

ECOLOGICAL STUDIES ON APHIDS INFESTING SOME MEDICINAL AND AROMATIC PLANTS IN EGYPT

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Abstract

Aphids are one of the most injurious insect pests infesting medicinal and aromatic plants in Egypt.

During vegetative stage, coriander was infested with three aphid species, namely *Aphis gossypii* Glover, *Rhopalosiphum maidis* Fitch. and *Myzus persicae* Sulzer, while caraway plants were attacked by only *M.persicae*. During the flowering and fruiting stages coriander and caraway were infested also with *Hyadaphis coriandri* Das. On the other hand, no aphids were observed on geranium plants. Statistical analysis showed that the temperature had a negative effect on the population of *Myzus persicae* Sulzer, while relative humidity have a positive effect. Thus, this species preferred low temperature and high humidity. On the contrary, the population density of *Hyadaphis coriandri* Das and *Aphis gossypii* Glover, were positively correlated with the temperature, while the relative humidity had a negative effect on the aphid population density.

INTRODUCTION

The presence of aphids as a pest attacking medicinal and aromatic plants was studied by several authors. Hall (1926) and Habib and El-Kady (1961), revealed that *H.coriander* Das was firstly recorded in Egypt on fennel under the name *Hyalopterus obscurus*. Dawood (1971) mentioned that ornamental plants were attacked by many aphid species including *A.gossypii*, *A.craccivora* and *M.persicae*. Araujo (1986) in Brazil found that coriander plants were heavily infested with *M.persicae*. Jain and Yadava (1986) in India, stated that delay in the sowing date of coriander caused an increase in the population density of the aphid *H.coriandri* and reduction in the yield

took place. Ali (1988) recorded that, 28 insect species were found associated with coriander plants, the most abundant species were aphids, thrips, wasps and bugs. Safaa (1989) mentioned that from the different species of aphids infesting medicinal plants, *M.persicae* was the most injurious and dominant on coriander in the vegetative stage and *H.coriander* during the flowering and fruiting stages on both coriander and fennel.

MATERIALS AND METHODS

Three medicinal plants namely, Coriander (*Coriandrum sativum* L.), Caraway (*Carrum carvi* L.) and Geranium (*Pelargonium graveolens*) were cultivated at the Experimental Farm of the Biological Research Station of the National Organization for Drug Control and Research, Giza for two successive years, 1990 and 1991. The experimental design was completely randomized block replicated three times. The plot size was 1/100 feddan. All regular agricultural practices were performed and no insecticides were applied. Samples of 10 leaves each, collected from 10 plants were taken weekly at random from each plot as soon as the newest vegetative growth appeared, the total number of aphids on 30 leaves together were taken as an indication of the population size of aphids at a given data from every tested medicinal plants. Through the flowering and fruiting stages, one flower was picked up at random from one sample, florescence and one fruit sample was taken randomly from 30 plants.

Daily mean temperature and relative humidity throughout the experimental periods were obtained from ARC, Giza Station and their weekly means were calculated. Data obtained were subjected to regular statistical analysis and mean comparison were carried out using LSD at 5% as described by Snedecor and Cochran (1981).

RESULTS AND DISCUSSION

The present work was carried out to study the changes in the population trends of aphids infesting coriander, caraway and geranium plants under field conditions.

1. Survey

a) Aphids infesting coriander, *Coriandrum sativum* L.

Survey study on coriander, revealed the occurrence of three aphid species during the vegetative stage, namely *Aphis gossypii* Glover, *Rhopalosiphum maidis*

Das, and *Myzus persicae* Sulzer. The first and second species were few and found scattered throughout the experimental field, while the third was the dominant and more injurious. This result is in agreement with Araujo (1986), who found that coriander plants in Brazil, were heavily infested with *Myzus persicae*. On the other hand, during the flowering and fruiting stages the plants were infested with *Hyadaphis coriandri* Das which was found attacking the simple and compound inflorescence and the simple fruits.

b) Aphids infesting caraway, *Carrum carvi* L.

The study showed the presence of *Myzus persicae* during the vegetative stage without any damage to caraway plants, which were also infested with *Hyadaphis coriandri* Das during the flowering and fruiting stages.

C) Aphids infesting geranium, *Pelargonium graveolens*

No aphid infestation was recorded on geranium plants growing during 1990 and 1991 seasons.

2. Seasonal abundance of aphids

a) On coriander

i. *Myzus persicae* Sulzer

Data in Table 1 showed the weekly fluctuations of the mean numbers of *M.persicae* per leaf and the weekly means of temperature and relative humidity one week earlier during 1990 and 1991 seasons, during the vegetative stage. It is obvious that this species was nearly subequally abundant during 1990 and 1991, the seasonal mean numbers were 2.5 and 2.4 individuals per leaf, respectively. Statistical analysis showed that there were no significant differences between the two seasons. The occurrence of this species on the leaves and stems began from the first week of January and continued till the third week of February in both seasons. The population density increased gradually reaching its peak on the fourth week of January (6.4 and 6.7 insects/leaf in 1990 and 1991, respectively). Simple correlation values between the weekly means of temperature and relative humidity, Table 1, showed that the temperature had a negative effect on the population density, while the relative humidity had positive effect. Thus, this species preferred low temperature and high humidity.

Table 1. The changes in the weekly mean number of *Myzus persicae* Sulzer infesting vegetative stage of *Coriandrum sativum* per leaf and the corresponding weekly means of temperature and relative humidity during 1990 and 1991 seasons.

Month	Week	Mean number of Insects			Temperature °C		Relative humidity %	
		1990	1991	Average	1990	1991	1990	1991
January	1st	0.367	0.467	0.417	14.4	14.5	67	72
	2nd	1.700	1.167	1.433	12.7	13.2	74	72
	3rd	5.000	3.800	4.400	12.8	12.0	69	66
	4th	6.36	6.653	6.450	19.9	12.2	70	67
February	1st	1.167	1.533	1.350	13.1	16.6	71	57
	2nd	0.333	0.633	0.483	15.5	16.8	52	56
Average		2.489	2.356					

Mean temperature °C and relative humidity recorded above are one week earlier.

LSD	0.05	0.01			
year	NS	NS		R.H.	Temp.
Inspection date	0.873	1.190		Correlation (r^2)	0.266
Year x Inspection date	NS	NS		Regression (b)	-0.624
					0.087
					-0.888

ii. *Hyadaphis coriandri* DAS

Data in Table 2 showed the weekly mean number of *H. coriandri* Das per leaf during the flowering and fruiting stages and the corresponding weekly means of temperature and relative humidity one week before. The results revealed that there was no significant difference between the two seasons 1990 and 1991. The seasonal mean number of 14.7 and 14.1 individuals per leaf, respectively. The aphids started to appear on the third week of February in both seasons and disappeared on the second week of May. The number of insects reached its peak (66.5 and 63.7 insects per leaf during 1990 and 1991, respectively), on the third week of April. The numerical changes in the population density was positively correlated with the temperature and negatively with the relative humidity.

b) On caraway

i. *Hyadaphis coriandri* DAS

Caraway was infested with *H. coriandri* during the flowering and fruiting stages during 1990 and 1991 seasons. Data in Table 3, showed that there was no significant difference between the two seasons. The mean numbers of individuals per leaf were 12.5 and 12.7 insects during 1990 and 1991, respectively.

The first appearance of aphids on the plants started during the first week of April in the two seasons. The population density reached its peak (29.3 insects per leaf) in the second week of May in 1990, while in 1991 the population reached its peak (27.8 insects per leaf) on the first week of May. The number of aphids declined after that and completely disappeared in the first week of June during the two seasons. Simple correlation and regression between the weekly means of temperature and relative humidity, Table 3, showed that temperature had a positive effect, while relative humidity had a negative effect on the population density in the two years.

Table 2. The changes in the weekly mean number of *Hyadaphis coriandri* Das infesting vegetative stage of *Coriandrum sativum* per leaf and the corresponding weekly means of temperature and relative humidity during 1990 and 1991 seasons.

Month	Week	Mean number of Insects			Temperature °C		Relative humidity %	
		1990	1991	Average	1990	1991	1990	1991
February	3rd	0.833	2.100	1.467	15.5	16.8	52	56
	4th	2.533	3.267	2.900	13.9	15.9	64	58
March	1st	3.367	2.000	2.683	15.6	20.6	61	58
	2nd	4.933	2.467	3.700	16.0	20.1	63	53
	3rd	6.000	3.233	4.617	18.6	21.0	59	65
	4th	10.133	12.267	11.200	19.1	21.0	61	50
April	1st	23.467	24.233	23.850	20.2	21.1	50	48
	2nd	31.067	31.767	31.417	22.0	22.0	50	50
	3rd	66.500	63.733	65.117	23.0	22.2	51	49
	4th	11.900	9.433	10.667	23.4	24.6	52	50
May	1st	0.767	0.800	0.783	20.9	24.9	51	45
Average		14.682	14.118					

From the previous results, it could be concluded that the population density of *M.persicae* was negatively correlated with temperature and positively with the relative humidity, while population density of *H.coriander* was negatively correlated with temperature and positively with relative humidity.

In general, it seems that the main weather factors (daily mean temperature and daily relative humidity) appeared to affect the population densities of different aphid species occurring during the two seasons, 1990 and 1991, on the previous plants, under these circumstance.

Table 3. The changes in the weekly mean number of *Hyadaphis coriandri* Das infesting vegetative stage of *Carum carvi* per leaf and the corresponding weekly means of temperature and relative humidity during 1990 and 1991 seasons.

Month	Week	Mean number of Insects			Temperature °C		Relative humidity %	
		1990	1991	Average	1990	1991	1990	1991
April	2nd	1.433	1.133	1.283	202	22.0	50	50
	3rd	1.867	6.833	4.350	22.0	22.2	50	49
	4th	5.000	21.533	13.267	22.5	24.6	51	50
May	1st	18.733	27.833	23.283	23.4	24.9	52	45
	2nd	29.267	16.167	22.717	20.9	27.3	51	43
	3rd	21.267	9.033	15.150	24.6	26.0	48	46
	4th	9.967	6.667	8.317	27.1	22.7	48	51
Average		12.506	12.743					

Mean temperature °C and relative humidity recorded above are one week earlier.

LSD 0.05 0.01

year NS NS

Inspection date 2.797 3.791

Year x Inspection date 3.956 5.361

Correlation (r²)

Regression (b)

Temp.

R.H.

-0.235

-0.885

1.291

REFERENCES

- 1 . Ali, A.G.A. 1988. Ecological and control studies on certain pests infesting medicinal and aromatic plants. Ph.D. Thesis, Fac. Agric., Assiut Univ., Egypt.
- 2 . Arajio, C.Z.D. 1986. Occurrence of *Myzus persicae* Sulzer, (Homoptera, Aphidiae) on a crop of coriander, *Coriandrum sativum* L., Ann. Soc. Ent., Brazil (1): 173-174. (C.F. Rev. Appl. Ent., Vol. 75).
- 3 . Dawood, M.Z. 1971. Survey of aphids and mealy-bugs infesting ornamental plants. M.Sc. Thesis, Fac. of Agric., Cairo Univ., Egypt.
- 4 . Habib, A. and E.A. El-Kady. 1961. The Aphididae in Egypt. Bull. Soc. Ent. Egypt., 45: 80.
- 5 . Hall, W.J. 1926. Notes on the Aphididae of Egypt. Tech. Sci. Serv., Bull., 68: 30-41.
- 6 . Jain, P.C. and C.P.S. Yadava. 1986. Effect of dates of sowing on the influence of insect pest of coriander. Indian J. Agric. Sci, 56 (1): 56-59. (C.F. Rev. Appl. Ent., 56 (1): 56-59).
- 7 . Safaa, M.F. Aly. 1989. Biochemical and chemical studies on some medicinal plants pests. Ph. D. Thesis, Fac. of Sci., Ain Shams Univ., Egypt.
- 8 . Snedecor, G.W. and W.G. Cochran. 1981. Statistical Methods. Seventh Edition, Iowa State Univ. Press, Ames, Iowa, USA.

دراسات بيئية على المن الذي يصيب بعض النباتات الطبية والعطرية في مصر

REFERENCES

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تلعب النباتات الطبية والعطرية دوراً هاماً في الصناعات الدوائية وكذلك كأعشاب مجففة تستعمل مباشرة في الطب الشعبي كما أن جزءاً من إنتاج هذه النباتات يصدر إلى بعض دول العالم. والنباتات الطبية والعطرية شأنها كشأن غيرها من النباتات الأخرى تكون عرضة للإصابة بالعديد من الآفات الضارة التي تؤثر على إنتاجيتها. ويلعب المن دوراً هاماً في هذا التأثير. ونظراً لقلّة الدراسات عليه في مصر، لذا تم إجراء بعض الدراسات على كل من نبات الكزبرة *Coriander* والكراوية *Caraway* والعتر *Geranium* في محطة بحوث المنظمة القومية لبحوث العقاقير (محافظة الجيزة).

وقد أظهرت النتائج المتحصل عليها ما يلي:

(١) نبات الكزبرة : تم حصر ثلاثة أنواع من المن تصيب المجموع الخضري هي (من القطن ومن الذرة ومن الخوخ) ويعتبر من الخوخ الأخضر أكثر الأنواع كثافة عدديّة من الأنواع الأخرى. كما أن المن *Hya-daphis coriandri* Das وهو الوحيد الذي يصيب نباتات الكزبرة خلال فترتي التزهير والإثمار .

(٢) نبات الكراوية : تصاب النباتات أثناء النمو الخضري بمن الخوخ ولكن بأعداد قليلة لا تسبب ضرراً يذكر كما تصاب أيضاً أثناء النمو الثمري بمن *H.coriandri*.

(٣) نبات العتر : أظهرت الدراسة أن نباتات العتر لاتصاب بأي نوع من أنواع المن كما وجد تناسب عكسي بين الكثافة العددية لحشرات من الخوخ ودرجات الحرارة وتتناسب طردياً مع الرطوبة النسبية. كما تتناسب الكثافة العددية لكل من حشرتي *A.gossypii*، *H.coriandri* طردياً مع درجة الحرارة وعكسياً مع الرطوبة النسبية.