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SURVEY AND SEASONAL ABUNDANCE OF APHIDS ON SOYBEAN AND ASSOCIATED WEEDS AT GIZA REGION, EGYPT

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ABSTRACT

Survey study was carried out on soybean (*Glycine max* L.) plants in the field at Giza region, throughout two growing seasons 2001/2002. Results revealed the occurrence of three aphid species: the cowpea aphid, *Aphis craccivora* (Koch.), the green peach aphid, *Myzus persicae* (Sulz.) and the cotton aphid, *Aphis gossypii* (Glov.). *A. craccivora* recorded the highest incidence, followed by *M. persicae* and *A. gossypii*.. Eleven different weed plant species occurred within the soybean field five of them hosted aphids. Only three aphid species were associated with the dominant weed species; *M. persicae* on *Convolvulus arvensis ,Amaranthus* spp. *,Euphorbia* spp. *,Solanum nigrum* and *P. oleraceae*. *A. craccivora* occurred on *Euphorbia* spp. and *Portulaca oleraceae*,while *A. gossypii* occurred on *P. oleraceae* and *S. nigrum* .

Keywords: aphid fauna, aphid abundance, soybean, weeds.

INTRODUCTION

Soybean *Glycine max L*. is a recently introduced as field crop in Egypt. It needs more studies to focus on the role of wild plants as a reservoir for aphid species.In Egypt, Hamed (1977) reported, *Aphis craccivora* (Koch) on soybean plants. El-Shazly (1985) reported , *Aphis gossypii* (Glov.) as one of the insect pests that cause economic damage to soybean plants. *Myzus persicae* Sulzer*, Aphis spiraeclo, Aphis glycines, A. gossypii, Lipaphis erysimi, Macrosiphum euphorbiae* Thomas and*,. Aulacorthum solani* were reported in association with soybean plant in the field (Cho *et al.*,1984; Alleman *et al.*.,2002 ; Venette and Raogsdale, 2004), Hill *et al.* (2001) mentioned that, *A. glycines* was found as a vector of soybean mosaic virus (SMV). *A.* gossypii, among other pests of soybean (Alegbejo,1999, Dharpure & Paradkar 1999 and Morris & Waterhouse 2001).

Several weed species are associated with soybean plant in the field. In Egypt, Shalaby (1974) recorded that, *A. craccivora* occurred on *Portulaca oleraceae* while *M. persicae* was found on C*onvolvulus arvensis*. Abu-Zeid (1975) determined that, wild plants are major virus reservoirs. Dharpure (2002) reported that, *Portulaca oleraceae, Solanum nigrum* and *Melilotus indica* were weeds associated with soybean plant in the field and served as alternate hosts to *M.* persicae.

The present investigation reports aphid species and their abundance on soybean plants and associated weeds at Giza region, Egypt.

MATERIAL AND METHODS

During the growing seasons 2001- 2004 in Giza, the soybean (*Glycine max* L.) variety "Crowford" was cultivated during the 1st week of June, in an experimental area of about one Kerate (175 m^2). The experimental area received all the usual agricultural practices except for any pest control treatments. Sampling started as soon as the plants appeared above ground. Samples were randomly taken and examined according to the method previously described by Amin (1989) and Kabeil (1993) for the different aphid species. The sample consists of ten plants from each plant species (soybean and associated wild plants). The collected plants were taken and marked to observe the aphid fauna and their seasonal abundance on soybean as well as dominant weed species.

RESULTS AND DISCUSSION

Obtained results, revealed the occurrence of only three aphid species . They were; the cowpea aphid, *Aphis craccivora*(Koch.), the green peach aphid, *M. persicae* Sulzer and the cotton aphid, *Aphis gossypii* Glov. *(* Table 1). The occurrence of these aphid species on soybean is similar to that found by Amin (1979) and Halbert *et al.*, (1986). Results also show that, the abundance of these species was generally low. In average, *A. craccivora* was the highest(6.20 individuals / plant), *M. persicae (* 3.37 individuals / plant) and *A. gossypii* (1.88 individuals/plant). This result agrees with that reported by Irwin and Goodman (1981) and Gunasinghe *et. al*. (1988) who reported that aphid vectors of soybean mosaic virus SMV don't colonise the crop. Ren *et al.* (2000) added that morphological resistance (trichome density) in soybean plant has an important role and influence the probing activities of aphids.

Table (2) show the occurrence of 11 different wild plant species within soybean field. The present study reveals the occurrence of 3 different aphid species: *A. craccivora, M. persieae* and *A. gossypii* (Table 2) on wild plant species associated with soybean. Amin (1979) found *M. persicae* on 26 species of wild plant while *A. craccivora* occurred on 11 species and *A. gossypii* occurred on three species of wild plants. Dharpure and Paradkar (1999) found a total of 12 host plant indentified as weed hosts for aphids in soybean field.

The obtained data illustrated in Figs. (1,2, & 3) show that *Convolvulus arvensis* harbored the highest average number (*M. persicae*) (71.42individual/plant) followed by *Amaranthus* spp., *Euphorbia* spp. while *Solanum nigrum* and *Portulaca oleraceae* harbored the lowest number of aphids. The peak of *M. persicae* was recorded in August after which the population density decreased in mid September. *A. craccivora was* recorded on both *Euphrobia* spp. and *Portulaca oleraceae* (Figs. 1,2, & 3). *Portulaca oleraceae* hosted the maximum average number of *A. craccivora* where firstly appeared at the end of July peaked in mid August and disappeared at the end of September. These results are in agreement with Alegbejo (1999) who

reported that, *Euphorbia* spp. harboured *A. craccivora* and Velchura *et al.* (2001) who found that *M. persicae* colonized *Euphorbia* spp. The results presented in Figs. (1,2, & 3) illustrated that, both *Solanum nigrum* and *Portulaca oleracea* hosted a low average number of *A. gossypii. A. gossypii* occurred in mid July until the end of September. The peak was recorded at early August. This result is in parallel with Quimio and Calilung (1993) who reported that, *A. gossypii* had very low presence (11.4%) in the field.

Table (1) : Weekly average numbers of the three aphid species/ plant occurred on soybean (*Glycine max.* L.) plants in the field at Giza region, throughout the growing seasons (2001and 2002).

Sample date		Aphid species					
		A.carccivora		*M.persicae*		*A.gossypii*	
Month	Week	2001	2002	2001	2002	2001	2002
June	4	0	0	0	0	2	0
	5	0	2	0	0	0	0
July	1	0	0	0	0	1	0
	2	0	3	0	0	0	0
	3	0	5	0	3	0	1
	4	2	3	0	0	0	0
August	1	0	8	0	0	1	0
	2	4	6	1	2	0	2
	3	6	9	5	6	3	3
	4	10	7	4	4	2	0
September	1	9	9	2	3	3	0
	2	7	4	3	5	0	2
	3	10	0	5	3	1	1
	4	8	0	2	1	3	0
	5	4	0	3	0	1	0
October	1	2	0	0	0	1	0
Total		62	56	25	27	17	9
Average		6.20	5.60	3.13	3.37	1.88	1.80

Table (2) : Wild host plant species recorded within the soybean field and the associated aphid species, at Giza region, throughout the growing seasons (2002-2004).

Common name	Scientific name	Arabic name	Associated aphid species
Bermuda Grass	*Cynodon dactylon*	El-negeel El-balady	Nil
Geniculata	*Euphorbia* spp.	Laban El Homara	*A. craccivora, M. persicae*
Struamrium	*Xanthium steumarium*	El shobate	Nil
Lesser Bindweed	*Convolvulus arvensis*	Elolaae	*M. persicae*
Black Nightshode	*Solanum nigrum*	Enab-eldeib	*M. persicae, A. gossypii*
Purslane	*Portulaca oleraceae*	Rigla	*A. carccivora, M. persicae, A. gossypii*
False Daisy	*Echipla alba*	ElSa'ad	Nil
Lividus	*Amaranthus* spp.	Orf eldeek	*M. persicae*
Difformis	*Cyperus difformis*	Agira	Nil
Deccan Grass	*Echinochloa colonum*	Abu-rokba	Nil
Egyptian Finger Grass	*Dactyloctenium aegyptius*	Rigl elherbaya	Nil

Fig. (1): Weekly average number of aphid species associated with the dominant wild plant species in the soybean field at Giza region, throughout the growing season (2002).

Fig. (2): Weekly average number of aphid species associated with the dominant wild plant species in the soybean field at Giza region, throughout the growing season (2003).

Fig. (3): Weekly average number of aphid species associated with the dominant wild plant species in the soybean field at Giza region, throughout the growing season (2004).

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الحصر والوفرة الموسمية لحشرات المن على فول الصويا وأنواع الحشائش المرتبطة بها في منطقة الجيزة، مصر

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تم في هذه الدراسة إجراء حصر لأنواع المن علي الحشائش المرتبطة بنباتات فول الصويا في منطقة الجيزة بمصر، حيث وجد أن هناك إحدى عشر نوعاً من الحشائش مرتبطة بمحصول فول الصويا في الحقل وهي النجيل، لبن الحمارة، العليق، عنب الديب، السعد، عرف الديك، العجيرة، أبو ركبة، رجل الحرباية، رجلة والشبيط وهي تأوي ثلاث أنواع مختلفة من حشرات المنّ، و هى منّ اللوبيا *A. craccivora* ، ومنّ القطن *A. gossypii* ومنّ الخوخ الأخضر *M. persicae*، وقد دلت بيانات النتائج المتحصل عليها أن منّ الخوخ الأخضر تواجد على ٥ أنواع من الحشائش وهي (لبن الحمار، العليق، عنب الديب، الرجله، عرف الديك) بينما وجد كل من النوعين : منّ اللوبيا ومنّ القطن على نوعين فقط من الحشائش والنباتات البرية المرتبطة بفول الصويا.

وقد أسفرت نتائج الحصر على أن نبات العليق تواجد علية أعلى تعداد من منّ الخوخ الأخضر (*M. persicae*)، بينما تواجد أعلى تعداد من منّ اللوبيا (*A. craccivora*) على نبات الرجلة، أما منّ القطن (*A. gossypii*) فقد تواجد بوفرة على حشيشة عنب الديب إذا ما قورن بالرجلة.

يعتبر وجود هذه الحشائش المرتبطة بنبات فول الصويا توضيحاً جيداً للدور الذي تلعبه هذه الحشائش البرية كعائل لحشرات المنّ.