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Relative Efficiency of Two Types of Sex Pheromone Traps in Attracting Potato Tuber Moth *Phthorimaea operculella* (ZELLER) in Egypt.

By

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ABSTRACT

This present study was conducted, in potato fields at Kalubia region during 1997 and 1998 seasons. Weekly number of *Phthorimaea operculella* (Zeller) male moths captured in sex pheromone traps were recorded. Results indicate that the most effective level for the sex attractant traps was 40 cm above the end of the height of the plant level, followed by 20 cm for funnel and water plastic traps.

Accordingly, the results indicate that the funnel traps, generally, captured more moths than the water plastic traps. In the meantime, the sex pheromone traps were instrumental in detecting and monitoring the first occurrence and population fluctuations of potato tuber moth, thus could be helpful in determining the proper time of insecticides use, and then *B.t.* insecticide use became necessary. Data also indicate that the weekly means of male moths catch/trap in funnel trap and water trap were 101.42 & 76.57 in 1997 against 77.92 & 64.57 in 1997 and 1998 seasons, respectively.

So, it is useful to use the funnel trap more than yellow water trap. That's for funnel trap is cheaper and its way of catching is easier.

INTRODUCTION

The potato tuber moth, *Phthorimaea operculella* (Zeller) is a serious pest of solanaceous crops and very important for feeding the human. It causes serious damage to potato plant leaves and tubers in the field and to tubers in storage. The use of chemical insecticides or *B.t.* unchemical insecticides for controlling this insect pest. One of the promising alternative methods is the use of sex attractant pheromone traps which was recommended by several workers in different countries, *i.e.* Bacon *etal.* (1976), Shelton and Wyman (1979 a & b) and Raman (1982).

The main objective of this present study was to evaluate the two types of sex pheromone traps in potato fields, under Egyptian conditions.

MATERIAL AND METHODS

Two types of sex pheromone traps were used :

1- The yellow plastic water pan :

This trap (Fig. 1) consists of rectangle plastic frame, each side measuring 35 x 25 cm long and 6 cm deep. The trap is filled with soapy water which acted as a catching solution whereas the soap-water in trap was renewed every week and increased some water to overcome the evaporation of water every 3 days, and has a removable rectangle covered of the same dimensions, 5 cm over it.

The whole structure is mounted on 4 wood legs as the different level above the ground level.

2- The funnel trap :

This trap (Fig. 2) consists of yellow plastic funnel, 17 cm in upper diameter, 5.5 cm in lower diameter, and 17 cm deep fitted to a polythene bag. The whole device is attached to a straight metal pole, 2 cm long on which it is freely adjusted by means of screw.

The plastic bag is held over the spout of the plastic funnel by means of a curie bracket which is clipped to the metal pole at the other

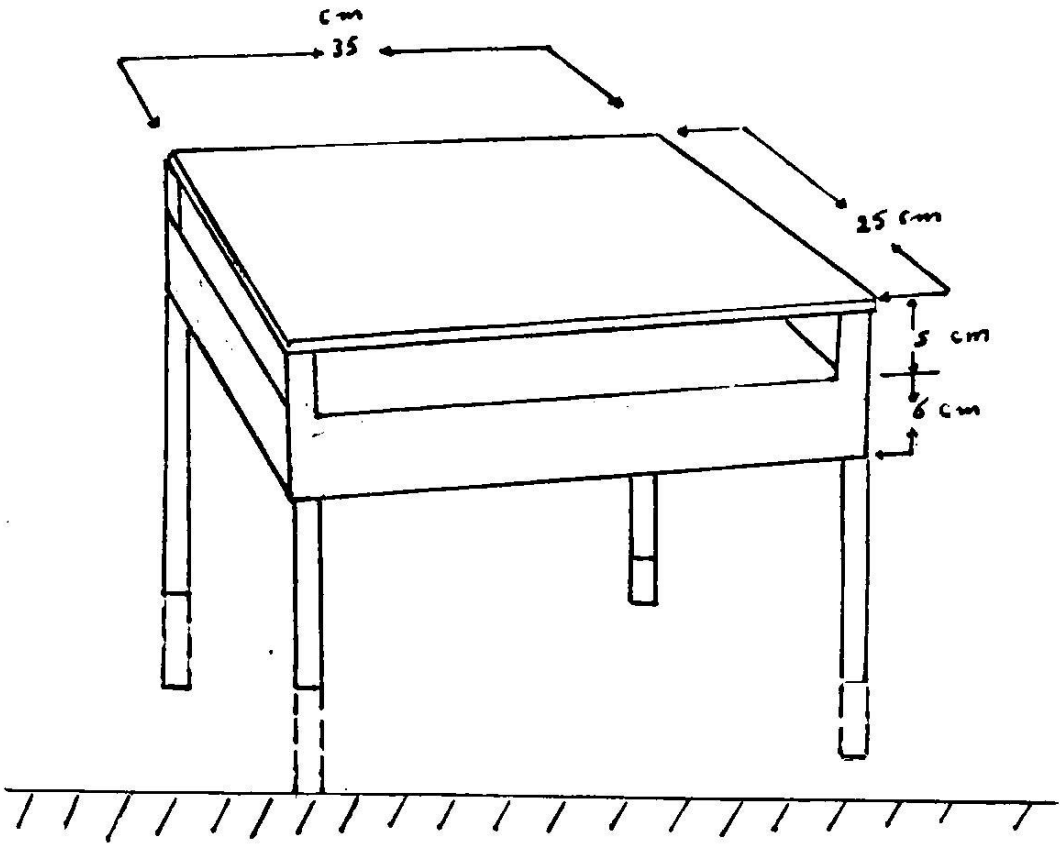

Fig. (1) : Diagram of the yellow plastic water trap.

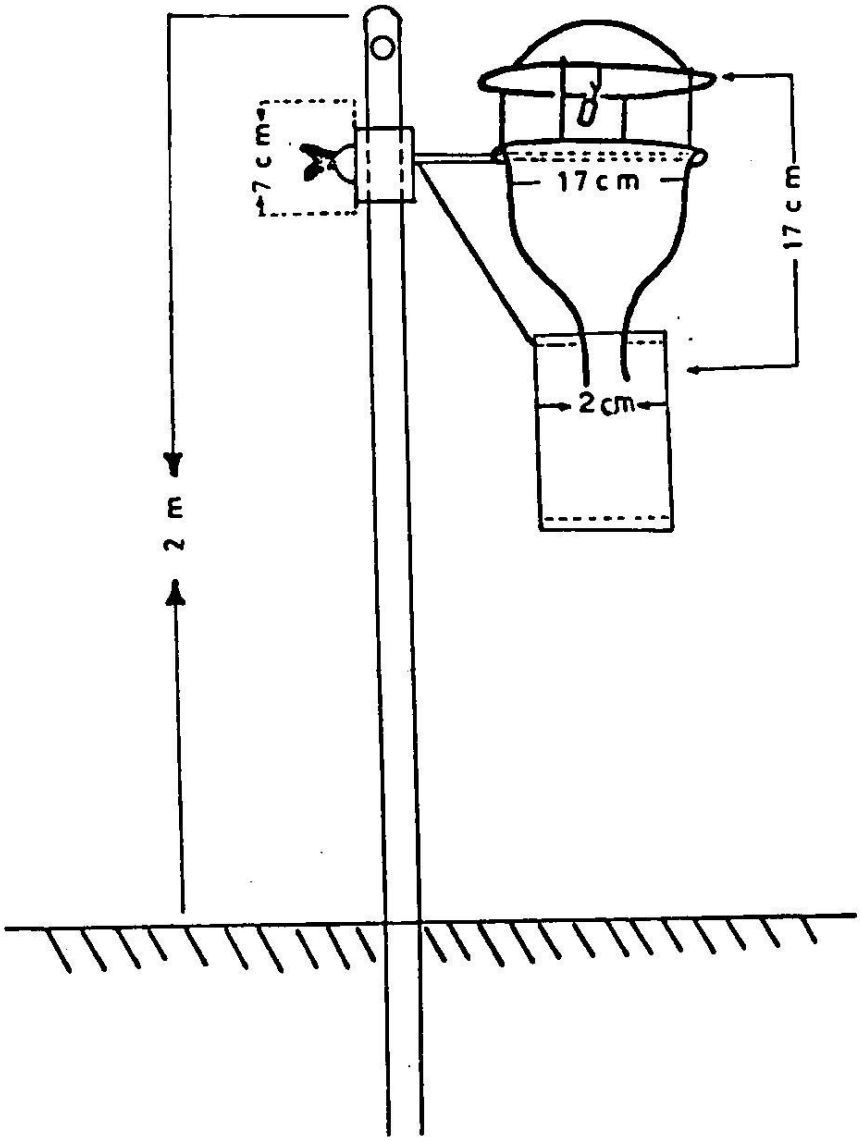

Fig. (2) : Diagram of the funnel trap.

end. This enables the bag to be emptied easily for counting of the trapped moths. The bag is made of heavy duty plastic changed if needed.

Moths collected in the bag are killed by means of DDVP (vapona)

The sex attractant (bait) was a commercially available PTM sex-pheromone mixture consisting of two compounds : trans-4, cis-7 tridecadien-1-ol acetate (PTM_1) and trans-4, cis-7 cis 10 tridecadien-1-ol acetate (PTM_2) (0.4 mg of PTM_1 + 0.6 mg of PTM_2), at rate of 1 mg. This pheromone is impregnated on rubber caps formulated by Trifolio-MGMBH, Germany, and stored at 5°C until needed.

Two experiments were counted in Kalubia region (El-Koum El-Ahmer), over two successive years in summer plantations, to find out the most suitable traps and height level of the sex attractant traps in the potato field. Two traps from funnel and water traps were allocated to each of the two tested levels (20 and 40 cm above the end of the height of the plant), each trap served one feddan cultivated with the potato variety "Sponta". Male moths captured in each sex pheromone traps were counted weekly and recorded.

RESULTS AND DISCUSSION

Results obtained during the two years (Tables I & II and Figs. 1 & 2), indicate that the most effective level for the sex attractant traps was 40 cm above the end of the height of plant level, followed by 20 cm for funnel and water traps, respectively.

Results indicated that funnel traps, generally, captured more moths than water traps, that's because of water evaporation at the water trap. So, funnel traps should be recommended in surveying and/or controlling the male moths at potato fields.

Although pheromone traps have been used for a number of years to monitor population dynamics of the more information pest. Yet, more information is still needed to know much about the way of traps' function or of the exact area from which the insects are being attracted.

Table(1)Weekly mean number of males collected per one pheromone trap hanging at different heights above the end of the plant top in potato field at Kalubia region, during summer 1997 season.

Inspection Date	Funnel trap		Water trap	
	at 20 cm	At 40 cm	at 20 cm	At 40 cm
7/3/97	3.5	4.5	2.5	3.5
14	3.5	5.5	3.0	4.5
21	4.5	7.5	3.5	5.5
28	5.5	12.0	4.5	9.5
4/4	7.5	14.5	6.5	12.5
11	9 5	17.5	7.5	14.0
18	9.0	18.0	6.5	15.5
25	12 5	21.0	10.5	18.0
2/5	28.5	34.5	22.5	29.5
9	42 5	90.5	39.5	82.5
16	39.5	68.0	29.5	59.0
23	86.5	100.5	70.0	80.5
30	97 5	150.5	81.5	99.0
6/6	73.5	168.0	62.5	112.0
Total of traped males	842	1420	700	1091
Mean	60.14	101.42	50	77.92

Table (2) :Weekly mean number of males collected per one pheromone trap hanging at different height above the end of the height of the plant in potato field at Kalubia region, during summer 1998 season.

Inspection Date	Funnel trap		Water trap	
	at 20 cm	at 40 cm	at 20 cm	At 40 cm
11/3/98	4.5	6.0	3.5	5.0
18	5.5	7.5	4.5	5.5
25	5.5	7.5	5.5	6.5
¼	6.5	7.0	6.5	6.5
8	9.0	12.5	7.5	9.5
15	12.5	14.5	9.5	11.5
22	11.5	13.0	7.5	12.0
29	14.5	16.5	11.0	13.5
5/5	32.0	38.5	20.5	22.0
12	50.0	55.5	40.5	42.0
19	43.2	48.0	39.5	43.5
26	89.5	93.5	79.5	80.0
3/6	102.5	116.5	90.5	97.0
10/6	89.5	99.5	82.5	90.5
Total of traped males	953	1072	817	904
Mean	68.07	76.57	58.35	64.57

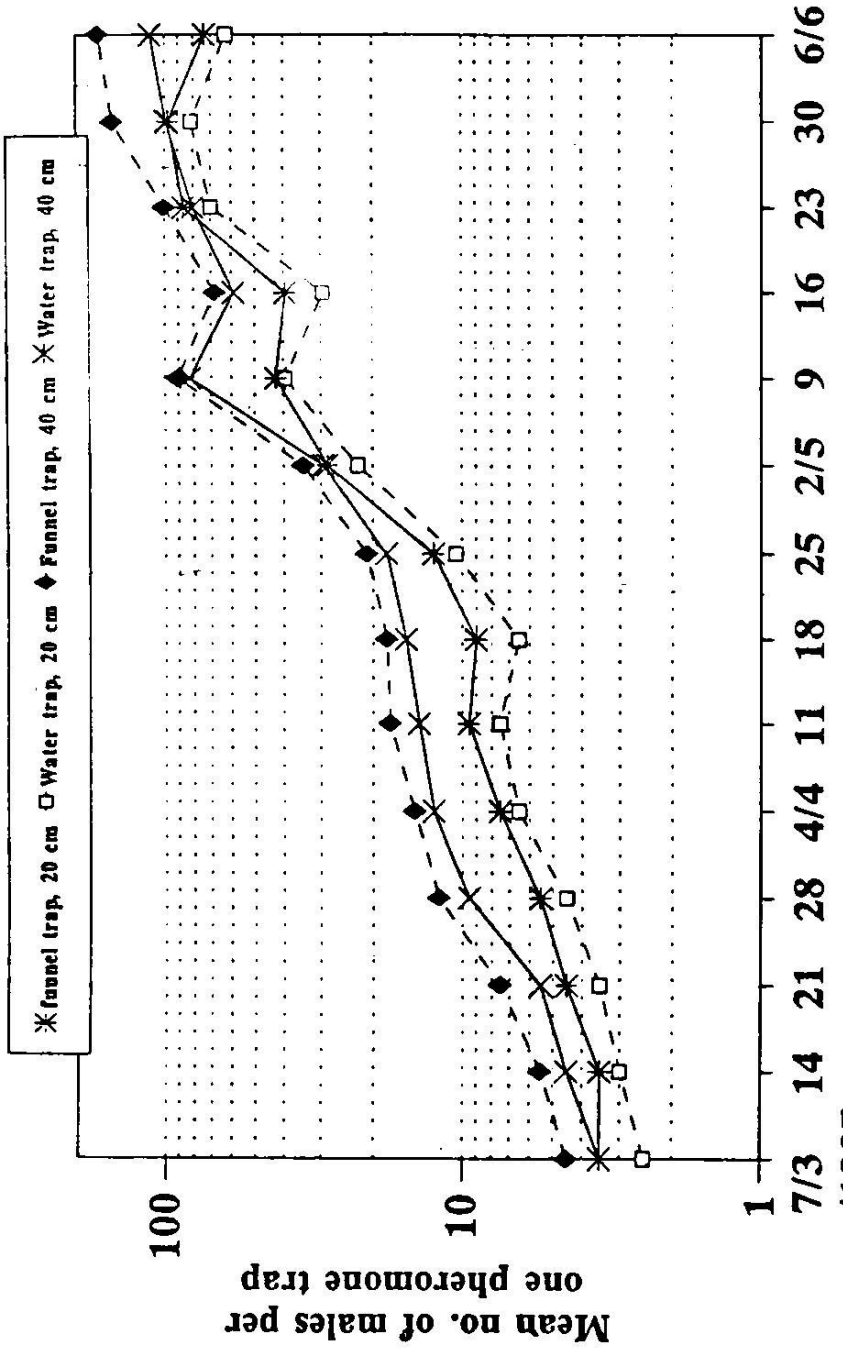

Fig. (1) : Mean number of *P. operculella* males collected weekly/one pheromone trap placed at different heights above the end of the height of the plant, 1997.

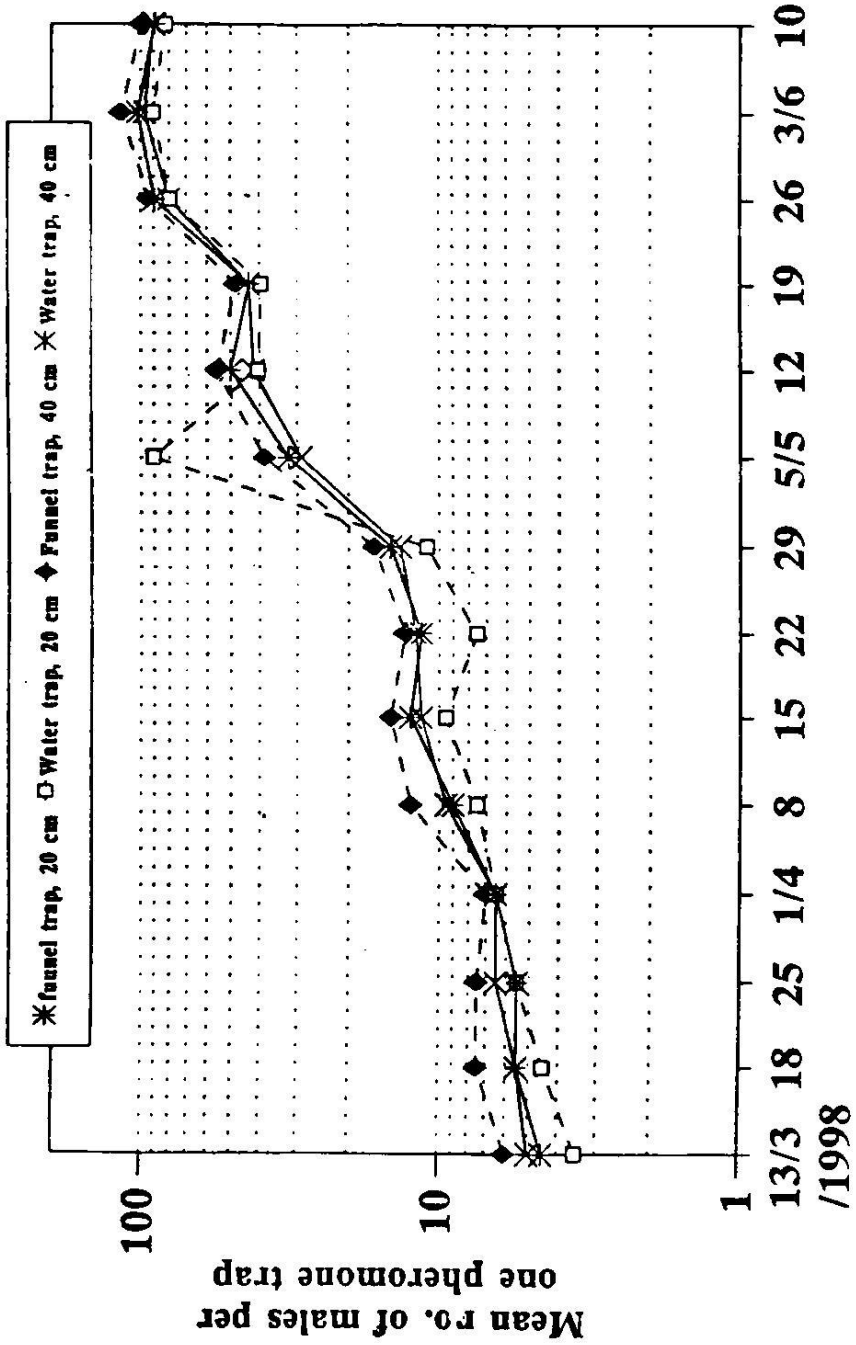

Fig. (2) : Mean number of *P. operculella* males collected weekly/one pheromone trap placed at different heights above the end of the height of the plant, 1998.

Diffusion of the pheromone from its dispenser depends on a number of meteorological factors particularly wind movement and temperature and these, in turn, will influence the shape, size and direction of the pheromone plume arising from the capsules.

The main finding from the above data is that the moth catch tended to increase as the heights of the traps increased.

Tables (I & II) and Figs. (3 & 4) show the mean numbers of *P. operculella* male moths/trap. The results indicate that the insect activity started to appear during March in the two years at the same locality. The population steadily increased throughout April and May to reach a peak in June. The general mean number of male moths were 101.42 & 76.57 moths/funnel trap/week and 77.92 & 64.57 moths/water trap/week during 1997 and 1998 seasons, respectively.

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الملخص العربى

تقييم كفاءة إستخدام المصائد الجاذبة الجنسية البلاستيك الصفراء المستطيلة المائية والقمعية فى اصطياد فراشة درنات البطاطس فى حقول زراعات البطاطس

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تمت هذه الدراسة بمنطقة الكوم الأحمر بمحافظة القليوبية لمدة عامين متتاليين ١٩٩٧، ١٩٩٨ لتقييم كفاءة نوعين من المصائد الجاذبة الجنسية والمزودة بكبسولة جاذب جنسى لذكور فراشة درنات البطاطس بتركيز ١ ملليجرام إنتاج ألمانى والموضوعة فى حقول البطاطس على ارتفاع ٢٠، ٤٠ سم من سطح النباتات.

أثبتت النتائج خلال عامى الدراسة أن التعداد الكلى لذكور فراشات درنات البطاطس المصاده كانت أعلى بالنسبة للارتفاعين ٤٠ و ٢٠ سم للمصيدة القمعية عن المصيدة البلاستيك الصفراء المائية.

أوضحت النتائج أيضا أن العدد الكلى لذكور فراشات درنات البطاطس كان ١٤٢٠، ١٠٧٢ ذكر للمصيدة القمعية على إرتفاع ٤٠ سم من سطح النبات يليه ٨٤٢، ٩٥٣ ذكر والموجودة على ارتفاع ٢٠ سم.

بينما كان العدد الكلى لذكور فراشات درنات البطاطس كان ١٠٩١، ٩٠٤ ذكر للمصيدة البلاستيك الصفراء على إرتفاع ٤٠ سم من سطح النبات يليه ٨١٧، ٧٠٠ ذكر والموجودة على ارتفاع ٢٠ سم.

وبذا يمكن استخدام المصيدة القمعية الصفراء فى إصطياد ذكور فراشات درنات البطاطس على إرتفاع ٤٠ سم وذلك لرخص ثمنها ولعدم إستخدام الماء والصابون بها كمادة قاتلة والذى يتعرض للتبخير بصفة مستمرة بفعل العوامل الجوية مما يقلل من كفاءة الاصطياد بالمصيدة المائية الصفراء البلاستيك المستطيلة.