

REMAINS *CYDALIMA PERSPECTALIS* (LEPIDOPTERA: CRAMBIDAE) AN INVASIVE SPECIES DANGEROUS FOR LANDSCAPING IN WESTERN ROMANIA?

I. GUGEA, Ana – Maria VÎRTEIU^{1*}

¹Department of Biology and Plant Protection, Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara

*Corresponding author: anamaria.badea@gmail.com

Abstract . *Cydalima perspectalis* (Walker, 1859) is a new invasive pest native to Asia, who's first recorded in Europe, was in 2007 in the south-western Germany (KRÜGER, 2008). Then spread rapidly throughout the European Union, most likely due to active larvae colonization, but also due to human introduction once with the seedlings. The larvae stage is the dangerous one, the *Cydalima perspectalis* larvae feed on the leaves of *Buxus sempervirens* plants, causing serious damage by a qualitative decreasing of the landscaping (the green spaces between apartment buildings, gardens and parks in the cities). Current status of this invasive species is to expansion in the western part of Romania. The purpose of this paper is to present an update of the geographical distribution of *Cydalima perspectalis* species in western Romania and to mention new records from this part of the country. Currently the species *Cydalima perspectalis* is present all over Romania, being very abundant, especially in August and September, in nurseries, public and private gardens, and also in parks. Across Timiș County, they were collected a total of 2348 larvae specimens in all 10 localities studied. Most specimens were collected from Timisoara. Larvae of *Cydalima perspectalis* were observed for the first time on *Buxus sempervirens* plants in four localities across Timiș County: Gătaia, Recas, Făget and Ciacova.

Keywords: *Cydalima perspectalis*, invasive species, *Buxus sempervirens*, landscaping, western Romania

INTRODUCTION

The box tree moth, *Cydalima perspectalis* is one of the most recent invasive species of East Asia origin that was introduced in Europe. The species is dangerous for landscaping, especially for *Buxus sempervirens* shrubs. 10 years after the first record in Europe, in south – western Germany (KRÜGER, 2008), the species *C. perspectalis* colonized 26 of the 48 countries of the European continent.

On our continent the *C. perspectalis* spread naturally (KRÜGER, 2008; FALDTRAUER ET AL, 2009; MUSS ET AL, 2009), the larvae of this species feeding on the *Buxus* sp. leaves (MARUYAMA, 1993) and as final results, defoliates and kill these ornamental plants (KÄPPEL, 2008; SIGG, 2009). In this way, *C. perspectalis* is becoming a serious threat for the West Palaearctic *Buxus sempervirens* shrubs and trees.

MATERIAL AND METHODS

The first stage in collecting the biological material consisted of visual control of the *Buxus sempervirens* shrubs directly affected by the pest. After identifying the attacked shrubs and reporting the presence of *C. perspectalis* larvae, the second step of collecting was carried out (fig. 1).

So, young larvae (L1 and L2 stage) of *Cydalima perspectalis* were collected in August and September 2016 – 2017 from shrubs and trees of *Buxus sempervirens* in 10 localities (15 collecting points) situated in Timisoara and all over Timiș County, as follows: Timișoara – 5 collecting points: Central Parks, Rozelor Park, Botanical Garden, Emanuil Ungureanu Squar and hedges on Liniștei street; Giarmata – private garden; Jimbolia – city

park; Recaș - private garden; Buziaș - arboretum; Lugoj – George Enescu park; Făget – green areas surrounding city; Ciacova – private garden; Deta – Elisabeta park; Gătaia – hedges o Republicii street. The insects were collected using the beating tray (Japanese umbrellas). For each location (park, green space, private garden) were randomly selected 5 shrubs (depending on the availability of the area) from which the insects have been collected.



Fig. 1. *Cydalima perspectalis*: (a) larvae, (b) larvae on *Buxus* plants, (c, d) aspects of the damage (photo: Vîrteiu Ana Maria, 2016)

Biological material collected was transported to the laboratory of Entomology from USAMVBT, larvae being determined as belonging to *Cydalima perspectalis* species.

RESULTS AND DISCUSSIONS

Globalization has changed the habitats of various species, resulting in harmful pest invasion (BYEON ET AL, 2017). Among these pests, *C. perspectalis* produced significant economic damage in urban areas by a significant decreasing in the ornamental landscaping qualities.

On European continent, the species *Cydalima perspectalis* was first reported in 2007 in Germany, and in a few months entered in Switzerland (2007), and also, in the next year, 2008, spread to Netherland and France and in 2009 into Austria.

In Romania, in the initial distribution of the species was highlighted one point of appearance located in the south part of the country (București). After three years from it first appearance, tree new points of occurrence have been reported: in western part - Timișoara, in southern part – Constanța and in eastern part – Botoșani (table 1).

Table 1

Chronology of the spread of <i>Cydalima perspectalis</i> in Romania			
Year	Romanian counties	Localities	Source
2010	București	București	IAMANDEI, 2010
2011	București	București	SZEKELY, 2011
2014	Botoșani	Botoșani	BALAN & CORDUNEANU, 2014
	Constanța	Constanța	SKOLKA & ZAHARIA, 2014
	București	București	GUTUE ET AL., 2014
	Timiș	Timișoara	VÎRTEIU, 2014 (UNPUBLISHED DATA)
2015	Cluj	Cluj Napoca	BUNESCU & FLORIAN, 2016
2016	Arad	Macea	DON ET AL, 2016
	Cluj	Cluj Napoca	OLTEAN ET AL., 2017
	Satu Mare	Satu Mare	KATONA ET AL., 2016
	Sălaj	Jibou	KATONA ET AL., 2016
	Timiș	Timișoara, Lugoj, Buziaș, Jimbolia, Denta, Giarmata	GUGEA & VÎRTEIU
2017	Timiș	Recaș, Făget, Ciacova, Gătaia	GUGEA & VÎRTEIU

In western part of Romania the species *C. perspectalis* established in 2014 and extended its range rapidly, especially in 2016.

The spread and distribution of *C. perspectalis* in Romania showed in 2014 the establishment of the species in at least 4 cities, species continues to spread rapidly an in 2017 is known to be established in 15 additional cities (fig. 2).

In western part (Timiș County) there are recent (2017) first records from Recaş, Făget and Ciacova, and in northern part the established range now includes Arad, Sălaj and Satu Mare counties.

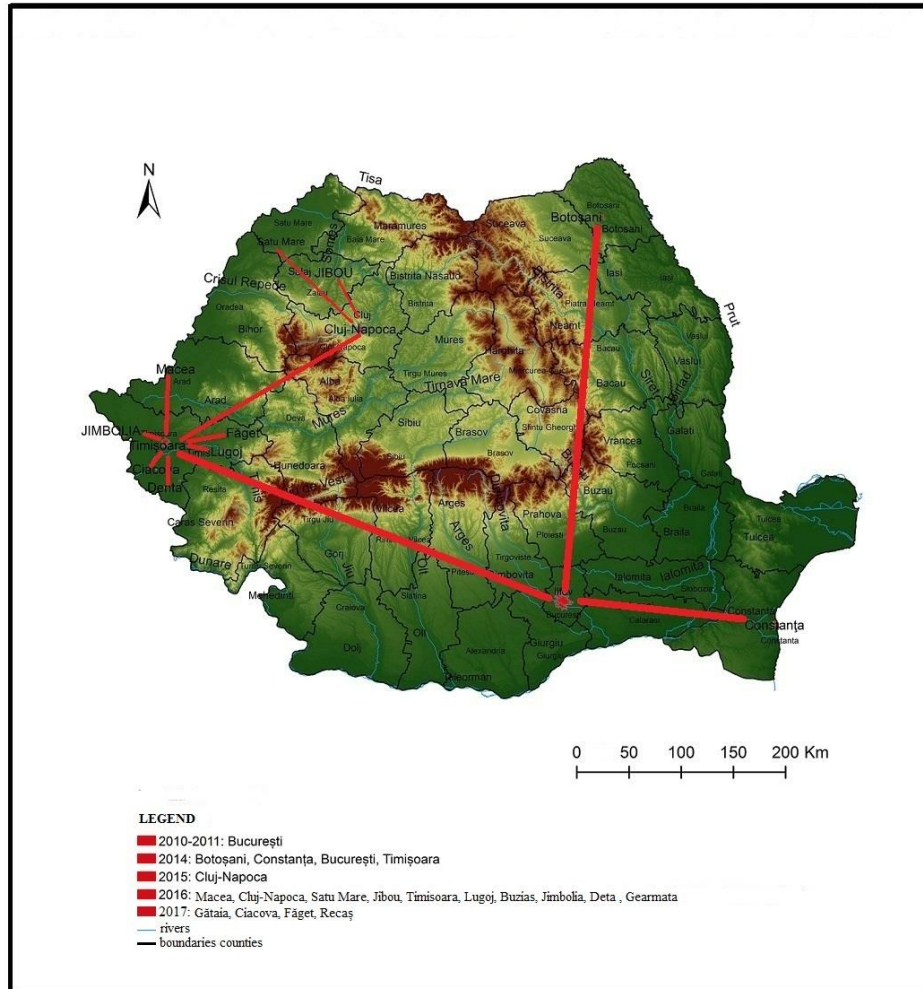


Fig. 2. The geographical distribution of invasive species *Cydalima perspectalis* in Romania (2010 - 2017) (original maps)

Being a species which is spreading rapidly due to favorable climatic conditions of development that were finding in our country, we expect no more than two years, the species to be present in all areas of the country.

The presence of the species *Cydalima perspectalis* in western part of Romania was signaled by VİRTEIU (2014 – unpublished data) and BUNESCU & FLORIAN (2016). From the first signal, insect showed a fast distribution today is present in five counties, plus other two (Alba and Bihor), counties in the vicinity of those already mentioned, from which no data have been reported in scientific publication (maybe present but not yet detected).

The first report of *Cydalima perspectalis* in Timiș County came from Timișoara (VİRTEIU, 2014) (table 2; fig. 3).

Currently the insect is present throughout Timișoara, being very abundant, especially at the end of the summer, in ornamental landscaping. Across the city, they were collected a

total of 1539 larvae (table 1) in all 5 collecting points studied, what it provide new data about the appearance of this insect in the western part of Romania. The species was observed both in parks and in green spaces between apartment buildings, extending also in private gardens, in all the places where found necessary food reserves. Most specimens were collected from Botanical Garden and from hedges on Liniştei street.

Table 2

Records of the box tree moth, *Cydalima perspectalis* from Timiș County in 2016 – 2017 period

Location		Geographical coordinates	Date(s)	Notes
Localities	Collecting points			
Timișoara	1 st (Central Park)	45°45'05"N 21°13'16"E	06.08, 19.08, 30.08, 09.09.2016 13.08, 25.08, 06.09.2017	322 larvae
	2 nd (Rozelor Park)	45°45'00"N 21°13'55"E	05.08, 18.08, 29.08, 08.09.2016 12.08, 24.08, 05.09.2017	254 larvae,
	3 rd (Botanical Garden)	45°76'05"N 21°22'54"E	04.08, 26.08, 07.09.2016 13.08, 25.08, 03.09, 17.09.2017	377 larvae
	4 th (E. Ungureanu Squar)	45°75'25"N 21°22'84"E	03.08, 15.08, 27.08, 05.09.2016 10.08, 22.08, 03.09.2017	231 larvae
	5 th (hedges on Linistei street)	45°77'42"N 21°22'67"E	02.08, 22.08, 02.09.2016 11.08, 20.08, 02.09, 15.09.2017	355 larvae
Giarmata	Private garden	45°84'01"N 21°31'91"E	15.08, 25.08.2016	19 larvae
Jimbolia	Jimbolia city Park	45°79'94"N 20°71'19"E	17.08.2016 01.09.2017	98 larvae
Recaș	Private garden	45°80'11"N 21°51'19"E	13.09.2017	26 larvae
Buziaș	Arboretum Buziaș	45°64'86"N 21°60'61"E	07.08, 25.08, 09.09.2016 11.08, 23.08, 05.09, 13.09.2017	167 larvae
Lugoj	George Enescu Park	45°68'74"N 21°89'89"E	07.08, 17.08, 25.08, 09.09.2016 11.08, 23.08, 05.09, 13.09, 22.09.2017	238 larvae
Făget	Green areas surrounding the city	45°85'27"N 22°17'29"E	23.08.2017	59 larvae
Ciacova	Private garden	45°50'97"N 21°12'98"E	26.08.2017	12 larvae
Deta	Elisabeta Park	45°38'90"N 21°22'68"E	11.08, 21.08.2016 09.08, 20.08, 03.09.2017	111 larvae
Gătaia	Hedges on Republicii street	45°43'05"N 21°42'47"E	03.09.2017	79 larvae

The species was recorded first in Timișoara in 2014 and after two years in 2016 was recorded also, in Giarmata, Jimbolia, Buziaș, Lugoj and Deta. În 2017, the insects appears to be widespread in the southern part of Timiș county, two more localities (Ciacova and Gătaia) being colonized.

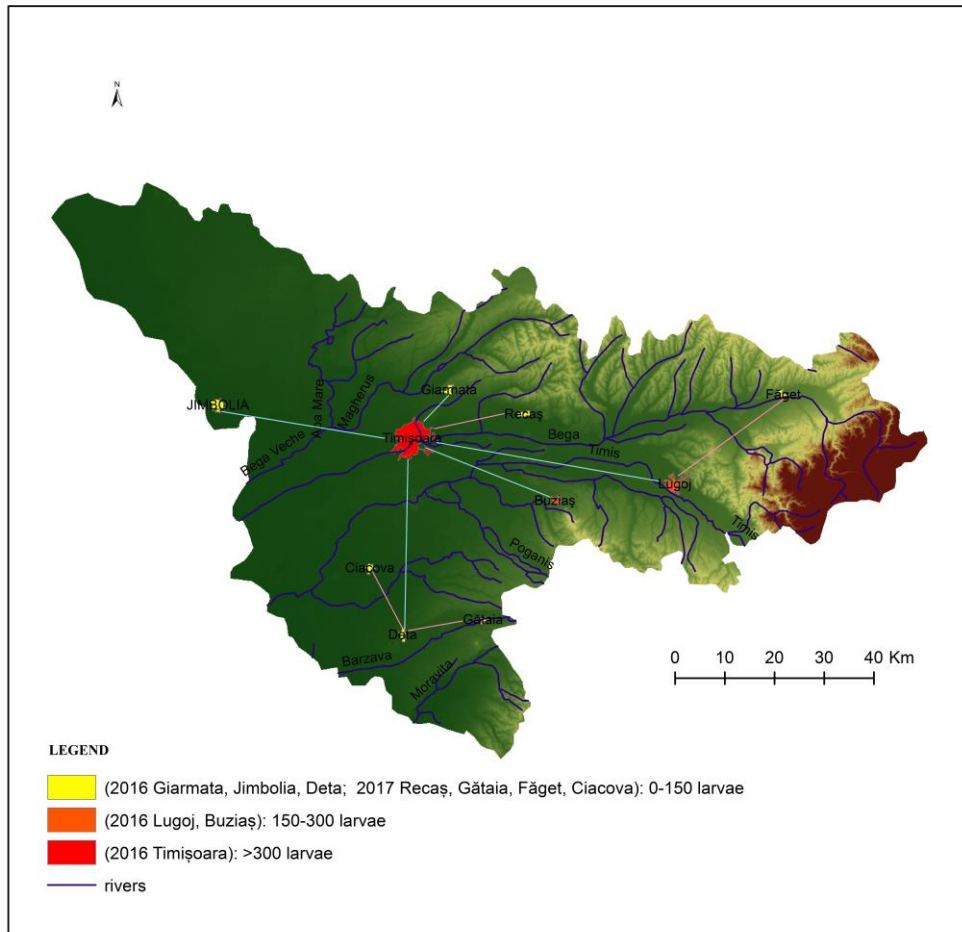


Fig. 3. The spread and distribution of *Cydalima perspectalis* in Timiș County (original maps)

C. perspectalis was also reported, in 2017, to be present in high areas of the county, in Făget city, at 145 m high in the hills, at the border with Hunedoara County.

The last locality from Timiș County in which the insects has been detected is Recea, a number of 26 larvae have been recorded in *Buxus sempervirens* shrubs found in a private garden.

Cydalima perspectalis has clearly spreads quickly in Timiș County, and further localities seem likely to be invaded.

CONCLUSIONS

After seven years from the first recorded in Romania, and also from tree years in western part of the country, the species continues to be a serious problem for ornamental landscaping and nurseries, as first its dispersal in not limited by food resources and secondly the climatic conditions are favorable to its rapid development and spread, the insects presenting tree generation/year in western part of the country.

Buxus species affect by the damage of this pest being threatened with extinction, where there are no collective efforts in order to stop the spread of this pest and of course the uses of same uniform control measures to combat the pest.

We conclude that *Cydalima perspectalis* will tend to extend its distribution in two directions: southward to Serbia, Bulgaria and Macedonia, and northward to Ukraine, Belarus and Moldova.

BIBLIOGRAPHY

- BALAN, C., CORDUNEANU, C., 2014 – *Cydalima perspectalis* (Walker 1859) (Insecta: Lepidoptera: Crambidae) at the first observation in Moldavia (Romania). Asociația pentru dezvoltare durabilă OPTIM Botoșani, Mnemosyne, 5:39.
- BYEON, D.H., JUNG, J.M., JUNG, S., LEE, W.H., 2017 – Prediction of global geographic distribution of *Metcalfa pruinosa* using CLIMEX, Entomological Research.
- BUNESCU, H., FLORIAN, T., 2016 – The box tree moth, *Cydalima perspectalis* Walker (Lepidoptera: Crambidae: Spilomelinae) a new invasive species in Cluj area (Romania). Proenvironmental 9:62 – 66.
- DON, I., DON, C.D., SASU, L.R., VIDREAN, D., BRAD, M.L., 2016 – Insect pests on the trees and shrubs from the Macea Botanical Garden. Studia Universitatis "Vasile Goldis", seria Științe inginerești și agro-turism, 11(2):23 – 28.
- FELDTRAUER, J.-F., FELDTRAUER, J.-J. & BRUA, C., 2009 – Premiers signalements en France de la Pyrale du Buis *Diaphania perspectalis* (Walker, 1859), espèce exotique envahissante s'attaquant aux Buis (Lepidoptera, Crambidae). Bulletin de la Société Entomologique de Mulhouse 65: 55-58.
- GUTUE, C., GUTUE, M., ROȘCA, I., 2014 – *Crambidae* associated with parks and ornamental gardens of Bucharest. Scientific Paper, seria B, Horticulture, 58:323 – 326.
- IAMANDEI, M., 2010 – *Diaphania perspectalis* (Walker, 1859) (Lepidoptera: Crambidae) a new pest of *Buxus* spp. In Romania. Scient Papers USAMVB Serie B 54:787-797.
- KATONA, G., RONKAY, L., SZABOKY, C., BALINT, Z., 2016 – New data to the knowledge of the Lepidoptera fauna of the Salaj – Region, Transylvania, Romania (Arthropoda: Insecta). Studia Universitatis "Vasile Goldis", seria Științele Vieții, 26(4):411 – 414.
- KÄPPEL, F., 2008 – Der Buchsbaumzünsler – Im Eiltempo durch Basler Garten. g'plus – die Gärtner-Fachzeitschrift (Zürich) 20:33.
- KRÜGER, E. O., 2008 – *Glyphodes perspectalis* (Walker, 1859) – Neu für die Fauna Europas (Lepidoptera: Crambidae). Entomologische Zeitschrift 118: 81-83.
- MARUYAMA, T., SHINKAJI, N., 1993 – The life cycle of the box - tree pyralid, *Glyphodes perspectalis* (Walker) (Lepidoptera:Pyralidae). III. Photoperiodic induction of larval diapause. Jpn. J Appl Entomol Zool 37:45-51.
- MUUS, T.S.T., VAN HAAFTEN, E.-J. & VAN DEVENTER, L.J., 2009 – De buxusmot *Palpita perspectalis* (Walker) in Nederland (Lepidoptera: Crambidae). Entomologische Berichten 69: 66-67.
- OLTEAN, I., HULUJAN, I., HULUJAN, I., VARGA, M., TOTOS, S., FLORIAN T., 2017 – *Cydalima perspectalis* Walker (Lepidoptera, Crambidae) a new dangerous pest raport on *Buxus sempervirens* in Cluj area. Buletin USAMV seria Agriculture 74(1): 26 – 36.
- SIGG, C.-R., 2009 – Auch das noch: Ein neuer Buchs-Schadling schlägt zu. Massive Schaden durch den Buchsbaumzünsler. Der Gartenbau (Solithurn) 4: 2-4.
- SZÉKELY, L., DINCĂ, V., MIHAI, C., 2011 – *Cydalima perspectalis* (Walker, 1859), a new species for the Romanian fauna (Lepidoptera: Crambidae: Spilomelinae). Bul Inf Entomol 22:3-4.