

**The effect of the feeding of *Macrosiphum rosae* (L.)
and *Chaetosiphon tetrarhodus* (Walk.) on the flowering of roses**

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S u m m a r y

Studies concerning the effect of the feeding of aphids *Macrosiphum rosae* (L.) and *Chaetosiphon tetrarhodus* (Walk.) on the flowering of roses were carried out in four sites in the green area of Lublin in the years 2001-2003. The studies comprised the shrubs of the park rose 'Grandhotel', the Rugosa rose, the multiflorous rose and the flower-bed roses of various cultivars. Aphids *Ch. tetrarhodus* dominated on Rugosa rose, while *M. rosae* dominated on the other roses. Aphids *M. rosae* and *Ch. tetrarhodus*, when found in greater numbers, caused deformation of the leaf blades, the shortening of shoots and petioles, as well as deformation of the flowers.

Key words: *Macrosiphum rosae* (L.), *Chaetosiphon tetrarhodus* (Walk.), roses, occurrence, urban green area

INTRODUCTION

Roses are the shrubs of exceptionally decorative character, especially at during the flowering period. A lot of species are also cultivated because of the shrub habit, effective colouring of the leaves in summer in autumn and the their decorative fruit and thorns (Bugala, 2000; Seneta and Dolatowski, 2003). Nowadays, thousands of cultivars are known whose flowers are often big, full and they smell nice, and besides, the "noble" roses usually repeat their flowering (Gottschalk, 1991). Valuable rose oil is distilled from the rose petals and it is utilized in industry (Bugala, 2000). The massive occurrence of a number of aphid species that take their food from the fibre-vascular bundles and the parenchyma can cause considerable injuries on roses. The colonized plants have small increases, they lose their leaves earlier, flower poorly and besides, they are covered with honey-dew which lowers the decorative nature of the plants.

The purpose of the paper was to determine the effect of the feeding of aphids *Macrosiphum rosae* (L.) and *Chaetosiphon tetrarhodus* (Walk.) on the flowering of roses in the urban environment.

MATERIAL AND METHODS

The studies concerning the effect of the feeding of aphids *Macrosiphum rosae* (L.) and *Chaetosiphon tetrarhodus* (Walk.) on the flowering of roses were conducted in the green area of the Lublin city in the years 2001-2003. The observations were made on four sites: situated close to a road (A), close to the street (B), in a housing estate (C) and in the park (D). Three shrubs of the park rose 'Grandhotel', three of Rugosa rose and three of the multiflorous rose, as well as five flower-bed roses of different cultivars were selected in each of the sites. Three shoots were randomly chosen on each shrub of flower-bed roses, while in the case of the other shrubs, five shoots were chosen. Both winged and wingless aphids (including the larvae) were counted on the shoots of similar length. The plants were observed from early spring till late autumn, with 10-days' intervals. The place of the feeding and the injuries caused by the aphids were determined.

RESULTS

The 'Grandhotel' park roses were colonized mostly by aphids *Macrosiphum rosae* (L.) in each of the studied years. Their total number reaching more than 47.000 individuals totally in all the years of studies, whereas the number of aphids *Chaetosiphon tetrarhodus* (Walk.) did not exceed 2.500 individuals. Similar results were achieved on multiflorous roses and the flower-bed roses, where *M. rosae* was the dominating species. The number of aphids *M. rosae* on multiflorous roses reached 8,552 individuals, while the population of *Ch. tetrarhodus* was 2.309 individuals. More than 18.000 aphids *M. rosae* were observed on the flower-bed roses, while *Ch. tetrarhodus* occurred only in one year (2002) – 10 individuals. On the other hand, aphids *Ch. tetrarhodus* were much more numerous in each year of the studies on the shrubs of Rugosa rose, their number reaching 174.020 individuals, while the population of *M. rosae* reached 11.150 individuals.

During the three years of studies, both aphid species were found in the greatest numbers on the shrubs of Rugosa rose, where more than 185.000 individuals were observed (Fig. 1). On the other hand, those aphids were the least numerous on the multiflorous roses, where almost 11.000 individuals were observed (Table 1).

The biggest number (40.931 individuals) of aphids *M. rosae* was observed on the site close to the road (A), while the smallest (12.497 individuals) was found in the park site (D). Aphids *Ch. tetrarhodus* were also the least numerous (5.468 individuals) in the park site (D). On the other hand, the biggest number of this species (106.681) was observed in the street site (B) (Table 2).

Table 1
The number of aphids *Macrosiphum rosae* (L.) and *Chaetosiphon tetrarhodus* (Walk.) occurring on roses in 2001-2003.

Rose	Year	<i>Macrosiphum rosae</i> (L.)	<i>Chaetosiphon tetrarhodus</i> (Walk.)	Total
Park rose 'Grandhotel'	2001	20053	196	49360
	2002	6394	454	
	2003	20651	1612	
	Total	47098	2262	
Flower-bed roses	2001	4931	-	18362
	2002	12233	10	
	2003	1188	-	
	Total	18352	10	
Rugosa rose	2001	7851	67618	185170
	2002	2492	83032	
	2003	807	23370	
	Total	11150	174020	
Multiflorous rose	2001	2923	31	10861

Table 2
The number of aphids *Macrosiphum rosae* (L.) and *Chaetosiphon tetrarhodus* (Walk.) occurring on roses in particular sites in 2001-2003.

Species	Site			
	Close to the road (A)	Close to the street (B)	Housing estate (C)	Park site (D)
	Number [in specimens]			
<i>Macrosiphum rosae</i> (L.)	40 931	14 455	17 269	12 497
<i>Chaetosiphon tetrarhodus</i> (Walk.)	39 758	106 681	26 694	5 468
Total	80 689	121 136	43 963	17 965

Aphids *M. rosae* at first fed on the developing leaf buds, and next they moved to the leaves, the top parts of the shoots, the flower buds and the sepals. Individual specimens were also found on the rose petals. This species occurred in two colour varieties, namely green and pink ones (Fig. 2). The green individuals were observed throughout the period of vegetation, while the pink ones were found in spring and autumn. In the summer time of the studied period partial or complete disappearance of the aphids of this species was observed on the analyzed shrubs.

The pale green individuals of *Ch. tetrarhodus* on Rugosa rose occurred in exceptionally big numbers, covering the bottom part of the leaf blades, the top parts of the shoots, the pedicels and the flower buds. In summer they fed most frequently on older leaves and on the shoots between the strigose thorns. This species was observed irregularly on the shrubs of the park rose 'Grandhotel', the multiflorous rose and the flower-bed roses, and its number was several times as low. In the years when the number of both species of aphids was very big, we observed deformation of the leaf blades, the shortening of the shoots and petioles, deformation of the flowers, as well as the secreted honeydew. Those injuries significantly lowered the decorative value of the studied plants.



Fig. 1. *Macrosiphum rosae* (L.) and *Chaetosiphon tetraerhodus* (Walk.) on the floral bud of the Rugosa rose.



Fig. 2. *Macrosiphum rosae* (L.) on the floral bud of rose.

DISCUSSION

M. rosae is the species whose presence was observed in each year studied on the roses from each utility group and on each of the examined sites, which testifies to its widespread occurrence. In a number of items of literature, this aphid is described as the species occurring on roses most frequently and in the greatest number (Cichocka and Jaśkiewicz, 2003; Jaśkiewicz, 1997b, 1999, 2000, 2003).

Ch. tetrarhodus is the species observed on roses from each utility group; however, it did not occur every year and not in all sites. Individual specimens were found on the flower-bed roses only in the year 2002. It occurred in small numbers on the shrubs of the 'Grandhotel' park rose, especially in the year 2001. Cichocka and Jaśkiewicz (2003) write about bigger number of this species on wild roses as compared to the noble ones, at the same time mentioning its increasing importance in the last 30 years. On the other hand, in earlier literature this aphid was described as the species occurring on roses in small numbers, also on *Rosa rugosa* (Jaśkiewicz, 1995, 1997a).

Bigger number of aphids were found on roses in the site with increased traffic as compared to the park site. The above data confirm the results of studies that point out that in the polluted urban environment observed increasing numbers of insects with the stinging-sucking mouth apparatus were observed (Cichocka and Goszczyński, 1991; Jaśkiewicz, 2003).

The feeding of aphids causes deformation of shoots and leaves on host plants, checking their growth and leading to poorer blooming and fructification. Besides, the honey-dew secreted by aphids sticks up the stomata, in this way making the gas exchange difficult and disturbing the processes of assimilation (Cichocka, 1980; Cichocka and Goszczyński, 1986). Aphids *Ch. tetrarhodus* and particularly *M. rosae*, when found in greater numbers, checked the growth of the shoots, caused deformation and discoloration of the leaves and deformation of the flower buds and flowers. Besides, the plants were covered with honey-dew, where saprophytic fungi marring the plants developed. Similar information is given by Cichocka (1980) and Jaśkiewicz (1997a, 1999, 2003).

CONCLUSIONS

1. Aphids *Chaetosiphon tetrarhodus* (Walk.) dominated on Rugosa rose, while *Macrosiphum rosae* (L.) dominated on the other roses.

2. Both aphid species were most numerous on the shrubs of Rugosa rose, and the least numerous on the multiflorous rose.

3. The biggest number of aphids *Macrosiphum rosae* (L.) was observed on the roses in the road site (A), while *Chaetosiphon tetrarhodus* (Walk.) dominated in the street site (B). Aphids of this species were the least numerous on the roses in the park site (D).

4. Aphids *Macrosiphum rosae* (L.) and *Chaetosiphon.tetrarhodus* (Walk.) fed on the leaves, the top parts of shoots, petioles and flower buds, as well as on the sepals. Clear injuries of the plants, such as deformation of the leaf blades, the shortening of the shoots and petioles, deformation of the buds and flowers, were observed with bigger populations of the aphids, particularly *M. rosae*.

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**Wpływ żerowania *Macrosiphum rosae* (L.)
i *Chaetosiphon tetraerhodus* (Walk.) na kwitnienie róż**

Streszczenie

Badania dotyczące wpływu żerowania mszyc *Macrosiphum rosae* (L.) i *Chaetosiphon tetraerhodus* (Walk.) na kwitnienie róż prowadzono w latach 2001-2003 na terenie zieleni miejskiej Lublina na czterech stanowiskach. Badaniami objęto krzewy róży parkowej 'Grandhotel', róży pomarszczonej, róży wielokwiatowej oraz róże rabatowe różnych odmian. Na róży pomarszczonej dominowała mszyca *Ch. tetraerhodus*, natomiast na pozostałych różach *M. rosae*. Mszyce *M. rosae* oraz *Ch. tetraerhodus* przy liczniejszej obecności powodowały zniekształcenie blaszek liściowych, skracanie pędów i szypułek kwiatowych oraz deformacje kwiatów.