

MONITORING OF PIERCING – SUCKING INSECTS BY USING YELLOW STICKY TRAPS IN SAUDI ARABIA

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ABSTRACT

Four piercing-sucking insects whiteflies, *Bemisia* spp., thrips, *Thrips* spp., leafhopper, *Empoasca* spp. and aphids, *Myzus persica* & *Aphis gossypii*, were monitored on cucurbit plants (cucumber, squash, melon and watermelon) during May and June, 1999. Sticky traps were placed at the plant height in fields of three districts, Al-Hasa, Qatif and Riyadh. Data showed that the mean number of whiteflies/trap was higher in Al-Hasa district when compared with that of Qatif and / or Riyadh. Moreover, whiteflies population was abundant in May than that in June at Al-Hasa and Qatif fields, while very small number of adults was captured on traps in May at Riyadh. Same trend of thrips number was observed, whereas Al-Hasa district had the highest number in both inspection months. In the meantime, thrips population was more in May compared with that of June. The mean number of leafhopper /trap was higher in Riyadh followed by Al-Hasa and Qatif and the prevalence of leafhopper population was more in May compared with that in June. However, the mean number of aphids/trap was higher in Riyadh followed by Qatif and Al-Hasa. The frequency of insects in descending order was as follows: whiteflies, thrips, leafhopper and aphids.

INTRODUCTION

Piercing-sucking insects are considered one of the major problems to economic crops all over the world. These insects transfer viral diseases from the infected to the healthy plant and that are associated with serious losses in field production. These tiny insects reproduce rapidly, and feed with rasping-piercing sucking mouthparts, which results in deformation of flowers and leaves. Early detection of these damaging insects is important because symptoms of feeding often remain latent until serious damage has occurred (Parker *et al.*, 1995, Daughtrey *et al.*, 1997, Gupta *et al.*, 1997, Labonne *et al.*, 1998 and Liu 2000). Thus population monitoring is necessary to detect insect problems in crops and to determine if control tactics have been effective (Milligan *et al.*, 1988). One of the most effective tactics developed for detecting the presence of the adults is the yellow sticky traps. These traps are widely used for monitoring and management of whiteflies, aphids, leafminers, thrips, leafhoppers and certain other insect pests (Liburd *et al.*, 1998, Kim *et al.*, 1998 and Kunmawat *et al.*, 2000). However, the trap location and trap height have effect on capture numbers of insects (Bruck and Lewis 1998).

The objective of this research is to monitor the population of the most common piercing-sucking insects (whiteflies *Bemisia* spp., thrips *Thrips* spp., leafhopper *Empoasca* spp. and aphids *Myzus persica* & *Aphis gossypii*). in three district in Saudi Arabia by using yellow sticky traps during two months of cucurbit plant growing season.

MATERIALS AND METHODS

Nine open fields cultivated with cucurbit plants were chosen (3/each) from three different districts in Saudi Arabia, Al-Hasa, Qatif and Riyadh. Yellow sticky traps were used to monitor four of the common piercing-sucking insects (whiteflies *Bemisia* spp., thrips *Thrips* spp., leafhopper *Empoasca* spp. and aphids *Myzus persica* & *Aphis gossypii*). These insects consider as vectors of viral diseases. Yellow sticky traps each 15 X 30 cm² were purchased from Gempler's™ Co. USA and placed in open fields in May and June 1999. Six yellow sticky traps were placed in each field (2000 m²) at plant height, one trap for every 200 m² . Traps were changed weekly and transferred to the laboratory for inspection and counting the number captured of adult insects. Binocular microscope was used to identify insects on the yellow sticky traps.

RESULTS AND DISCUSSION

Occurrence of whiteflies in Al-Hasa, Qatif and Riyadh districts:

The data showed that the mean number of whiteflies captured per yellow sticky trap was high in Al-Hasa fields when compared with that in Qatif and/ or Riyadh. Whiteflies reached 3299.8, 381.6 and 19 adults/trap in May at Al-Hasa, Qatif and Riyadh, respectively. Moreover, whiteflies population was abundant in May than that in June at Al-Hasa and Qatif fields (Table 1 & Figure 1). The result in line with that of Liu (2000) who reported that adult whiteflies *Bemisia argentifolii* on spring collard first appeared on the plant in early April, increased rapidly within the month, peaked in May and declined at the end of the season in early mid and late June. Moreover, Kim *et al.* 1999 reported that the numbers of whiteflies on yellow sticky traps were significantly correlated to plants. Furthermore, Kumawat *et al.* (2000) reported that temperature was significantly correlated with whitefly densities.

Occurrence of thrips Al-Hasa, Qatif and Riyadh districts:

Data also showed same trend of thrips number, whereas Al-Hasa district had the highest number in both inspection months (619.5 and 384.5 adults/trap) in May and June, respectively. In the meantime, thrips population was more in May compared with that of June in the three districts (Table 1 & Figure 2). The data also revealed that the number of thrips in Qatif is close to that in Riyadh. Cho *et al.*, 1998 and Kim *et al.*, 1998 reported the appropriate use of yellow sticky traps to study the distribution of thrips and whitefly in cherry tomatoes. In the meantime Shipp and Zariffa (1991) reported the necessitate of thrips population monitoring as a tool to detect thrips problems in crops and to determine if control actions have been effective.

Occurrence of leafhopper in Al-Hasa, Qatif and Riyadh districts:

The obtained data showed that the mean number of leafhopper captured per yellow sticky trap was higher in Riyadh followed with Al-Hasa

and Qatif where it reached 191, 129.1 and 3.6 adults/ trap in May, respectively. Again the prevalence of leafhopper population was more in May compared with that in June in the three districts (Table 1 & Figure 3). The existence of leafhopper in May in line with Bentz and Townsend (1997) who reported that migratory adult of potato leafhopper started arriving between late April and early May and the population peaked during 31 May- 14 June. Begemann and Schoeman (2000) showed good correlation between leafhopper catch and climatic parameters (temperature, humidity, sunshine hours, evaporation, wind, rain and saturation deficit).

Table (1): Mean number of whiteflies, thrips, leafhoppers and aphids per yellow sticky trap at three districts in Saudi Arabia in May and June 1999.

Insect	Month	Mean No. of adults/trap at the three districts \pm SD		
		Al-Hasa	Qatif	Riyadh
Whiteflies	May	3299 \pm 2734	381.6 \pm 192.5	19.0 \pm 26.8
	June	2710 \pm 3133	305.8 \pm 163.7	192.9 \pm 66.3
Thrips	May	619.5 \pm 158.7	137.9 \pm 74.8	131.2 \pm 131
	June	384.5 \pm 211.5	101.9 \pm 15.3	88.6 \pm 42.9
Leafhoppers	May	129.1 \pm 123.3	3.6 \pm 5.1	191.0 \pm 14.1
	June	46.3 \pm 29.5	3.0 \pm 1.0	149.1 \pm 102
Aphids	May	1.0 \pm 1.4	1.5 \pm 2.1	1.8 \pm 0.4
	June	0.0 \pm 0.0	1.0 \pm 0.9	0.7 \pm 1.0

Moreover, Kersting *et al.* 1997 reported that yellow sticky traps were more effective in monitoring leafhopper population on sesame compared to modified Johnson-Taylor suction trap. However, the data in contrast with that of Traore *et al.* 1999 who claimed that yellow traps was not effective to caught leafhopper.

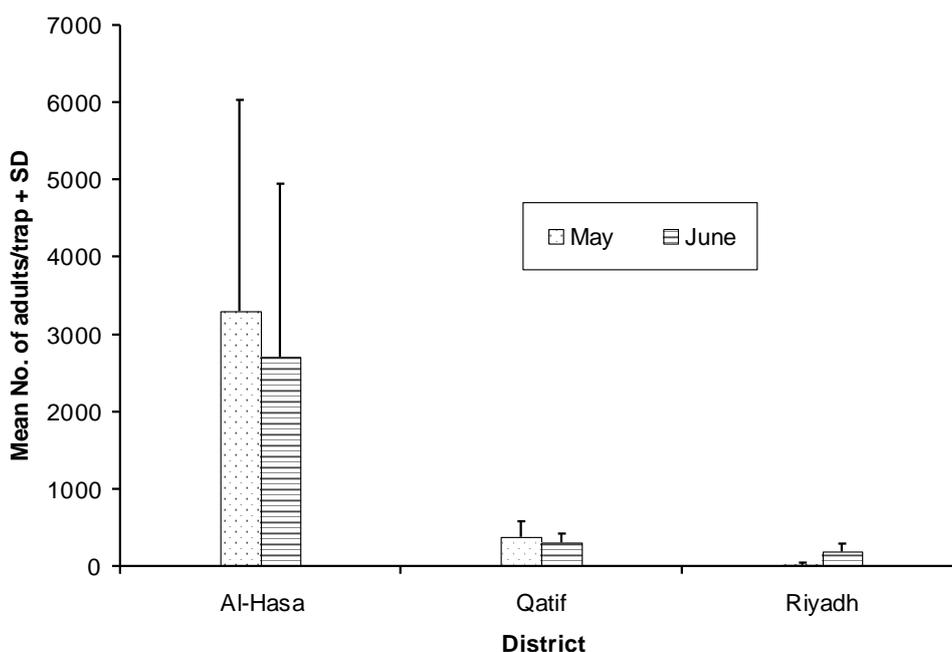
Occurrence of aphids Al-Hasa, Qatif and Riyadh districts:

The obtained data showed that the mean number of aphids captured per yellow sticky trap was minute in the three districts where it doesn't exceeded 5 adults/trap. In the meantime, no aphids were captured on traps during June in Al-Hasa. The data also revealed no pronounced differences in the number of aphids between the three districts or between the two inspection months (Table 1 & Figure 4). In other words aphids almost not exist during summer months (May and June) in open fields and that might

due to sever weather and environmental condition in these districts. The data in consistent with that of Parker *et al.* 2000. Who reported one peak of aphids population on potato and they mentioned that plant nutritional quality and other factors (e.g. natural enemies) causing decline of aphid population. Moreover, Kaniuczak (2000), reported that depending on the atmospheric conditions, first aphids on wheat plantation were found in May.

In general it is apparent that yellow sticky traps captured more whiteflies and thrips from the three districts than that of leafhopper and /or aphids. Al-Hasa district possessed the highest population of whiteflies and thrips while Riyadh district had the highest population of leafhopper. Accordingly existence of certain insect species in certain region might depend on the intrinsic factors of insect population and/ or extrinsic factors of the environment in this area. Data also point to the convenience of yellow sticky traps to be used for predicting whiteflies, thrips and to less extent aphids and leafhopper infestation in open fields. Moreover, captured insects will be a sign of the ssize of their populations and will deliver useful information to limitize the size of insect problems and help in deciding the start point of insect management programs.

Fig. (1). Mean number of whiteflies /trap in open fields at Al-Hasa, Qatif and Riyadh Districts during May and June 1999



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رصد الحشرات الثاقبة الماصة باستخدام المصائد اللاصقة الصفراء في المملكة العربية السعودية
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تم رصد وجود أربع حشرات ثاقبة ماصة هي الذباب الأبيض والتربس ونطاطات الأوراق والمن على نباتات القرعيات (الخيار- الكوسة- الشام – البطيخ) المنزرعة في الحقول المكشوفة باستخدام المصائد اللاصقة الصفراء في شهري مايو ويونيه. حيث تم وضع المصائد عند مستوى ارتفاع النباتات في محافظتي الاحساء والقطيف ومنطقة الرياض. أوضحت النتائج أن متوسط أعداد الذباب الأبيض لكل مصيدة كان مرتفعاً في الاحساء بالمقارنة بالقطيف والرياض. كما أن عشيرة الذباب الأبيض كانت وفيرة في شهر مايو مقارنة بتلك التي في شهر يونيه في الاحساء والقطيف وكان عددها في شهر مايو منخفضاً في الرياض. كما اتضح نفس الاتجاه في أعداد التربس حيث كانت في الاحساء هي الأعلى في شهري الحصر. كما أن عشيرة التربس كانت أعلى في شهر مايو مقارنة بالتالي ظهرت في يونيه. ومن ناحية أخرى كان أعداد نطاطات الأوراق في الرياض أعلى متبوعاً بالاحساء ثم القطيف . بالاضافة إلا أن أعدادها كان أكثر في شهر مايو مقارنة بتلك التي وجدت في شهر يونيه وكان أعداد المن أعلى في الرياض متبوعاً بالقطيف ثم الاحساء. وعموماً كانت أعداد الحشرات الكاملة على المصائد على الترتيب التالي تنازلياً الذباب الأبيض ثم التربس ثم نطاطات الأوراق ثم المن.