

**THE RESULTS OF THE MONITORING OF TOBACCO WHITEFLY
Bemisia tabaci (Gennadius, 1889), (HOMOPTERA: ALEYRODIDAE) DURING
2001. AND 2002. IN CROATIA**

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ABSTRACT

The tobacco whitefly, *Bemisia tabaci* (Gennadius, 1889) has been reported for the first time in Croatia on plants of *Euphorbia pulcherrima* and cuttings of *Thunbergia grandiflora* in the county of Splitsko-Dalmatinska in 2000. In 2001 we started with monitoring of this quarantine pest in all 21 counties of Croatia. In this project were involved the most important producers of vegetables and flowers in glasshouses and the importers of potted plants and cut flowers. Eventual presence of tobacco whitefly adults on the plants in greenhouses was established by the hanging of yellow sticky traps. In the course of monitoring the undersides of leaves on host plants were inspected for the purpose of discovering pest nymphal and pupal stages. The plants of poinsettia produced as pest free plants have been used as catch plants in the conditions of lower infestation of host plants by tobacco whitefly adults. During the monitoring in year 2001. and 2002. by using the listed methods the species *Bemisia tabaci* was reported on 39 localities in 10 counties of Croatia and in 5 imported shipments of poinsettia on 2 border-transits. Thirty two host plants were recorded in the greenhouses and in open field.

IZVLEČEK

**REZULTATI MONITORINGA TOBAKOVEGA ŠČITKARJA *Bemisia tabaci* (Gennadius, 1889),
(HOMOPTERA: ALEYRODIDAE) NA HRVAŠKEM V LETIH 2001 IN 2002**

Tobakov ščitkar, *Bemisia tabaci* (Gennadius, 1889) je bil na Hrvaškem prvič najden na božičnih zvezdah (*Euphorbia pulcherrima*) in na potaknjencih vrste *Thunbergia grandiflora* v Splitsko – Dalmatinski županiji v letu 2000. V letu 2001 smo začeli izvajati monitoring tega karantenskega škodljivca v vseh 21 županijah Hrvaške. V projekt so bili vključeni najpomembnejši pridelovalci zelenjave in okrasnih rastlin v rastlinjakih in uvozniki lončnic in rezanega cvetja.

Morebitno zastopanost odraslih osebkov tobakovega ščitkarja na rastlinah v rastlinjakih smo ugotavljali s pomočjo rumenih lepljivih plošč. Pregledovali smo tudi spodnjo stran listov gostiteljskih rastlin, da bi našli ličinke in puparije škodljivca. Božične zvezde, ki so bile popolnoma brez škodljivcev, smo uporabili za vabo, ko je bila naseljenost gostiteljskih rastlin z odraslimi osebki tobakovega ščitkarja manjša.

Rezultati monitoringa z opisanimi metodami v letu 2001 so pokazali, da je bila vrsta *Bemisia tabaci* razširjena na 28 lokacijah v 8 županijah Hrvaške in na uvoženih ladijskih pošiljkah božičnih zvezd na 2 mejnih prehodih. Najdenih je bilo 32 gostiteljskih rastlin v rastlinjakih in na prostem.

Monitoring tobakovega ščitkarja v letu 2002 smo izvajali na enak način kot v letu 2001. Poleg monitoringa škodljivca smo zbirali še liste paradižnika z rastlin, ki so kazale znamenja, podobna okužbi z virusom. Listi so bili testirani na okužbo z TYLCV (Tomato yellow leaf curl virus), ki ga prenaša tobakov ščitkar.

Poster na kratko prikazuje biologijo vrste in opis poškodb, ki jih povzroča tobakov ščitkar in širjenje škodljivca v 2 letih monitoringa ter seznam najdenih gostiteljskih rastlin tobakovega ščitkarja na Hrvaškem.

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1 INTRODUCTION

The tobacco whitefly, *Bemisia tabaci* (Gennadius, 1889) is an extremely invasive, widespread and adaptable pest. It is present and widespread as pest of ornamentals and vegetables in greenhouses. The pest has very wide host range within a number of plant families and it is vector of approximately 60 plant viruses.

For the first time in Europe, it was found in Netherlands in 1987. Since then it has been spread in many European countries. *Bemisia tabaci* has been reported for the first time in Croatia on plants of *Euphorbia pulcherrima* and cuttings of *Thunbergia grandiflora* in the county of Splitsko-Dalmatinska in 2000.

The adult is a moth-like insect approximately 0,8 mm in length. The male is slightly smaller than the female. The body and both pairs of wings are covered with a powdery, waxy secretion, white to slightly yellowish. The pest inhabits and feeds on the undersurfaces of leaves by penetrating the tissue and removing plant sap with its piercing-sucking mouth parts. The adults hold their wings tent-like over their body as when at rest or while feeding. Differentiation of whitefly species by means of the adults is difficult. *Bemisia tabaci* at rest has wings more closely pressed to the body than *Trialeurodes vaporariorum*.

Eggs are very small, pear-shaped, about 0,2 mm long and 0,1 mm in diameter. Newly laid eggs are whitish, but gradually turn brown.

The insect goes through four nymphal instars ranging in approximate size from 0,3 mm as first instar to 0,6 mm as fourth instar. The empty puparium is used to distinguish between *Bemisia tabaci* and *Trialeurides vaporariorum*.

The life cycle of the tobacco whitefly, from egg to adult, requires 2-3 weeks in warm conditions. Female lays up to 160 eggs during her lifetime. Eggs are laid on the underside of leaves and they are anchored by a pedicel. Hatching occurs after 5-9 days at 30°C but this depends very much on host species, temperature and humidity. On hatching the nymph moves only a short distance from the egg site before settling down to feed. It does not move again through the four nymphal stages. The first three nymphal stages last 2-4 days each. The fourth nymphal stage lasts about 6 days and within this stage occurs the metamorphosis to adult. The adult emerges through a split in the skin of the puparium.

The feeding of adults and nymphs causes chlorotic spots to appear on the surface of the leaves. The honeydew produced by the feeding of the nymphs covers the surface of leaves and can cause a reduction in photosynthetic potential when colonized by moulds.

2 MATERIALS AND METHODS

In 2001 we started with monitoring of this quarantine pest in all 21 counties of Croatia. The most important producers of vegetables and flowers in greenhouses and the importers of potted plants and cut flowers in all counties were involved in the program of monitoring. In the monitoring of *Bemisia tabaci* in the counties along the Adriatic coast were included open fields as well, because in that area are optimal conditions for its outdoor spread.

In 2001. and 2002. monitoring of tobacco whitefly was carried out by following methods:

- leaf sampling of the host plants
- hanging of yellow sticky traps
- installing catch plants

3 RESULTS AND DISCUSSION

Leaf sampling of the host plants - surface of leaves on the host plants were inspected for the purpose of discovering pest nymphal and pupal stages. Samples were microscopic

analysed and the whiteflies were determined on the base of 4th instar and empty puparium morphological characteristics according to Martin key (1987).

Total number of analysed samples are 297. These 297 samples include 29 culture plants and 5 weeds species. *Bemisia tabaci* was identified in 50 leaf samples. The highest number of leaf samples positive on *Bemisia tabaci* was established on *Euphorbia pulcherrima* (20). Yellow sticky traps - monitoring of tobacco whitefly adult was carried out by hanging yellow sticky traps on the level of the top of plants.

In 2001. 125 yellow sticky traps were placed on the 12 localities and *Bemisia tabaci* adults have been found on 3 localities. In 2002. 128 yellow sticky traps were placed on the 16 localities and *Bemisia tabaci* adults have been founded on 5 localities.

Installing catch plants - the plants of poinsettia produced as pest free plants have been used as catch plants in the conditions of lower infestation of host plants by tobacco whitefly adults. This method has been carried out on 6 localities. Species *Bemisia tabaci* was established only on 1 locality what it was in connection with results of monitoring by other two methods on the same locality.

4 CONCLUSIONS

1) During monitoring in 2001. and 2002. *Bemisia tabaci* was established on 39 localities in 10 counties of Croatia (Fig. 1) and in 5 imported shipments of poinsettia plants on 2 border transits.



Fig. 1: Finding places of *Bemisia tabaci* in Croatia

2) On 39 plant species (Table 1) have been found empty puparium, what indicate that pest completed its life cycle on those plants as host plants.

Table 1: Recorded host plants of *Bemisia tabaci* (Gennadius) in Croatia in 2001-2002.

Family	Species of the host plants
Amaranthaceae	<i>Amaranthus retroflexus</i>
Asteraceae	<i>Aster amelus</i> , <i>Cichorium intybus</i> , <i>Cynara scolymus</i> , <i>Cirsium arvense</i> , <i>Gerbera</i> sp., <i>Helianthus annuus</i> , <i>Sonchus oleraceus</i> , <i>Tagetes</i> sp., <i>Taraxacum officinale</i>
Boraginaceae	<i>Heliotropium peruvianum</i>
Malvaceae	<i>Abutilon striatum</i> , <i>Hibiscus rosa sinensis</i> , <i>Hibiscus syriaca</i>
Convolvulaceae	<i>Convolvulus arvensis</i> , <i>Convolvulus</i> sp.
Cucurbitaceae	<i>Cucumis melo</i> , <i>Cucumis sativus</i> , <i>Cucurbita maxima</i> ,
Euphorbiaceae	<i>Euphorbia pulcherrima</i> , <i>Euphorbia helioscopia</i> , <i>Euphorbia milii</i>
Fabaceae	<i>Phaseolus vulgaris</i>
Labiatae	<i>Salvia</i> sp.
Onagraceae	<i>Fuchsia hybrida</i>
Rosaceae	<i>Rubus</i> sp.
Scrophulariaceae	<i>Veronica persica</i> , <i>Torenia fournieri</i>
Solanaceae	<i>Capsicum annum</i> , <i>Datura stramonium</i> , <i>Solanum jasminoides</i> , <i>Solanum lycopersicum</i> , <i>Solanum melongena</i> , <i>Solanum nigrum</i> , <i>Solanum rantonnetti</i>
Verbenaceae	<i>Lantana camara</i> , <i>Verbena</i> sp.
Veronicaceae	<i>Bacopa</i> sp.

3) The results of monitoring show that distribution of *Bemisia tabaci* in Croatia is associated with import of poinsettia plants, what is in keeping with EPPO informations. Species *Bemisia tabaci* widely spreads in greenhouses and outdoor in the counties along Adriatic coast in distinction from continental part of Croatia where the pest is limited only on greenhouses.

4) Quarantine measures (inside the country and on the borders) slowed down the spreading and new introduction of this pest.

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