

Seasonal changeability of *Cinara cupressi* (Buckton, 1881) /Hemiptera, Aphidoidea/ on *Thuja* spp.

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Introduction

The genus *Cinara* Curtis, 1835 consists of about 200 species which are present on coniferous trees common worldwide (BLACKMAN & EASTOP 1988). Out of 30 European species of the *Cinara* genus which are connected with coniferous trees and shrubs, only 3 species are connected with the *Thuja* genus. Of those only 2 have been registered in Poland, i.e. *Cinara cupressi* (Buckton, 1881) and *Cinara tujafilina* (Del Guercio, 1909), (DURAK *et al.*, 2006; DURAK *et al.*, 2007). *C. cupressi* has been put on the Global Invasive Species Database as one of the 100 most invasive species of the world.

In Poland *C. cupressi* has been registered for the first time on *Chamaecyparis nootkatensis* (De Don) Spach in 1998 (ŁABANOWSKI *et al.*, 2001). It is a holocyclic species which mainly feeds on plants of the Cupressaceae, such as *Cupressus lusitanica* Mill., *Cupressus macrocarpa* (Hartw.), *Cupressus sempervirens* L., *Chamaecyparis lawsoniana* (A. Murray) Parl., *Thuja occidentalis* L. and *Juniperus* spp. It was also registered on *Thuja orientalis* L. (BLACKMAN & EASTOP, 1988). All the species of the *Cinara* genus have a very limited range of hosts, which almost always includes the plants of the same genus. Only species which live on the Cupressaceae have a wide range and can occur on plants of different genera (SOIKA & ŁABANOWSKI, 2001).

There are limited resources concerning the fauna settling trees and shrubs which have been introduced in Poland through plantation such as e.g. *Thuja*

occidentalis, *Thuja plicata* Donn ex D. Don, *Thujopsis dolabrata* (Thunb. ex L. f.) Siebold & Zucc.

The aim of this paper was to determine seasonal changes in the presence of *C. cupressi* feeding on different species and varieties of *Thuja* and *Thujopsis*.

Material and methods

The research was carried out in an arboretum in the village of Bolestrzyce near Przemyśl in 2005-2006. The following plant species were selected: *T. occidentalis*, *T. plicata*, *T. dolabrata*, and within the species of *T. occidentalis* four varieties were selected: 'Aurescens', 'Filiformis', 'Lutescens' and 'Smaragd'. The catches were made every two weeks during the growth season from May until October. The material was collected with the use of an entomological sweep net, considering 5 shaken branches from 5 subsequent shrubs as one sample (JAŚKIEWICZ, 2003).

Results

In 2005-2006, the 814 *C. cupressi* specimens were collected in total. *C. cupressi* was caught in the following *T. occidentalis* varieties: 'Aurescens' (37 specimens: 4.5%), 'Filiformis' (34 specimens: 4.2%), 'Smaragd' (140 specimens: 17.2%), 'Lutescens' (413 specimens: 50.7%), on *T. plicata* (185 specimens: 22.7%). On *T. dolabrata* only single specimens of *C. cupressi* were observed (0.6%).

On all the studied plants the first specimens of *C. cupressi* were observed in the first decade of May.

In 2005 the number dynamics of this species on *T. occidentalis* 'Aurescens' (Fig. 1) reached one maximum number in the beginning of June. Single specimens were recorded still in mid-July and mid-September. In 2006 this species reached the maximum number in mid-June.

Cinara cupressi also reached the maximum number on *T. occidentalis* 'Filiformis' in 2005 (Fig. 2) which took place in mid-June. This species was not recorded in August. A much greater number was registered in 2006 when its maximum was noted in the beginning of May and remained so until the end of June.

In mid-May of 2005, *C. cupressi* reached its maximum number on *T. occidentalis* 'Lutescens' (Fig. 3), and such a high number remained so until June. The second maximum number was registered in mid-September. The number dynamics in 2006 was formed by two maximums in the beginning of May and October.

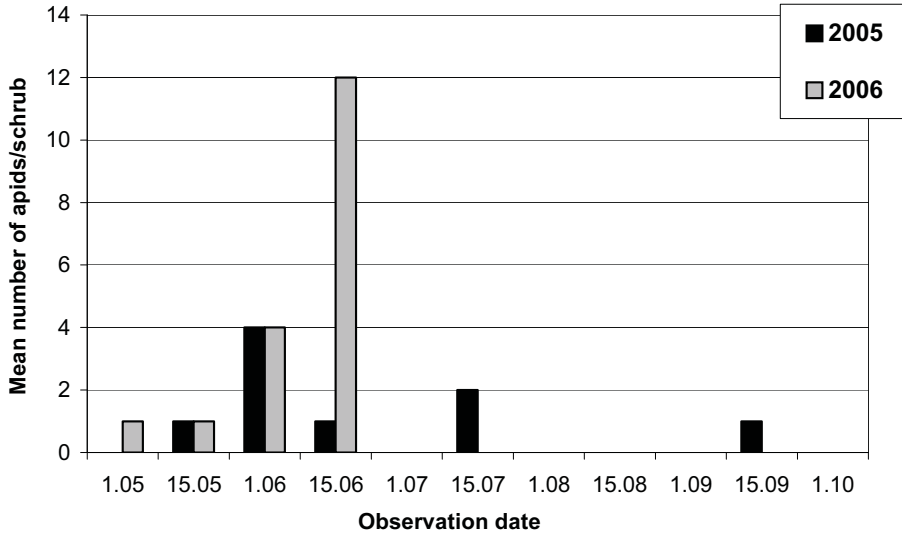


Figure 1. Seasonal changeability of *Cinara cupressi* on *Thuja occidentalis* 'Aurescens'

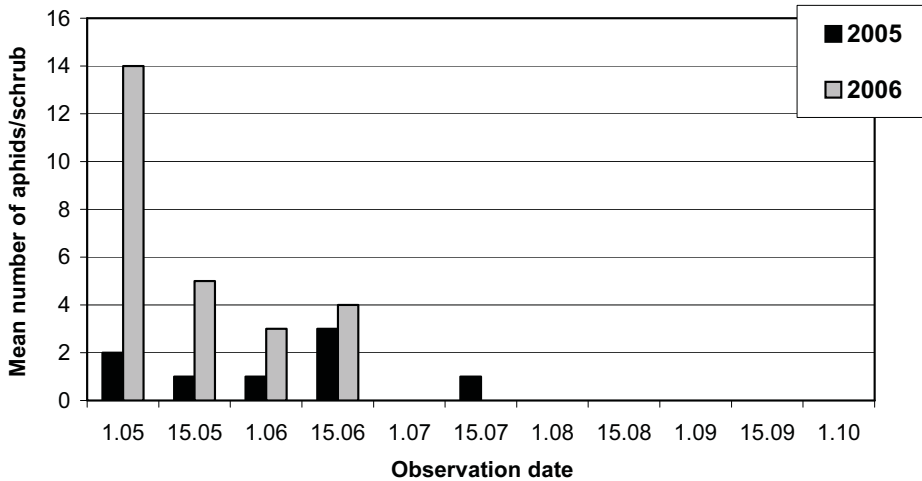


Figure 2. Seasonal changeability of *Cinara cupressi* on *Thuja occidentalis* 'Filiformis'

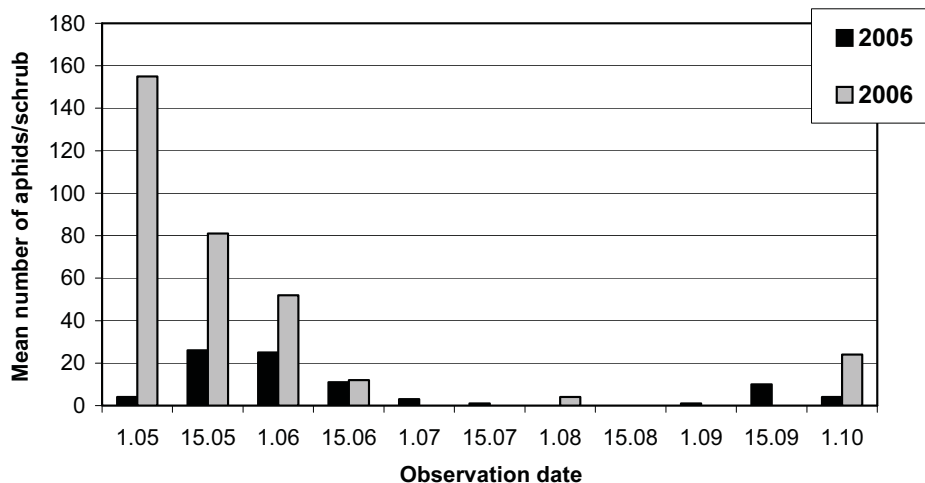


Figure 3. Seasonal changeability of *Cinara cupressi* on *Thuja occidentalis* 'Lutescens'

The maximum presence of *C. cupressi* on *T. occidentalis* 'Smaragd' (Fig. 4) in 2005 and 2006 took place in mid-May. In September 2005 single specimens of this species were recorded while in 2006 it was not recorded as soon as in July.

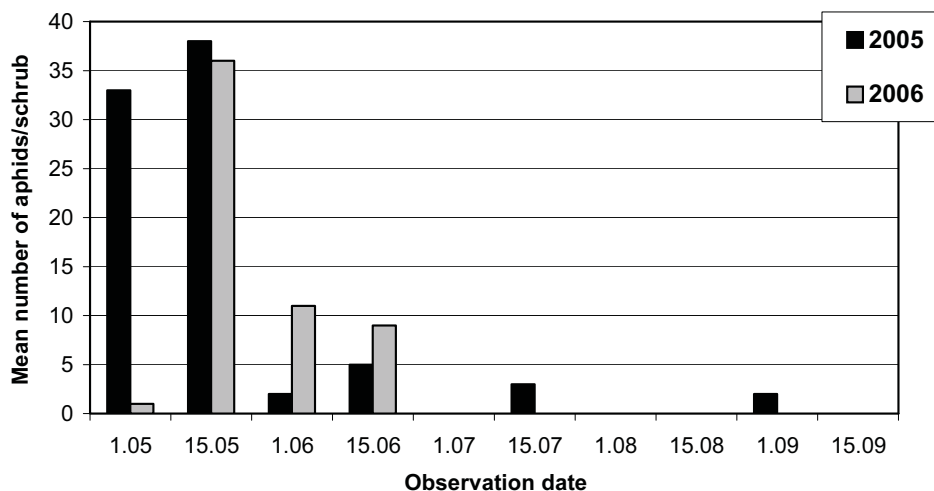


Figure 4. Seasonal changeability of *Cinara cupressi* on *Thuja occidentalis* 'Smaragd'

Two maximum numbers were registered on *T. plicata* (Fig. 5) in both research seasons: in the spring (mid-May) and in the autumn (September).

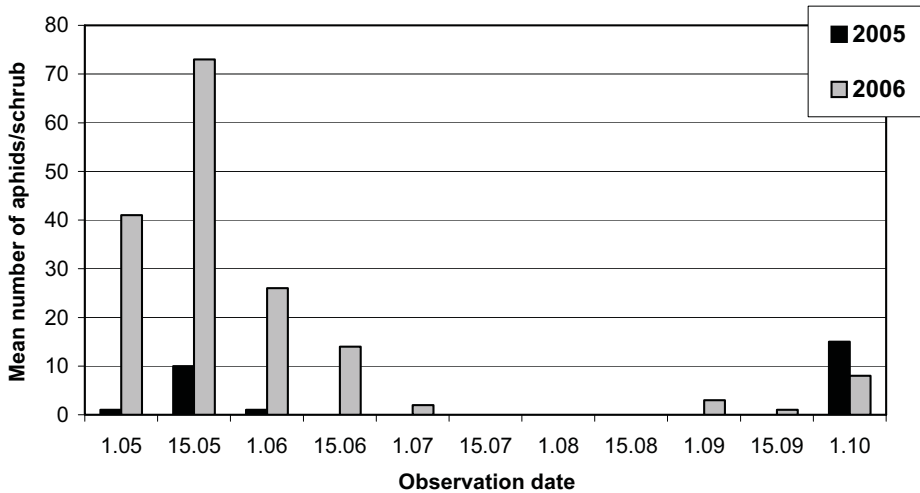


Fig. 5. Seasonal changeability of *Cinara cupressi* on *Thuja plicata*

Results and Discussion

SOIKA & ŁABANOWSKI (2001) claim that in Poland *Cinara cupressi* is most often encountered on the following *Juniperus scopulorum* Sargent 'Skyrocket', 'Witchita Blue', *Juniperus virginiana* L. 'Glauca', *Thuja occidentalis* 'Aureos-poicata', 'Smaragd', *T. orientalis*, *Ch. nootkatensis*. The research carried out in the village of Bolestraszyce proved the presence of *C. cupressi* on *T. occidentalis* and its varieties 'Aurescens', 'Filiformis', 'Lutescens', 'Smaragd' and on *T. plicata* and *T. dolabrata*, which points out to a recent widening of the spectrum of host plants.

The seasonal change of *C. cupressi* which has been observed on selected host plants was in accordance with its biology. Both winged and wingless specimens were registered. Weather conditions between 2005-06 differed. An early spring of 2006 and higher temperature than in the previous year resulted in differences in the time of the first *C. cupressi* specimen appearance, as well as the size of population which in 2006 was much larger.

High temperature of above 30°C which was noted in the summer of 2006 hampered aphid development and caused the decrease of their number so that

in that period only single specimens were registered or they were absent from the studied host shrubs. The limiting impact of high temperature on the number and development of *Cinara juniperi* (De Geer, 1773) on *Juniperus* spp. was confirmed by JAŚKIEWICZ (2000, 2003). Similar dependencies on *Tilia euchlora* C. Koch, *Quercus robur* L. and *Acer platanoides* L. were described also by CICHOCKA *et al.* (1990).

MWANGI (2002) claimed that this species prefers warm and dry growth seasons when its number is the highest, while the lowest number of specimens was registered in seasons of heavy rainfall. Excessive or even heavy rainfall does not have a negative impact on aphid reproduction but when accompanied by strong winds they may significantly regulate their number, which was pointed out by CICHOCKA (1984) and JAŚKIEWICZ (2003). Between different *T. occidentalis* varieties some differences in autumn generation development followed by sexuales presence have been recorded. Autumn generations did not develop on *T. occidentalis* 'Filiformis'. This may have been caused by the characteristic cross-cutting of the crown of this variety of *Thuja*, whose soft, falling down twigs do not protect aphids from a too high temperature in the summer and a direct impact of sunlight causes death of populations as soon as in the beginning of July.

The seasonal changeability of *C. cupressi* which has been registered on varieties of *T. occidentalis* 'Aurescens', 'Lutescens' and 'Smaragd' and *T. plicata* corresponds with the data provided by *C. juniperi* (JAŚKIEWICZ, 2000, 2003).

The research that was carried out shows that *C. cupressi* successfully settles plants of the genus *Thuja* spp. and *Thujopsis* spp. which has lately been more often recorded in Poland.

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**Sezonowa zmienność *Cinara cupressi* (Buckton, 1881)
/Hemiptera, Aphidoidea/ na *Thuja* sp.**

Streszczenie

Praca przedstawia dynamikę liczebności populacji *Cinara cupressi* na *Thuja occidentalis* w odmianach 'Aurescens', 'Filiformis', 'Lutescens' i 'Smaragd' oraz na *Thuja plicata*. Najliczniej *Cinara cupressi* wystąpiła na *Thuja occidentalis* 'Lutescens', najmniej licznie zasiedlała ona *Thuja occidentalis* 'Filiformis'.

