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RESEARCH ARTICLE

The abundance and frequency of aphid species on rose shrubs in Baghdad province, Iraq

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Abstract

The current study recoded five aphid species colonizing cultivated and native rose shrubs in Baghdad province, Iraq for the duration of winter to early summer of 2012, namely *Aphis fabae* Scopoli, *A. gossypii* Glover, *Macrosiphum rosae* (L.), *Myzus persicae* (Sulzer) and *Rhodobium porosum* (Sanderson). The effect of temperature and relative humidity on the frequency of these aphid species were investigated here, the frequency was affected by these two weather conditions. Statistically analyzed showed high significant differences between frequency of aphid species and different plant parts of rose shrubs.

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Introduction

Roses (*Rosa* ssp. Rosaceae) are an exceptionally valuable decorative element of green areas in the cities and important ornamental shrubs. It is the most popular perennial flowering plant in almost all Countries. Some species such as (*Rosa damascena* Miller) represent an important aromatic plant providing volatile oils which are used for the production of medicines, perfumes, cosmetics and other aromatherapy products. It is cultivated as an agricultural crop in various countries of the northern hemisphere such as Bulgaria, China, Egypt, France, India, Iran, Morocco and Turkey (Demirozer, 2012).

A lot of phytophagous species occur on roses, among them aphids are the most numerous, aphid species are present on roses from late Winter to spring. The rose plant is attacked by a number of insect pests, out of which aphid (Homoptera: Aphididae) is very serious pest of rose plant. it causes disfiguring of the foliage, crippling of the shoot and injuring the buds and quickly smoothers the plant if allowed to breed freely (Becker, 1997).

Aphids feed on buds, shoots and leaves, colonies may persist throughout the year but are most numerous and troublesome in late spring and early summer (Buczacki & Harris, 1998). Strong infestation by the aphid resulted in the deformation of stems, leaves and flowers. (Jaskiewicz, 1997). The insect pours sugary excreta known as honeydew which facilitate the growth of black fungus on them. A black fungus may

also develop on the honeydew excreted by these insects giving an ugly look to the plant. According to Naeem (1996). The honeydew excreted by the aphid promotes the growth of sooty mold on flowers and surfaces of leaves. All of these factors together cause significant economic damage to rose crops by decreasing their beauty and the value of cut flowers (Alford, 1991). The population buildup of aphid is greatly influenced by the environmental factors such as temperature, relative humidity and rainfall, temperature is an important environmental variable that affects the rate of aphid development, reproduction, mortality, survival and subsequently its population increase (Dixon, 1987), a clear relationship was observed between occurrence and abiotic conditions high temperature (30 C), heavy rain and strong winds which all resulted in a drop in number of Aphids (Jaskiewicz, 1995). This study was focused on Baghdad province on rose aphids surveyed, since there are few records of the aphid from this region (Bodenheimer and Swirski ,1957; Daoud and El-Haidari,1968; Al-Ali,1977 and Ali et al., 2012 a,b). The purpose of this study was to identify the spectrum of aphid species attacking rose plants in this area, as well as to investigate the frequency of different aphid species on different plant parts of rose, this investigation also included study the effect of temperature and relative humidity on the frequency of rose aphid species.

Material and Methods

The study was performed between January to June 2012 on infested roses from five locations of Baghdad province / Iraq, these are: Al-jadiriya; Taji; Abu Ghraib; Al Hussiania; Al-Mansour, Al-Zuofrania). Populations of aphid pests in the infected roses were determined by regular weekly surveys performed between January and June. In each infected plants, 100 leaves, 100 stems (10 cm), 100 flower buds, 100 rose flowers were randomly collected. The counts for the determination of Aphid populations were made under stereomicroscope as follows:

- a. On the upper and bottom surfaces of leaves.
- b. On new stems.
- c. On rose flower buds.
- d. On rose flowers.

Sampling was done weekly; data were statistically analyzed for results by SPSS program version (IBM 20), Chi-Square test was applied for checking the correlation between aphid species frequency and different plant parts of rose.

The collecting and preserving technique was based mainly on Eastop and Van Emden (1972). General information about the weather conditions especially temperature and relative humidity fig.(1). for the duration of January to June in 2012 from <http://www.wunderground.com/history/airport/KQTZ> Insect samples collected during the study were kept in the Department of Entomology / Iraq Natural History Museum / University of Baghdad.

Result and Discussion

Fourteen aphid species are known on *R. damascena* in the world (Holman 2009; Natskova 1970), five aphid species were reported in this study on *Rosa* spp. namely *Aphis fabae* Scopoli, *A. gossypii* Glover, *Macrosiphum rosae* (L.), *Myzus persicae* (Sulzer) and *Rhodobium porosum* (Sanderson). Percentages of population of each aphid species were recorded here as rose pests from Baghdad province, Iraq (Fig. 2).

Aphis fabae was observed on rose firstly in second week of January and the percentage of population reached maximum at June, while Jaśkiewicz (2004) reported that the presence of this aphid species on rose shrubs was observed most frequently from June till the end of July in the urban conditions of Lublin.

A. gossypii is the most dominant aphid species in cold climate, occurred from first week of January to end of June, this species with *Myzus persicae* could be considered perhaps as tentative or important aphid pests in Iraq (Ali, 2012) the two species are highly polyphagous being particularly evident during the dry season in hot countries (Blackman & Eastop, 2006).

Macrosiphum rosae appeared from second week of February to end of May the maximum occurrence of this species in the end of February when the average mean of temperature is low. Jaśkiewicz (2004) found that this species spread at the turn of April and May, this difference in occurrence due to the differences in temperature and humidity between these two countries. Since Baghdad city shows an extreme climate with maximum temperature in summer reaching 52°C and a winter temperature of -1°C. *M. rosae* have a limited range of host plants, food quality and temperature over which their population increases (Dixon, 1998). Our results in accordance with those obtained by (Mehrparvar & Hatami, 2007; Olmez et al. 2003) indicate that the developmental rate of *M. rosae* declines at temperature higher than 22 °C.

Rhodobium porosum is the lowest percentage of aphid population, it's appeared from first week of March to end of May in very small numbers. This study provided the first information about the appearance of this species in Iraq, since recorded by Ali (2012) later. Barjadze *et al.* (2011) also recorded this aphid on *Rosa damascena* later in the neighboring county (Turkey).

Weather conditions affected the population dynamics of all aphid species, drought and high temperatures (over 30°C) reduced the aphid number (Jaśkiewicz, 2004).

Ahmed and Aslam, (2000) also observed that high temperature (over 30 °C) reduced the number of aphid on rose when they study some environmental factors on rose aphid *Macrosiphum rosaeiformis* Das. The present study showed that *Macrosiphum rosae* and *Rhodobium porosum* appeared only throughout period when new rose buds form, while *Aphis fabae*, *A. gossypii* and *Myzus persicae*, colonies persist not only throughout this period but also all of rose vegetation period.

Akhtar and Abdul Khaliq, (2003) reported aphid population declines at the end of season rose aphid to approximately to zero due to high temperature above 30° C, while in this study we observed that some aphid *Aphis fabae*, *A. gossypii* and *Myzus persicae*, Analysis result was highly significant between frequency of aphid species and different plant parts of rose ($X^2 = 75.63$ and $P < 0.001$), the minimum frequency value on rose stems was for *A. fabae* and *A. gossypii*, on leaves and flowers for *M. rosae* while

Maximum frequency value on rose flower was for *A. gossypii* on stems for *M. rosae* and *R. porosum* and on leaves for *A. fabae* (Fig. 3). Jaśkiewicz (2004) reported that *A. fabae* colonised only the flower petals of the examined roses.

According to Schopfer (2006) the development of any plant is ruled with growth or other developmental changes such as thickness in cell wall, so each of these aphid species occurred or presented on different rose parts because of slight differences in the

morphometric parameters of the rostrum of these species (Blackman and Eastop, 1994).

Akhtar and Abdul Khaliq (2003) studied the maximum population value for rose aphid *Macrosiphum rosaeiformis* which was different on all parts of rose. Kraz *et al.* (1977) presented original information on aphid population, that increase in main growing period of plant up to the time of flowering.

Figure. 1 Average mean temperatures and relative humidity for the duration of January to June 2012, Baghdad province, Iraq.

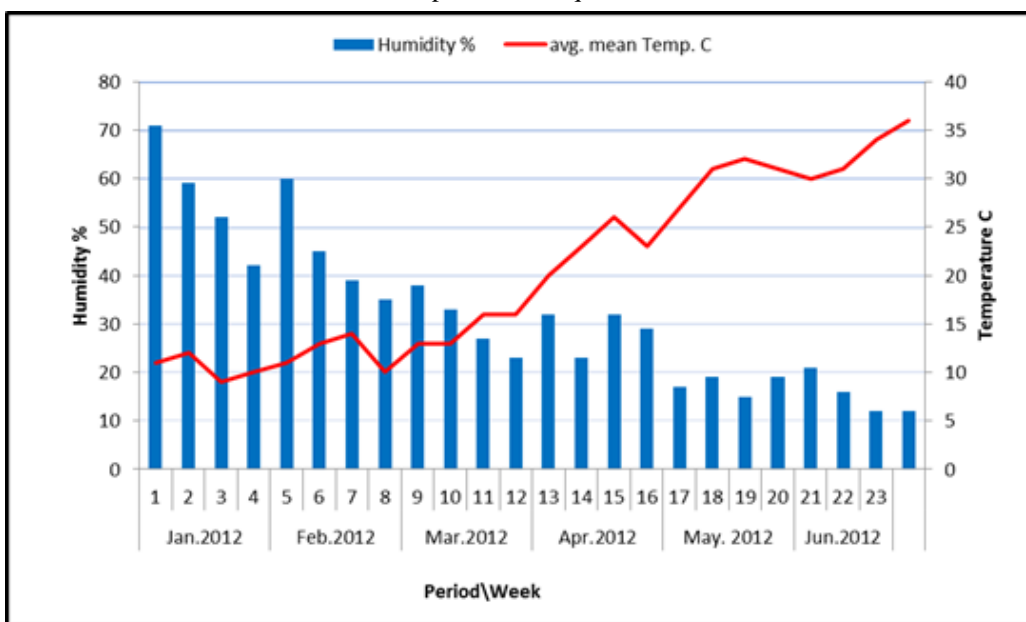


Figure. 2 Percentage of population of each aphid species infested rose for the duration of January to June 2012, Baghdad province, Iraq

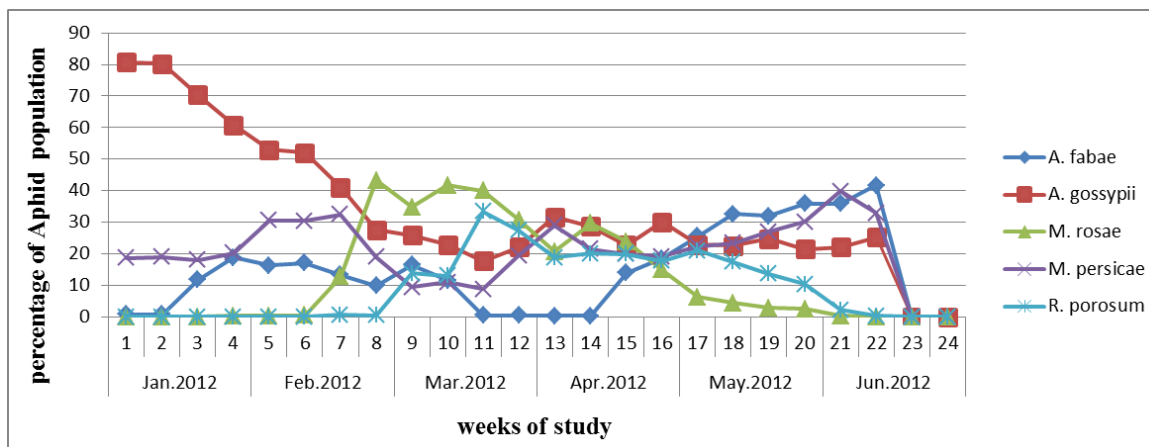
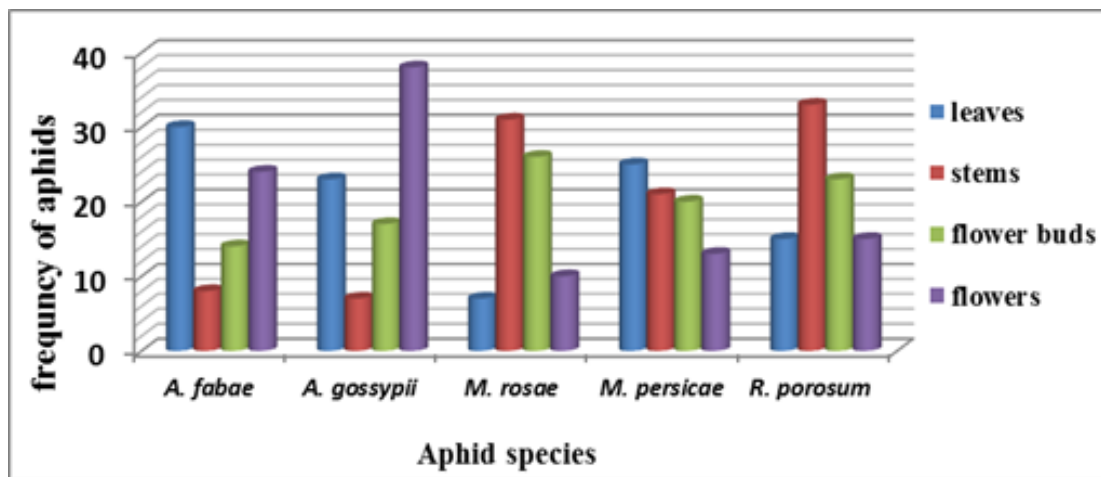


Figure 3 Frequency of aphid species on different plant parts of rose



Conclusions

1. Five aphid species colonizing cultivated and native rose shrubs in Baghdad province, Iraq for the duration of winter to early summer of 2012, namely *Aphis fabae* Scopoli, *A. gossypii* Glover, *Macrosiphum rosae* (L.), *Myzus persicae* (Sulzer) and *Rhodobium porosum* (Sanderson).
2. The frequency of aphid species infesting rose shrubs was affected by weather conditions (temperature and relative humidity).
3. Statistically analyzed showed high significant differences between frequency of aphid species and different plant parts of rose shrubs.

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