Food and Agriculture Organization of the United Nations

Estación Phoenix

1) Performance Assessment of dry low cost dry trapping systems

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FAO RPW Eradication Programme
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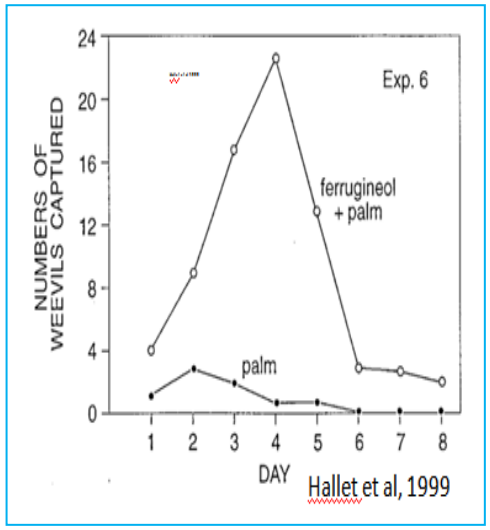
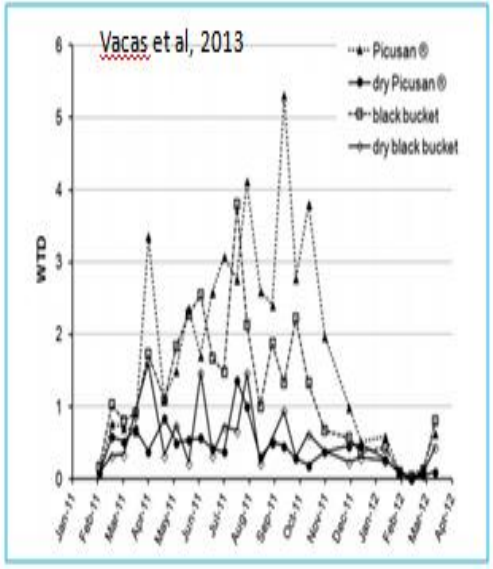
Background

In 1999, a strong but short synergetic effect between the RPW aggregation ferrugineol and food bait was demonstrated



"Standard" pheromone food bait trapping systems. They pose a problem of **standardization** and require **frequent servicing to renew the food bait and water**

Vacas et al, 2013



Surprisingly: a new trapping system **not based on synergetic effect (no food bait) and without water** would present “equivalent” result as the “standard” ones

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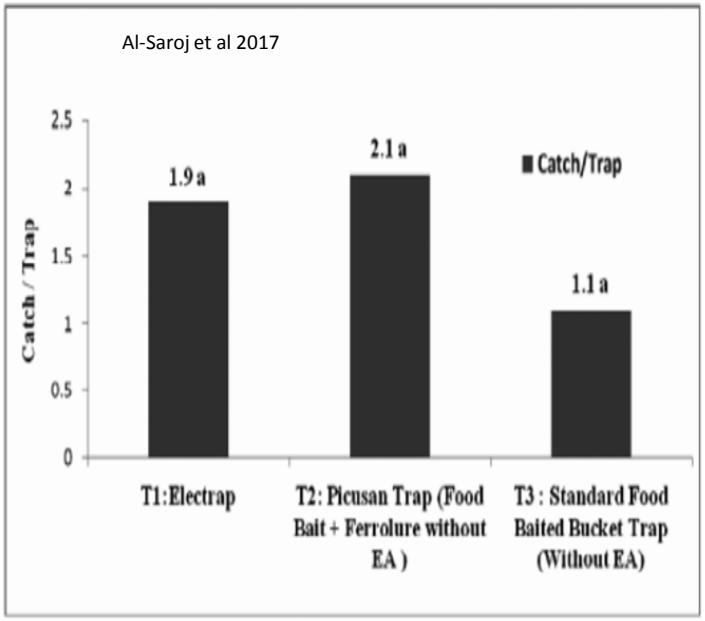
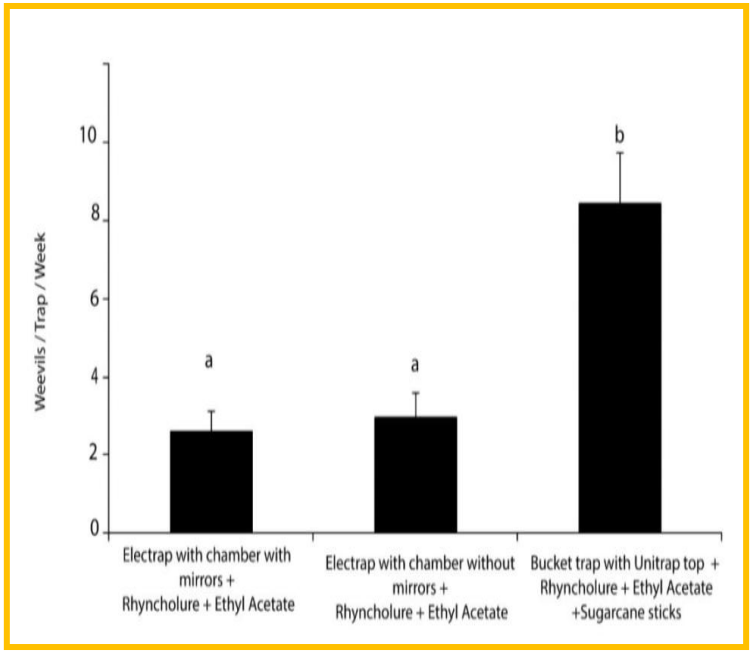


However, Gonzalez et al. (2019) demonstrated that, at least for *Phoenix palmarum* and with oil palm, the attractiveness of this new trapping system was not due to the addition of a component supposed to produced an attractive electromagnetic radiation.



Objective of the experiment

- To evaluate the **equivalence** or effect size between a “standard” trapping systems (problem of standardization) and no food bait/dry trapping systems
- To evaluate the possible role of trap physical features (to foster attraction, capture, prevent escape and confine pheromone and kairomone to optimal concentrations).

Three phases of trapping		
Attraction	**Capture itself**	**Escape prevention**
Could differences in some physical trapping characteristics explain similarity or differences between “standard” trapping system and dry trapping systems?		

If results are conclusive, to recommend new standard dry low cost trapping system (limited servicing) that would allow that **mass trapping be intensive and becomes a low cost and effective component of area-wide integrated RPW control programmes**.

Material and method

Place/date: Oasis of Bahariya (Egypt), intensively cultivated, very infested by the RPW. May 6 to July 6, 2023.

Comparison of 6 trapping systems: In each of the trap was added ferrolure™ - 700 mg and ethyl acetate dispensers , attached to the lid for system nº1 and 2 , placed at the bottom of the traps for systems 3 and 6, inside the component with the mirrors for the system 4 and 5. The bucket traps are buried up to the edge of the four holes. Food and water in the bucket traps are replaces each week at the moment of the monitoring.

1: “standard” trapping system (bucket, black color, 26 cm diameter, 20 cm height, 4 circular 4-cm diameter holes, 200 g of dry dates, 2 litres of water)

2: “standard” trapping system without food bait

3: “standard” trapping system without food bait and without water and with a system supposed to prevent RPW escape

4: Electrap™ with ferrolure™ and ethyl acetate dispensers placed inside the receptacle with the mirrors

5: Electrap™ as 4 but with the mirrors covered by a Plastic self-adhesive tape.

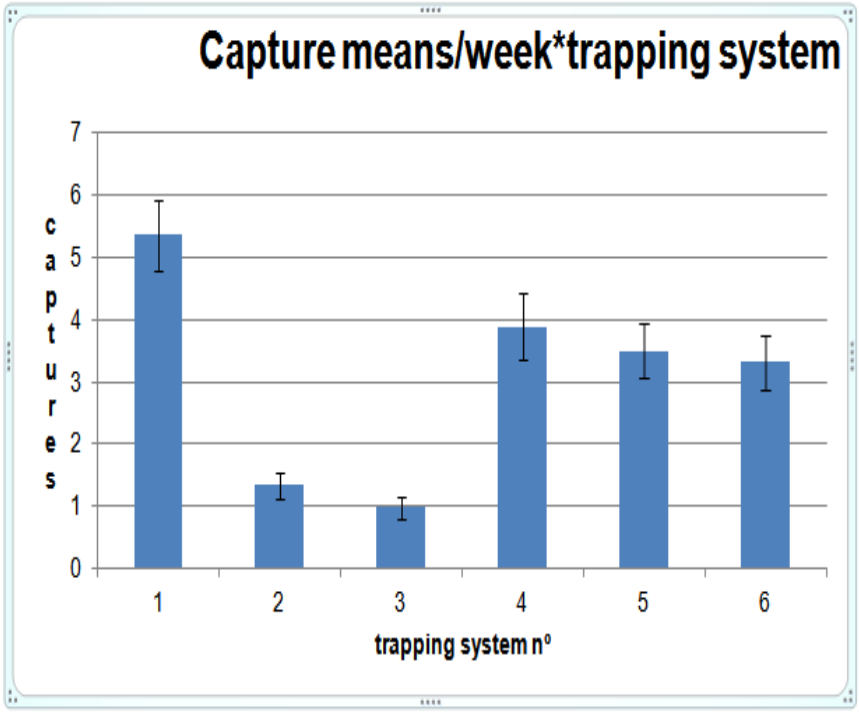
6: Pyramidal Picusan ™ trap

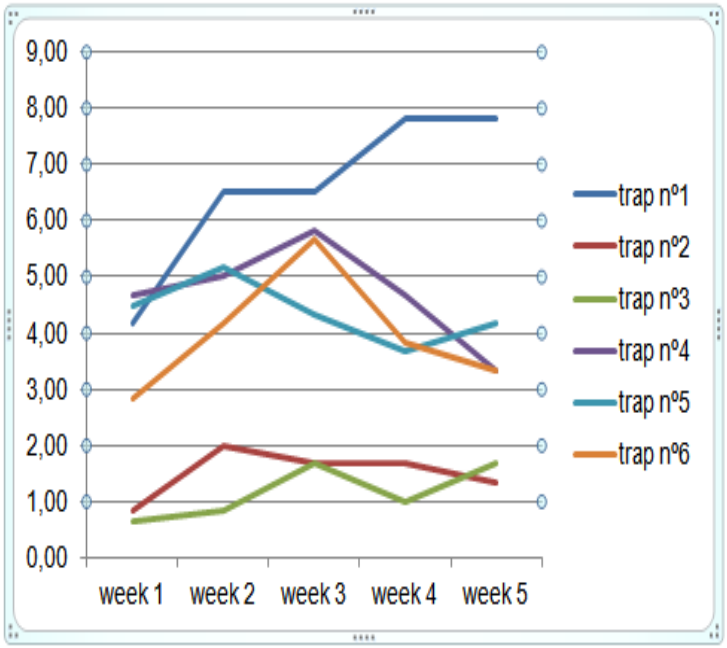
- **Randomized Complete Block Design**: 6 blocks (distance between block: 50 m). 1 single replication of each treatment per block (distance between treatment: 50 m). To minimize the bias effect of cluster RPW spreading: **randomized rotation of the traps each week during two months.**
- **Statistic analysis: Effect Size** Analysis of **confidence intervals** of magnitude difference. As **equivalence** between trapping system can be of great practical importance, null hypothesis tests significant testing (Kruskal Wallis + LSD) will be completed by equivalence testing when the null hypothesis can't be rejected.

	Trap position (n° of the stick)	n° of trap							
		first week	second week	third week	fourth week	fifth week	sixth week	seventh week	eighth week
Block n°1	1	1/3	1/3	1/4	1/3	1/4	1/6	1/3	1/2
	2	1/4	1/6	1/6	1/6	1/1	1/2	1/6	1/3
	3	1/5	1/1	1/3	1/1	1/3	1/4	1/2	1/1
	4	1/6	1/4	1/5	1/2	1/2	1/3	1/5	1/6
	5	1/2	1/5	1/2	1/5	1/6	1/1	1/4	1/4
	6	1/1	1/2	1/1	1/4	1/5	1/5	1/1	1/5
Block n°2	1	2/3	2/6	2/1	2/3	2/3	2/4	2/6	2/1
	2	2/6	2/4	2/2	2/2	2/5	2/3	2/4	2/2
	3	2/1	2/5	2/3	2/4	2/1	2/6	2/1	2/6
	4	2/2	2/1	2/6	2/5	2/4	2/1	2/5	2/4
	5	2/4	2/3	2/4	2/6	2/6	2/5	2/3	2/3
	6	2/5	2/2	2/5	2/1	2/2	2/2	2/2	2/5
Block n°3	1	3/6	3/1	3/6	3/3	3/4	3/4	3/2	3/4
	2	3/3	3/4	3/1	3/6	3/3	3/3	3/3	3/3
	3	3/2	3/3	3/4	3/2	3/6	3/1	3/6	3/1
	4	3/4	3/2	3/5	3/5	3/5	3/5	3/5	3/5
	5	3/5	3/5	3/2	3/1	3/1	3/2	3/1	3/6
	6	3/1	3/6	3/3	3/4	3/2	3/6	3/4	3/2
Block n°4	1	4/3	4/4	4/3	4/5	4/5	4/4	4/1	4/3
	2	4/4	4/1	4/2	4/1	4/6	4/6	4/3	4/4
	3	4/1	4/3	4/4	4/2	4/4	4/5	4/4	4/1
	4	4/6	4/2	4/6	4/3	4/1	4/3	4/2	4/2
	5	4/5	4/5	4/1	4/6	4/2	4/2	4/5	4/6
	6	4/2	4/6	4/5	4/4	4/3	4/1	4/6	4/5
Block n°5	1	5/1	5/5	5/4	5/4	5/2	5/3	5/3	5/5
	2	5/6	5/1	5/6	5/2	5/6	5/1	5/2	5/4
	3	5/3	5/4	5/2	5/1	5/5	5/6	5/6	5/3
	4	5/5	5/2	5/3	5/3	5/4	5/4	5/1	5/2
	5	5/2	5/6	5/1	5/5	5/3	5/2	5/5	5/6
	6	5/4	5/3	5/5	5/6	5/1	5/5	5/4	5/1
Block n°6	1	6/1	6/4	6/6	6/3	6/4	6/2	6/1	6/1
	2	6/6	6/2	6/5	6/2	6/5	6/6	6/4	6/2
	3	6/3	6/6	6/4	6/4	6/6	6/4	6/6	6/4
	4	6/5	6/3	6/2	6/6	6/2	6/1	6/3	6/6
	5	6/2	6/5	6/3	6/1	6/1	6/3	6/2	6/5
	6	6/4	6/1	6/1	6/5	6/3	6/5	6/5	6/3

Randomized rotation of the traps each

Partial results





To review after statistical analysis:

-**"standard" wet trapping system seems to capture a bit more** than the other trapping system although difference (size effect) will be probably little or moderate. Synergetic food bait/Pheromone/Ethyl acetate little or moderate and/or RPW escape less from this trapping system compared with the dry ones.

- **Captures of the 3 dry trapping systems with pyramidal shape are similar.**

- Confirmation that the component supposed to produce an electromagnetic wave has no effect. **Electrap™ captures as a simple pyramidal trap.**

- **Best low cost trapping system with simple dry pyramidal trap.**

- **Dry and wet bucket trapping systems capture significantly less RPW than the "standard" wet trapping system and the dry pyramidal trapping systems**. Various possible hypothesis. One of them in relation with lower semiochemical release and attraction due to soil buried position (temperature measures in the traps have been done). Experiment has to be completed.

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2) Performance assessment of Attract and Kill technology

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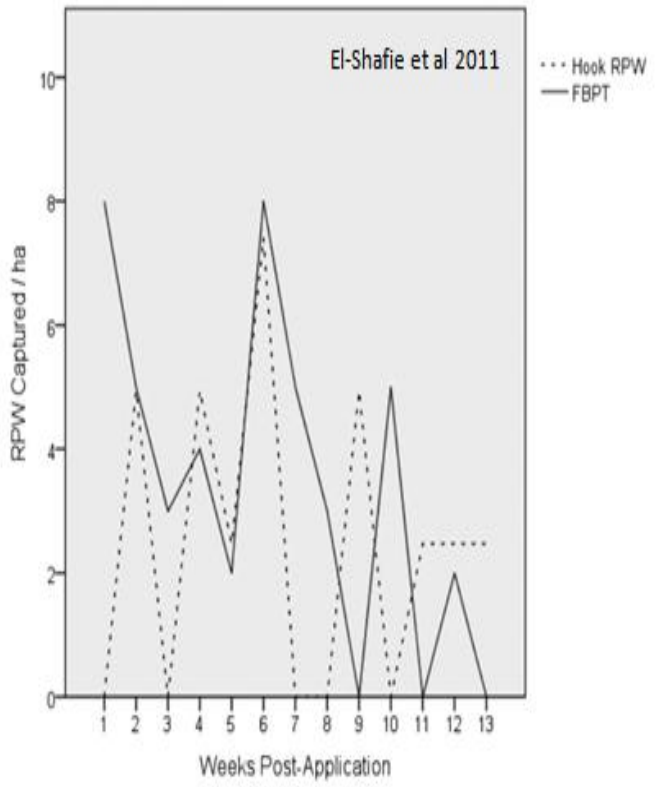
State of art

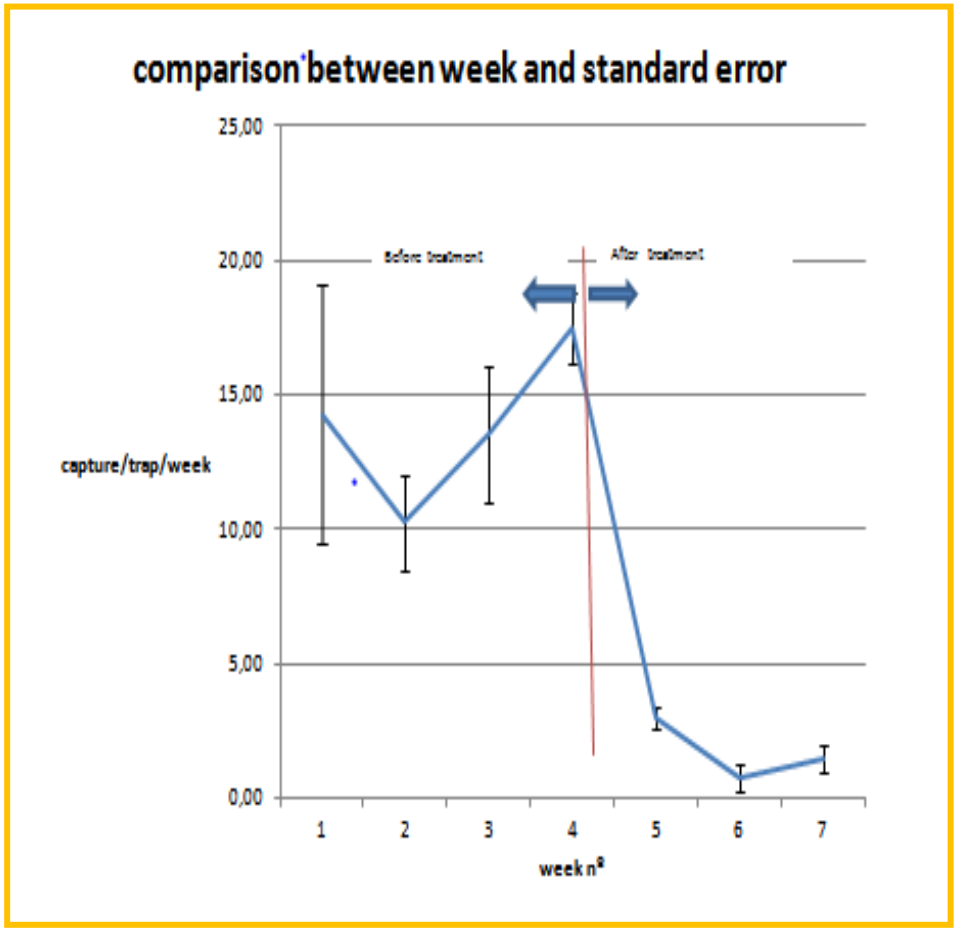
El-Shafie et Al (2011) showed that a paste formulation containing **15% ferrugineol (attractant) and 5% of cypermethrin (killing by contact the attracted RPW)** placed on equivalence of 250 spots (3 g/spot) per ha, attract and kill a number of RPW similar to the number of RPW captured in one "standard" pheromone/food bait trapping system per ha.

The interest of such treatment is multiple:

- Easy to use
- Efficiency during at least three months.
- No inhalation risk of the insecticide (extremely low vapor pressure) and no risk of dispersion in water or soil.



Partial results



The A&K treatment leaded to **a spectacular decrease of the captured RPW that means a brutal decrease of the RPW population in a very short time period of time.**
Experiment to be extended to establish the frequency of the treatment and to be repeated in other conditions.

THANK YOU