

First Occurrence of *Cinara curvipes* Patch 1912 on white fir (*Abies concolor* (Gordon et Glendinning) Hildebrand 1861) in the Czech Republic

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Introduction

Cinara curvipes (Patch) synonymous with the *Todolachnus curvipes* is an indigenous species from the USA, Canada and Mexico, where its host plants are the balsam fir (*Abies balsamea*), the subalpine fir (*Abies lasiocarpa*), the red fir (*Abies magnifica*) and the sacred fir (*Abies religiosa*). The occurrence of this aphid has been recorded in Great Britain since 1999. In 2000 *Cinara curvipes* was discovered in Germany on the grand fir (*Abies grandis*) and the white fir (*Abies concolor*) (SCHEURER *et al.*, 2001). In 2001 it was also found in Serbia (POLJAKOVIĆ & PETROVIĆ, 2002). This species appeared in greater numbers on the territory of the Czech Republic on white fir in the spring of 2007. Research has shown that in 2007 *Cinara curvipes* was already widespread on the territory of the Czech Republic (Fig. 1.). It is therefore clear that this invasive species had spread around the Czech Republic during the previous several years but escaped notice. Its occurrence became apparent only during its overpopulation following the unusually warm winter of 2006/2007.



Fig. 1. Occurrence of *Cinara curvipes* in the Czech Republic

Material and Methods

In Europe, its main host trees are the white fir (*Abies concolor*) and the grand fir (*Abies grandis*). In the Czech Republic it has also been found on coast Douglas fir (*Pseudotsuga menziesii*) and in Serbia even on the atlas cedar (*Cedrus atlantica*). Due to its link to foreign coniferous tree species the *Cinara curvipes* is mostly found in urban areas such as parks, gardens, wooded areas of various organisations and institutions, arboreta, etc. The first finding of *C. curvipes* was serendipitous because the sample was delivered in March from an elementary school, where they did not know what to do with black colonies of aphids on a large white fir. After this first discovery there were more and more reports of the occurrence of large black aphids feeding on the bark and branches of white firs. All the sources to date indicated that the *C. curvipes* was involved. Collected samples were analysed in the Aphid Determination Centre in Opava. The aphids were delivered to the laboratory in 75% ethanol solution.

After degreasing, the aphid samples were deposited into a test-tube and soaked for 12 – 24 hours in a 10% solution of KOH (potassium hydroxide). After that, the sample was rinsed three to four times in distilled water. After rinsing the sample was put onto a Petri dish with a 60% solution of lactic acid. The translucent aphids were easier to define. The presumption that it was *C. curvipes* was confirmed, and it was also verified by Dr. Jaroslav Holman from the Institute of Entomology of ASCR.

Results and Discussion

General characteristics

Cinara belongs to the tribe of *Aphididae*, which includes about 365 species worldwide. Many species of *Cinara* spp. can be found on conifers.

Cinara tujafilina - 2.5 – 3.5 mm in length. It is yellow-brown in colour. It lives in colonies on the bark, branches and trunks of *Platycladus (Thuja orientalis)*.

Cinara pectinatae – 2.5 – 3.5 mm in length. It is a light-green aphid with a dark stripe along its body. It lives individually on various species of fir (*Abies* spp.).

Cinara juniperi - 2.5 – 3.5 mm in length. It is light-brown in colour. It lives individually or in smaller colonies on young shoots of junipers (*Juniperus* spp.), most often on *Juniperus communis* ‘Hibernica’.

Cinara cupressi - 2.5 – 3.5 mm in length. Red-brown colouring. Lives in numerous colonies in the shoots of *Juniperus, Thuja*.

Taxonomy

Class – *Insecta*

Order – *Hemiptera*

Suborder – *Sternorrhyncha*

Family – *Aphididae*

Scientific name – *Cinara curvipes* (Patch 1912)

English name – bow-legged fir aphid

Morphologic characteristics

C. curvipes is an aphid 3.4 – 5.5 mm in length. Body colouring is dark-brown to black. On dorsal side are visible two rows of sclerotised spots. Siphunculi are short, rather siphuncully bumps (BLACKMAN & EASTOP, 1994). These bumps are surrounded by an oval sclerotised spot covered with hair. The length of this hair is an important identifying characteristic because all the hairs have the same length (Fig. 2.). Another significant identifying characteristic is conside-

red to be the existence of a round sclerotised rhinarium on the last segment of the antennae (processus terminalis) (Fig. 3.). The abdominal part (cauda) is short and rounded. The rostrum is very long and its length can exceed the length of the body. Winged viviparous females are usually somewhat smaller (Fig. 4.). This aphid is characterised by its volumes of secretions called honeydew (Fig. 5.). This secretion, which covers the trunk and branches of the conifers, is unsightly. This sticky secretion which contains a large amount of filtered sugars from the aphids' digestive track attracts ants, yellow jackets and bees. Only beekeepers welcome honeydew as a source of food for bees in the early spring season. *Cinara* is one of the largest aphids and therefore sucking only from needles is not enough for it, but it requires larger venous structures, which it finds in larger branches and trunks. The general rule is: "The larger the aphid the more honeydew it discharges." This is true in this case as well.

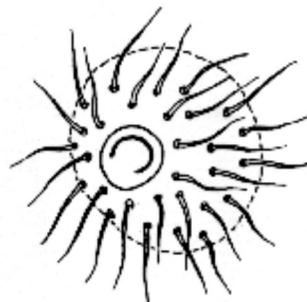
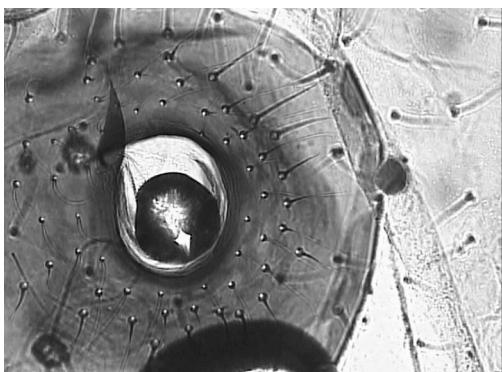


Fig. 2. Siphunculi with hair



Fig. 3. Antennae

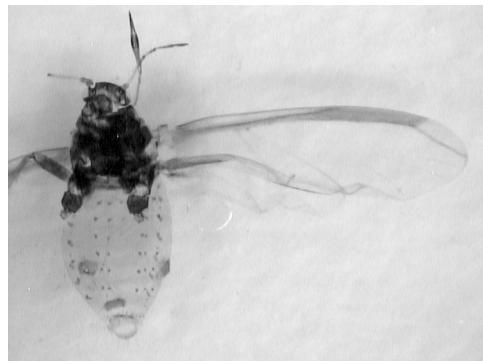


Fig. 4. Winged viviparous female



Fig. 5. *Abies concolor* – secretions called honeydew

Bionomics

The aphid starts laying eggs in November. The eggs spend the winter on shoots. In the spring the larvae hatch and mature to wingless nymphs. Another generation arises from these nymphs. In Central Europe there can be up to six generations in one season. During temperate winter weather viviparous females can also survive and give birth to another generation. This situation was created in 2007 and resulted from reproduction in great number. Winged females start to appear in the second half of May. From March, therefore, we can observe large feeding colonies of these aphids (Fig. 6.). The second culmination

of the population can occur at the end of summer or towards the fall. Males occur during September and October.



Fig. 6. Feeding colonies of *Cinara curvipes*

Harmfulness and Protection

In Central Europe, harmful effects are not too significant at present, but with the increasing prevalence of warm weather, overpopulation of these aphids could occur. Scientific sources from Serbia document a case where a twenty-year-old tree measuring 6 – 7 m died after two years of these aphids feeding on it. In conclusion the question is – how can these aphids be controlled? There are several options. To conduct spraying with commonly available products is one of them. The application of this kind of protection can, however, be quite complicated on very high conifers. A mechanical approach, such as a concentrated stream of water applied on a specific aphid colony, can remove it from the afflicted location. Biological methods of protection still cannot be used. Of the aphid's natural predators, at the sites of the aphid occurrence, predatory larvae of green lacewings (*Chrysopa* spp.) and hoverfly (*Syrphidae* spp.) have been documented. However, they were not able to reduce the numerous colonies. If we ignore the occurrence of the aphids we can expect a repeat of the problem and its escalation during the vegetative season, especially during seasons preceded by a temperate winter.

References

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**Pierwsze pojawienie się *Cinara curvipes* Patch, 1912 na *Abies concolor*
w Republice Czeskiej**

Streszczenie

Cinara curvipes (syn. *Todolachnus curvipes*) jest gatunkiem pochodzący z USA, Kanady i Meksyku, gdzie żyje na takich roślinach jak *Abies balsamea*, *Abies lasiocarpa*, *Abies magnifica* oraz *Abies religiosa*. Na terytorium Republiki Czeskiej gatunek ten został zebrany w większej ilości na jodle kalifornijskiej (*Abies concolor*) wiosną 2007 roku. Zauważony został dopiero przy rzucającym się w oczy licznym wystąpieniu, które nastąpiło po bardzo łagodnej zimie 2006/2007. Kolonie mszyc były obserwowane na roślinach wśród zabudowy miejskiej – w parkach, ogrodach i innych obszarach zieleni miejskiej. *Cinara curvipes* ma 3,4 – 5,5 mm długości i ciemnobrązowy albo czarny kolor ciała. Żyje w dużych koloniach na gałęziach i pniach *Abies concolor*.

