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# THE MAIN PESTS OF ORNAMENTAL TREES GROWN IN KRAKÓW

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The soil and air pollution exerts an unsuitable effect on the wholesomeness and further development of trees cultivated in Krakow. Weakened plants become more susceptible to a pest attack. Growing contamination of the urban environment and the increasing abundance of some phytophagous mites and insects are observed simultaneously. In 2003-2004 observations on the occurrence and species composition of mites and insects were carried out on four most common tree species grown in the area of Krakow.

*Key words:* green areas, ornamental trees, parks, pests, phenological observations, urban entomology.

The urban environment creates specific conditions for the insect development [4]. The green city areas like parks, areas among buildings and those along the roads provide completely different conditions. At each of the locations mentioned, the abundance of insects as well as their mutual proportions differs. The degree of city urbanization significantly influences the species composition of phytophagous insects. In such conditions the importance of insects with a biting mouth part decreases, whereas the role of pests with a sucking-piercing mouth part [2] and the role of leaf miners increase. The increased amount of phytophagous insects and the decrease of the zoophagous ones result in an unbalanced natural equilibrium and may eventually lead to pest gradation. The trees grown along the streets with heavy traffic are heavily attacked by phytophagous mites [5, 9] and aphids, whose number might otherwise be several hundred times higher than in parks [13].

An observation was carried out in 2003-2004, on four species of the most popular trees in Krakow: (Tilia cordata Mill., Acer pseudoplatanus L., Acer platanoides L. oraz Aescullus hippocastanum L.), grown in different locations (parks, the Planty green area, areas around buildings and along the main roads (Tab. 1). From each tree (four trees of every species), samples of 25 leaves were taken every 30 days and analyzed in a laboratory. The abundance of each studied insect as well as the percentage of the infested leaves and the degree of damage were evaluated.

Table 1

Location and number (in parentheses) of observed trees

| Species of tree | Parks | Planty | Greeny areas along roads | Greeny areas among buildings |
|---|---|---|---|---|
| *T. cordata* | Jordana (4) | Ul. Straszewskiego (4) | Ul. Nawojki (2)<br>Ul. Bratysławska (2) | Ul. Widok (4) |
| *A. pseudo-platanus* | Jordana (2)<br>Kleparz (2) | Al. Słowackiego (3)<br>Ul. Dietla (1) | Al. Pokoju (2)<br>Ul. Focha (2) | Ul. Nad Sudołem (3)<br>Ul. Widok (1) |
| *A. plata-noides* | Jordana (2)<br>Kleparz (2) | Ul. Basztowa (2)<br>Ul. Dunajewskiego (2) | Ul. Dietla (2)<br>Ul. Nawojki (2) | Ul. Widok (4) |
| *A. hippo-castanum* | Krakowski (3)<br>Jordana (1) | Ul. Westerplatte (2)<br>Ul. Straszewskiego (2) | Al. 29-Listopada (2)<br>Ul. Nawojki (2) | Ul. Widok (2) |

A two-year observation indicated the numerous presences of several dominating insects and mites during two vegetative periods. The list of the most abundant pests as well as the degree of danger they create for a host plant is presented in Tab. 2.

Lime trees (*Tilia cordata*), were host plants for one of the two most abundant species – *Eucallipterus tiliae* (fam. *Callaphididae*). The eggs over winter after they are laid close to the buds. The larvae appear at the beginning of May and occur until September, feeding on the lower parts of leaves, excreting plenty of honey-dew. The highest number of aphids was observed in June and July, which was confirmed by several other authors [3, 8]. Seven-eight generations develop during a vegetative season.

The lime tree sawfly (Caliroa annulipes, fam. Tenthredinidae) occurs mainly on Tilia cordata [14]. The larvae sceletonize leaves, which become brown and dry out. If the infestation is high, up to 100% of leaf surface might be damaged. The pupae overwinter under the soil surface at the depth of 15–20 cm. The adults emerge at the beginning of May and soon after that the lay eggs on the lower side of leaves. The larvae of the first generation were observed from mid-May up to mid-June, and the second generation from mid-July until mid-August. If the weather is extremely dry, the emergence of the second generation is uncertain.

Lime tree mite (Eotetranychus tiliarum fam. Tetranychidae) is a common pest of lime trees (mainly Tilia cordata) in the whole country. The females overwinter in natural shelters, and become active at the beginning of May. Several generations were observed during this study. The larvae and adults feeding discolor leaves and cause their falling down. This mite is particularly dangerous when the weather is hot and dry, which was confirmed by other authors [6]. Particularly numerous mites were observed on the leaves of trees grown along the main roads with heavy traffic.

The eriophyid mites (*Eriophyes tiliae*, fam. *Eriophyidae*) are common mites occurring on different lime trees. The females overwinter under bud scales [1, 11], and become active in mid-April. As a result of their feeding elongated galls appear on the upper side of leaves. The second species, *Eriophyes leiosoma* causes cream spots on the lower side of leaves. In urban

Table 2

The occurrence of the most common insects and mites on four tree species

| **Species of tree** | **Pest** | **The stage of threat (from *-low to *****- very high)** |
|---|---|---|
| *Tilia cordata* Mill. | *Eucallipterus tiliae* L. | ***** |
| | *Caliroa annulipes* Klug. | **** |
| | *Eotetranychus tiliarum* Herm. | **** |
| | *Eriophyes tiliae* Pagen. | ** |
| | *Eriophyes leiosoma* Nalepa | *** |
| *Acer pseudoplatanus* L. | *Drepanosiphum platanoidis* Schrank | ***** |
| | *Periphyllus testudinaceus* Fern. | *** |
| | *Aceria macrorhynchus* Nalepa | *** |
| | *Empoasca* sp. | **** |
| *Acer platanoides* L. | *Drepanosiphum platanoidis* Schrank | *** |
| | *Periphyllus testudinaceus* Fern. | *** |
| | *Periphyllus aceris* L. | **** |
| | *Empoasca* sp. | **** |
| *Aescullus hippocastanum* L. | *Cameraria ohridella* Desch. & Dim. | ***** |

areas the most serious pests of *Acer platanoides* L. and *Acer pseudoplatanus* L. are phytophagous pests with sucking piercing mouth part.

*Drepanosiphum platanoidis* (fam. *Phyllaphididae*) – is a single host aphid which occurs on both species of *Acer* trees. Its eggs overwinter on the bark of trunks and branches. The larvae appear at the end of April / beginning of May feeding primarily inside the overgrown buds. There are only larvae and wingless forms in aphid colonies. The most numerous aphids were observed in June and July on the trees grown in quiet places. Their abundance per leaf very often exceeded 80, and the percentage of infested leaves reached 100%. Feeding on the lower part of leave was accompanied by excreting plenty of honey-dew which reduced assimilation.

Periphyllus testudinaceus (fam. Chaitophoridae) overwinter as eggs on thin twigs. The larvae appear in mid-April and settle down primarily on young shoots (first generation) and later move on the leaves (second generation). As a result, the growth of young shoots is limited and yellow spots appear on the leaves. Single larvae of the third generation diapause on the leaves from mid-May until mid-September. The females belonging to the fourth generation lay eggs which hibernate. The highest number of aphids was observed on the trees grown near roads. Periphyllus aceris L. development is similar to the former species. The larvae are also inactive during summer and their diapause lasts seven-eight weeks. Empoasca sp. – in some years abundant. Its feeding caused leaves discolor.

*Aceria macrorhynchus* (fam. *Eriophyidae*) – occurs on different species of *Acer including A. pseudoplatanus.* The females overwinter in leaf buds and become active in early spring. As a result of their feeding, specific galls which change colour from green to red appear. The first galls were observed at the beginning of May and mites were the most abundant in June and July. The mean number of galls per leaf varied from 150 to 280, but 1000 galls per leaf were also observed.

Since 1985 the most important pest of horse chestnut (Aescullus hippocastanum) in Europe has been Cameraria ohridella (fam. Gracillaridae) – the horse chestnut leaf miner. In Poland its first appearance was observed close to Wroclaw in 1997 [10]. C. ohridella was also observed in small quantity on A. pavia, A. octandra, A. glabra i A. turbinata [16]. It overwinters the form of pupae, in dead leaves. There are three generations per year. The highest infestation was observed in the locations where leaves were not removed and the number of mines per leaf often exceeded 100, whereas the percentage of damaged leaf area reached 90%. In the locations were leaves were removed leaf infestation was much lower.

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## ГОЛОВНІ ШКІДНИКИ ДЕКОРАТИВНИХ ДЕРЕВ, ЩО РОСТУТЬ У КРАКОВІ

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З'ясовано, що забруднення ґрунту і повітря негативно впливає на стан і розвиток дерев, культивованих у Кракові, ослаблені рослини стають вразливішими на ураження шкідниками. Наведено результати спостережень, проведених у 2003-2004 рр. за появою і видовим складом шкідників на чотирьох найпоширеніших видах дерев, що ростуть на території Кракова.

*Ключові слова*: шкідники, декоративні дерева, парки, зелені території, ентомологія міст, фенологічні спостереження.

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