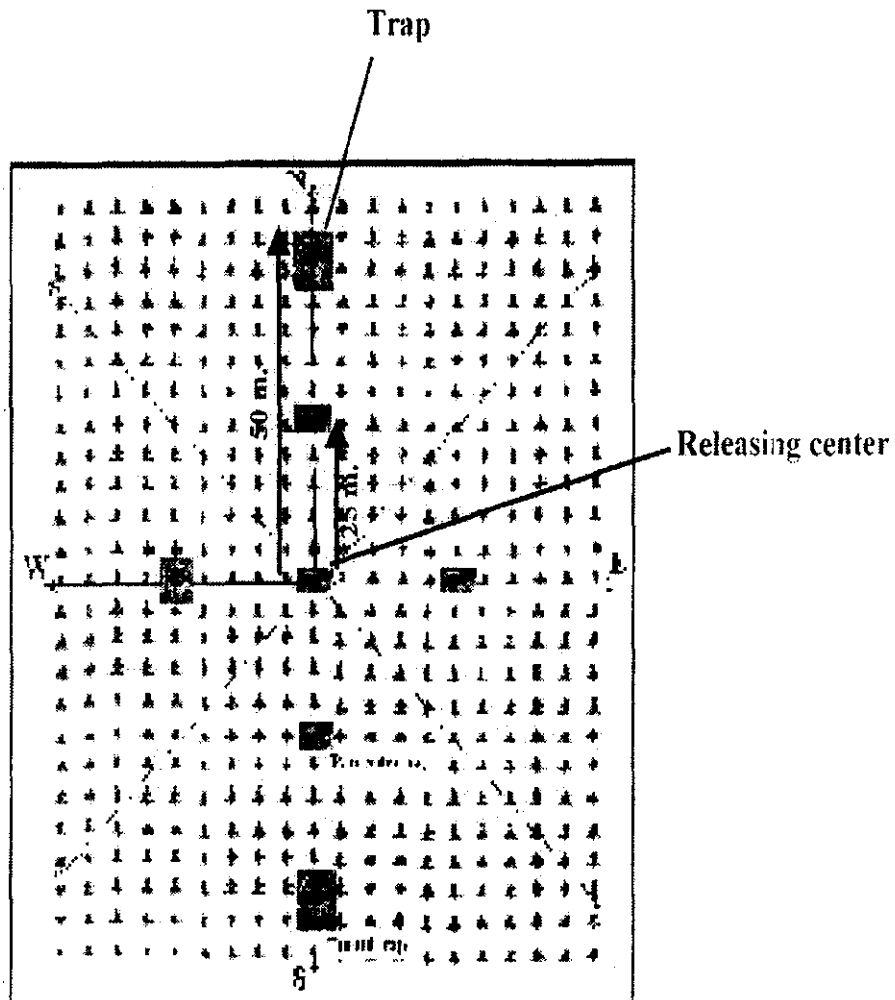


Fig. 1. Distribution of blue traps between trees of navel orange orchard at El-Khattara district (25m. distance between two adjacent traps & 5m of tree apart).

Table 1. Number of released adult beetles, of *T. squalida* and number of captured beetles from different flight directions during 1994 and 1995 seasons at El Khatara, Sharkia Governorate.

Release No.	Year	Date	Number of captured beetles								
			T. No. released insect	North (N)		South (S)		East (E)		West (W)	
				No.	%	No.	%	No.	%	No.	%
1	1994	25-3	200	7	20.51	9	26.47	3	8.82	4	11.67
	1995		200	13	18.1	13	18.1	9	12.5	7	9.7
2	1994	28-3	200	7	13.5	10	19.2	2	3.8	20	38.5
	1995		200	11	14.1	13	16.7	6	7.7	18	23.1
3	1994	29-3	200	3	6.5	11	23.9	5	10.9	13	28.3
	1995		200	5	8.1	13	20.9	7	11.3	15	24.2
4	1994	30-3	200	10	17.5	11	19.3	8	14.0	6	10.5
	1995		200	7	15.9	7	15.9	6	13.6	5	11.4
Total	1994		800	27	14.3	41	21.7	18	9.5	43	22.7
	1995		800	36	14.1	46	17.9	28	10.9	45	17.6
Mean	1994		200	6.75	14.3	10.25	21.7	4.5	9.5	10.75	22.7
	1995		200	9	14.1	11.5	17.9	7	10.9	11.25	17.6
General total	Two Years		1600	63	14.2	87	19.6	46	10.3	88	19.8
General mean \pm s.e	One Year		200	7.875 \pm 1.32	14.2	10.87 \pm 0.65	19.6	5.75 \pm 0.62	10.3	11 \pm 3.33	19.8

Release No.	Year	Number of captured beetles									
		N/E		N/W		S/E		S/W		Total No.	Mean No.
		No.	%	No.	%	No.	%	No.	%	No.	%
1	1994	3	8.82	2	5.88	2	5.88	4	11.67	34	4.25
	1995	8	11.1	7	9.7	7	9.7	8	11.1	72	9.0
2	1994	1	1.9	2	3.9	4	7.7	6	11.5	52	6.5
	1995	8	10.3	7	8.9	8	10.3	7	8.9	78	9.75
3	1994	2	4.3	3	6.5	3	6.5	6	13.1	46	5.75
	1995	4	6.4	5	8.1	5	8.1	8	12.9	62	7.75
4	1994	7	11.3	6	10.5	4	7	5	8.9	57	7.13
	1995	5	11.4	5	11.4	5	11.4	4	9.0	44	5.50
Total	1994	13	6.9	13	6.9	13	6.9	21	11.1	189	23.63
	1995	25	9.8	24	9.4	25	9.8	27	10.5	256	32
Mean	1994	3.25	6.9	3.25	6.9	3.25	6.9	5.25	11.1	47.25	5.91
	1995	6.25	9.8	6	9.4	6.25	9.8	6.75	10.5	64	8
General total	Two Years	38	8.5	37	8.3	38	8.5	48	10.8	445	55.63
General mean \pm s.e	One Year	4.75 \pm 0.66	8.5	4.63 \pm 0.31	8.3	4.75 \pm 0.43	8.5	6 \pm 0.54	10.8	55.63 \pm 3.21	6.95 \pm 0.40

F. between direction= 35.691** (L.S.D $_{0.01}$ = 1.79 L.S.D $_{0.05}$ = 1.32) F. between released= 6.425**

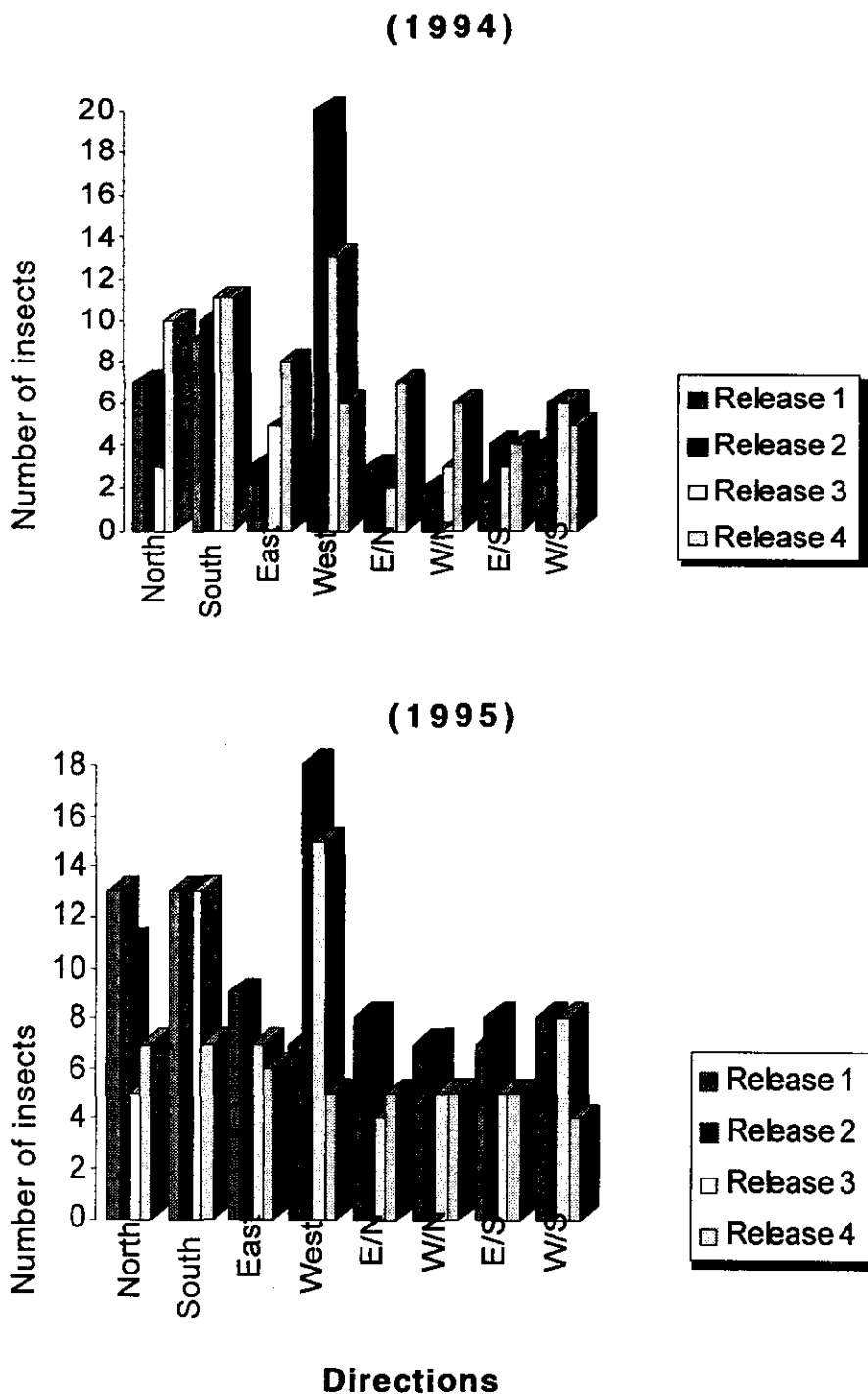


Fig 2. Flight directions of adult beetles, *Tropinota squalida* released four times in navel orange orchard during 1994 and 1995 seasons.

The obtained results help selecting the suitable sites for monitoring system or using trapping methods for control.

b. Flight distance: The data obtained in Table, 2 clear that the longer flight distance for female were 170 meter recorded on flowers of trees located at north-east in both seasons, while the flight distance of males were 100 m. at the same directions. It is clear that, females fly longer distance (170m) than males (100 m). That may be due to searching for suitable sites for mating and oviposition.

In other words, 68.4 % males, 56.4 % females flight to a distance of 50 m., while 29.3 % ♂ , 40.7 % ♀ were flight to a distance of 100 m. Low percentages of 2.3 % ♂, 2.9 % ♀ were recorded for distance 170m.

Generally, the flight distance of total adults released were 61.4 % for 50 m. & 36 % for 100 m. and 2.6 % only for 170 m.

Since literature concerning web beetles are scarce, infestation references of other species are included, where no literature was found about the flight distance range of *T. squalida*, but many authors pointed to the flight distance range of other insect such as Kalshoven (1952), Goonewardena and Velv (1958), Hanna *et al* (1992), Mosallam (1993), El-Dash *et al* (1997), Moawad and El-Sebay (1999).

Table 2. Flight distances A (50M), B (100M), C (170 M) of adult beetles *T. squalida* released in four times in navel orange orchard to different directions during 1994 and 1995 seasons.

Release No.	Year	Dist. Dir. Sex	Number of adults to 50 m.									100 M. Flight									No. of adults 170m. Flight									G. T.
			N	S	E	W	E/N	W/N	E/S	W/S	T	N	S	E	W	E/N	W/N	E/S	W/S	T	N	S	E	W	E/N	W/N	E/S	W/S	T	
1	1994	♂	2	2	1	1	1	0	0	0	7	1	2	1	0	0	0	0	2	6	0	0	0	0	0	0	0	0	0	13
		♀	4	3	1	3	0	1	1	1	14	1	3	0	0	1	1	1	1	8	0	0	0	0	1	0	0	0	1	23
	1995	♂	4	6	2	2	4	3	3	1	25	1	0	1	1	0	0	0	4	7	0	0	0	0	0	0	0	0	0	32
		♀	6	2	6	4	1	4	2	2	27	2	4	0	0	2	0	2	1	11	0	1	0	0	1	0	0	0	2	40
2	1994	♂	1	2	2	5	1	0	2	2	15	2	1	0	5	0	0	0	1	9	0	0	0	3	0	0	0	0	3	27
		♀	0	0	0	1	0	0	2	2	5	3	7	0	4	0	2	0	1	17	1	0	0	2	0	0	0	0	3	25
	1995	♂	4	3	3	5	4	0	3	3	25	1	4	0	3	1	1	2	1	13	0	0	0	0	0	0	0	0	0	38
		♀	2	2	3	3	1	4	3	3	21	4	4	0	7	2	2	0	0	19	0	0	0	0	0	0	0	0	0	40
3	1994	♂	0	4	1	2	1	1	2	0	11	1	0	0	1	0	1	0	0	3	0	0	0	0	0	0	0	0	0	14
		♀	0	3	3	3	1	0	1	4	15	2	4	1	7	0	1	0	2	17	0	0	0	0	0	0	0	0	0	32
	1995	♂	2	3	2	3	1	2	3	1	17	0	3	0	2	1	1	0	0	7	0	0	0	0	0	0	0	0	0	34
		♀	2	4	3	6	2	1	1	5	24	1	3	2	4	0	1	1	2	14	0	0	0	0	0	0	0	0	0	38
4	1994	♂	1	2	2	0	0	0	1	0	6	0	0	0	0	1	0	1	0	2	0	0	0	0	0	0	0	1	1	9
		♀	4	1	1	2	2	2	0	1	13	0	2	1	1	0	1	0	0	5	0	0	0	0	0	0	0	0	0	18
	1995	♂	1	3	2	0	2	1	2	2	13	1	0	1	1	0	0	1	0	4	0	0	0	0	0	0	0	0	0	17
		♀	4	4	2	2	1	3	2	0	18	1	0	1	2	2	0	0	2	8	0	0	0	0	0	1	0	0	1	27
Total one year	1994	♂	4	10	6	8	3	1	5	2	39	4	3	1	6	1	1	1	3	20	0	0	0	0	0	0	0	1	4	63
		♀	8	7	5	9	3	3	4	8	47	6	16	2	12	1	5	1	4	27	1	0	0	0	0	0	0	0	4	98
	1995	♂	11	15	9	10	11	6	11	7	80	3	7	2	7	2	2	3	5	31	0	0	0	0	0	0	0	0	0	111
		♀	14	12	14	15	5	12	8	10	90	8	11	3	13	6	3	3	5	32	0	1	0	0	1	1	0	0	3	145
Total	Two Years	♂	15	25	15	18	14	7	16	9	119	7	10	3	13	3	3	4	8	51	0	0	0	3	0	0	0	1	4	174
		♀	22	19	19	24	8	15	12	18	137	14	27	5	25	7	8	4	9	99	1	1	0	2	2	1	0	0	7	243
Distance Catch G.T.		♂								68.4%									29.3%										2.3%	
		♀								56.4%									40.7%										2.9%	
G. Total of two Y.		♂ + ♀	37	44	35	42	22	22	28	27	256	21	37	8	38	10	11	8	17	150	1	1	0	5	2	1	0	1	11	417
		%								61.4%									36.0%										2.6%	
F. between tratment = 43.98 **			L.S.D. 0.05 = 18.5															L.S.D. 0.01 = 27.98												

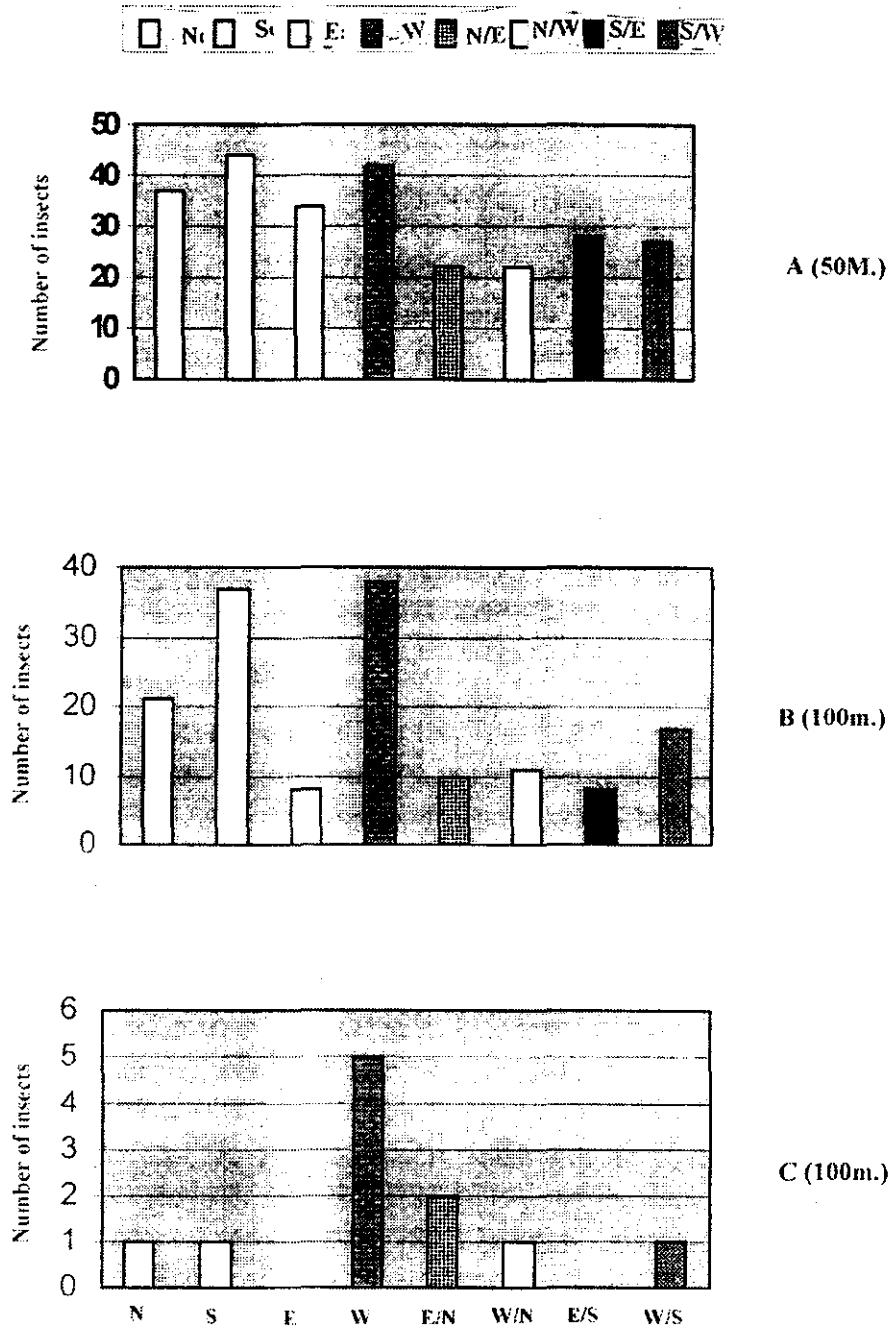


Fig. 3. Flight distances A (50M), B (100M), C (170M) of adult beetles *T. squalida* released in four times in navel orange orchard to different directions during 1994 and 1995 seasons.

REFERENCES

1. Alfieri, A. 1976. The Coleoptera of Egypt. Memo. Boll. Soc. Ent. Egypt. 361.
2. Ali, M.A. and I.L. Ibrahim. 1988. Preliminary study on occurrence and abundance of *Tropinota squalida* Scop. (Coleoptera : Scarabaeidae) infesting certain ornamental plants and fruit crops, Al-Azhar J. Agric. Res., 9 : 1-14.
3. Bohm, H. 1950. Observation on the occurrence of (*Tropinota*), (*Epicometis*) *hirta* poda injuring fruit blossom in Austria. (C.F. Rev. APP. Entomol 40 : 132 – 133).
4. El-Bassiouny, M.N. 1996. Susceptibility of some peach varieties of infestation by *Tropinota squalida* Scop. (Coleoptera : Scarabaeidae) in North Sinai. Bull. Ent. Soc. Egypt 74 (40) : 40-44.
5. El-Dash, A., M. O. Kolaib, A. El-Nabawi and Y. I. Soliman. 1997. *Aphytis maculicornis* (MAST) the parasitoid of *Parlatoria oleae* (colvee) o peach and pulm trees at Kom hamada region. Menofiya J. Agric. Res., 22 (1): 167-179.
6. El-Deeb, M. A. 1992. Biological and ecological studies on *Tropinota squalida* Scop. at Sharkia Governorate adult stage. Zagazig J. Agric. Res. 19(3):1409-1419.
7. Goonewardena, H.F. and M. S. Velu. 1958. The red palm weevil *Rhyncophorus ferrugineus* Ol. in Ceylon. I. Introduction, distribution and life history. Ceylon Coconut Quart 9 (1/2):20.
8. Hanna, M. A. F.F. Mostafa, H. Helal and A.A. Okil. 1992. Description and ecological studies on the citrus tree borer *Chrysobothrus dorsata* Fab. (Coleoptera: Buprestidae) and an associated new chalcidid parasite. Zagazig J. Agric. Res., 19 (1):515-525.
9. Isshak, R. R., Z.D. Nadia, Z. H. Zidan and H.M. Hussein. 1994. Vertical and horizontal distributions of hairy rose Scarabaeid beetle *Tropinota squalida* Scop. adults and their diurnal rhythm on apple trees. 5th Conf. Agric. Dev. Res., Fac. Agric., Ain Shams Univ., Cairo, Egypt, 2, 983-995.
10. Kalshoven, L. G. E. 1951. The pests of crops in Indonesia. P.T. Ichtiar Baru-Van Hoeve, Jakarta. Revised by P. A. Van der Laan 1981.
11. Moawad, G. and Y.El-Sebay. 1999. *Rhynchophorus ferrugineus*. the red weevil of date palm trees. Workshop on pest Management of date palm pestes with special

emphasis on the red palm weevil. Cairo, Egypt, 26-28 January, 16-17. Abstracts.

12. Mohamed, SH. F. 1992. Studies of some ecological and biological aspects of the hairy rose beetle *Tropinota squalida* Scop. (Coleoptera : Scarabaeidae) in Egypt, M. Sc. Thesis, Faculty of Agric., Al. Azhar Univ., Nasr City,,: 98-100.
13. Mosallum, A. M. Z. 1993. Studies on the Mediterranean fruit fly. *Ceratitis capitata* (Wied.) and its control. M. Sc. Thesis, Fac. Agric. Zagazig Univ. 158 P.P.

تقدير اتجاهات ومسافات الطيران المختلفة لحشرة جعل الورد الزغبى

محمد على الديب^١، منصور محمد منصور الزهيرى^١،
السيد على حسن شريف^٢، وحيد محمود نسوقى^٢

١ كلية الزراعة - جامعة الزقازيق - مصر

٢ معهد بحوث وقاية النباتات - مركز البحوث الزراعية - الدقى - الجيزة - مصر

تمت هذه الدراسة بمزرعة كلية الزراعة بالزقازيق بالخطارة وذلك لتقدير مسافات الطيران والاتجاه المفضل للحشرات الكاملة لهذه الآفة خلال موسمى ١٩٩٤ ، ١٩٩٥ لأربعة إطلاقات من الحشرات الكاملة فى كل موسم حيث تم تعليم الحشرات باستخدام ألوان خاصة وإطلاقها من مركز البستان كما تم توزيع عدد ٣ مصائد مائتية ملونة زرقاء و٣ مصائد أخرى قمعية على مسافة ٢٥ متر بين كل واحدة و الأخرى بالتبادل ، وتم عد الحشرات المعلمة المنجذبة الى المصائد و كذا الى الازهار الموجودة على الاشجار بمنطقة التجربة بمنتصف النهار (١٢ - ٢ ظهرا) أسبوعيا ولمدة ست أسابيع بعد الاطلاق و كانت النتائج كما يلى :

أ- اتجاه الطيران:

أغلبية الخنافس كانت أكثر انجذاباً إلى الاتجاه الغربى ثم الجنوبى ثم الجنوبى / الغربى وأخيراً الجنوبى / الشرقى. وهذه النتائج يمكن الاستفادة منها فى اختيار أفضل وضع للمصائد سواء بهدف التنبؤ أو لمكافحة الحشرات.

ب- مسافات الطيران:

تطير الإناث لمسافات أطول من الذكور وقد وجد أن ٦٨,٤٪ من الذكور و ٥٦,٤٪ من الإناث طارت إلى مسافة ٥٠ م ، بينما ٢٩,٢٪ من الذكور ، ٤٠,٧٪ من الإناث طارت حتى ١٠٠ م. و ٢,٣٪ من الذكور ، ٢,٩٪ من الإناث طارت حتى ١٧٠ م. وإجمالياً طارت ٦٠,٤٪ من الحشرات حتى مسافة ٥٠ م ، ٣٦٪ من الحشرات حتى ١٠٠ م ، ٢,٦٪ فقط حتى ١٧٠ م. وعلى هذا يمكن التوصية بوضع المصائد على مسافة ٥٠ م لاصطياد أكبر عدد من الحشرات الكاملة لجعل الورد الزغبى.