PRELIMINARY DATA ABOUT OPHRAELLA COMMUNA LESAGE, 1986 (COLEOPTERA: CHRYSOMELIDAE) IN ROMANIA

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Abstract

This paper presents data on the species Ophraella communa LeSage, 1986 in Romania, with some references to the biology and ecology of this species recently reported nationally. In Romania, the species was detected in 2019 in Bucharest, but published pictures and data appeared in 2020. The researches were carried out in Bucharest during 2020 - 2021. The main host plant of this species is Ambrosia artemisiifolia L., an invasive North American species whose pollen creates health problems for humans, causing allergies. This species of beetle can be used in the biological control of this plant. Other host plants also belong to the Asteraceae family: Xanthium strumarium L., Helianthus annuus L, Ambrosia trifida L. *From the point of view of biology, the existence of two annual generations has been observed. The following natural enemies have been identified: Perillus bioculatus Fabr., Zicrona caerulea* L.

Key words: *Ambrosia artemisiifolia*, data, *Ophraella com*muna, Romania, *Perillus bioculatus*.

INTRODUCTION

Ophraella communa LeSage, 1986 is a North American beetle, belonging to the Chrysomelidae family, Galerucinae subfamily. It was first detected in Europe in 2013 in Italy, near Milan airport (Boriani et al., 2013), then in Switzerland (Müller-Schärer et al., 2014), Slovenia (Seljak, 2017), Croatia (Zadravek et al., 2019), Serbia (Petrovic-Obradovic et al., 2020), Hungary (Horvath et al., 2020) and in Bosnia and Herzegovina (Karrer et. al., 2020).

In Romania, this species is allochthonous and has been observed for the first time in 2019, in Bucharest by Eugenia Petrescu on the 8th of July (unpublished date) and by iNaturalist user danamihaimileazachi in Bucharest on the 19th of June 2020 (www.inaturalist.org/observations/50185018).

Then Eugenia Petrescu and Alexandru Ștefan-Fotin observed the species also in Bucharest and in Popești-Leordeni (Ilfov County) during 2020–2021.

Ophraella communa LeSage is a natural enemy of *Ambrosia artemisiifolia* L., an invasive North American weed expanding inside the green fields of Europe and whose pollen creates health problems for humans causing allergies.

MATERIAL AND METHOD

The insects were gathered by hand. The observations were made periodically in Bucharest on some fields, between July and November 2019-2021. For the determination of the plant species different guides were used (Ciocârlan, 2000; Sârbu et al., 2013).

RESULTS AND DISCUSSION

Description of the beetle species – *Ophraella communa* LeSage is characterized by a moderately dense pubescence on the body, with a specific elytral pattern of black stripes on a yellowish – ochre chromatic background: the discal stripe and the basal stripe are incomplete, the subsutural and submarginal stripes are sometimes joined at the elytral apex (LeSage, 1986). The punctuation of the elytra is rough, it is not arranged in rows. The pronotum has three black spots: one central and two lateral. The base of the head is black and has a blackish spot in the center. The antennae are dark in colour, sometimes the first antenna segment may be yellowish. The legs are yellowish, the last tarsal segment and claws are brown. The eyes are dark (Fig. 1a).

Body length in adults is 4–7 mm, the males being smaller than females.

Body length in larvae is approximately 5.5 – 7 mm, the size of the eggs is aproximate 0.5 mm.

The colour of the pupa is yellowish – brownish, being located in a silky cocoon glued to the leaf (Fig.1c).

The colour of the larvae is yellowish to brownish – dark, with the head brown – blackish, the legs are brownish to black, it presents hairs, capitate dorsal setae and tubercles (Fig 1b).

The colour of the eggs is yellowish and after a few hours becomes yellow – orange, with microsculpture on the chorion. The eggs can be laid alone on the leaves or in groups of up 20 – 25 (Fig. 1d).

Fig. 1 – Ophraella communa LeSage – a. adult on host plant *Ambrosia artemisiifolia* (photo by Alexandru Ștefan-Fotin); b. larva (photo by Eugenia Petrescu); c. pupa and eggs (photo by Alexandru Ștefan-Fotin); d. eggs (photo by Eugenia Petrescu)

Host plants – this species is an oligophagous beetle: its host plants belonging to the genus *Ambrosia* (*Ambrosia artemisiifolia* L., *Ambrosia trifida* L.). (Fig.2a, 2b, table 1, table 2)

Other attacked plants also belong to the Asteraceae family (*Xanthium strumarium* L., *Helianthus annuus* L.). Sometimes the beetle was observed on *Artemisia absinthium* L. (Table 1)

In Japan, the larvae and adults of this beetle feed on several cultivars of sunflower *Helianthus annuus* L. (Emura, 2000). The larvae and the adults feed on leaves and flowers of these plants. Sometimes, this insect destroys the plants before their flowering.

Biology: From the point of view of biology, the existence of two annual generations has been observed (bivoltine). Overwintered adults appear in nature in June. The adults live over 60 days/generation. Adults enter the hiemal diapause in October or early November.

The simultaneous existence of several stages of development was observed (Table1, Table 2).

Fig. 2 – *Ophraella communa* on host plants - a. adults on *Ambrosia artemisiifolia*; b. adult on *Ambrosia trifida*; c., d. pupae on *Helianthus annuus* (photos by Eugenia Petrescu)

The researches were carried out in Bucharest and in Ilfov County during 2019 - 2021 (Table 1, Table 2).

Table 1

Ophraella communa in Bucharest and Ilfov County (2019-2021)

Park or street in the vicinity/Geographical coordinates	Year	Host plant	Day /month	*Ophraella.communa* life stages
Bucharest sector 1				
Padina Street 44.523009°N ; 26.087131°E	2021	*Ambrosia artemisiifolia* L.	23.07	eggs, larvae, adults
Bucharest sector 2				
Barbu Văcărescu Street 44.462518°N ; 26.107703°E	2019	*A. artemisiifolia*	08.07	adults
	2021	*A. artemisiifolia*	04.09	eggs, larvae, adults
Plumbuita 1 Park 44.467256°N ; 26.128231°E	2021	*A. artemisiifolia*	31.08	eggs, larvae, pupae, adults
Tei Park 44.465309°N ; 26.128231°E	2021	*A. artemisiifolia*	25.08	adults
Râul Colentina Park 44.454791°N ; 26.149718°E	2021	*A. artemisiifolia*	21.08	eggs, pupae, adults
Păsărari Park 44.449802°N ; 26.123854°E	2021	*A. artemisiifolia*	19.07	adults
Bucharest sector 3				
Theodor Pallady Boulevard 44.406909°N ; 26.184472°E	2019	*A. artemisiifolia*	13.07	larvae, adults
	2020	*A. artemisiifolia*	21.08	eggs, larvae, pupae, adults
			11.09	adults
			17.09	adults
			28.09	adults
	2021		12.07	eggs, larvae, pupae, adults
			16.07	eggs, larvae, pupae, adults

		A. artemisiifolia	20.07	eggs, larvae, pupae, adults
			12.08	eggs, larvae, pupae, adults
			15.09	pupae, adults
			23.09	pupae, adults
			08.10	adults
			11.10	adults
		Xanthium strumarium	14.07	adults
Theodor Pallady Boulevard 44.407444°N ; 26.187091°E	2020	*A. artemisiifolia*	11.08	adults
			20.08	adults
			06.09	larvae, adults
	2021	*A. artemisiifolia*	20.07	eggs, larvae, pupae, adults
			22.07	eggs, larvae, pupae, adults
			11.10	adults
		Artemisia absinthium	08.08	adults
			08.10	adults
		Helianthus annuus L.	08.08	adults
			11.08	pupae
			05.09	larvae
			12.09	adults
		Xanthium strumarium	18.07	adults
			20.07	pupae
			22.07	adults
			11.08	adults
			21.08	larvae

Theodor Pallady Boulevard 44.406825°N ; 26.196583°E	2019	*A. artemisiifolia*	13.07	eggs, larvae, adults
	2021	*A. artemisiifolia*	04.09	eggs, larvae, pupae, adults
Theodor Pallady Boulevard 44.409021°N ; 26.186801°E	2020	*A. artemisiifolia*	19.08	adults
			23.08	eggs, larvae, adults
			24.08	eggs, larvae, pupae, adults
			25.08	eggs, larvae, adults
			03.09	adults
			24.09	adults
			01.10	adults
			04.10	adults
	2021	*A. artemisiifolia*	04.07	eggs, pupae, adults
			11.10	adults
		Artemisia absinthium	10.07	adults
Liviu Rebreanu Boulevard 44. 424233°N ; 26.172232°E	2020	*A. artemisiifolia*	27.09	adults
	2021	*A. artemisiifolia*	15.07	larvae, adults
IOR Park 44.425435°N ;26.029230°E	2021	*A. artemisiifolia*	22.09	adults
Miniș Park 44.426576°N; 26.173992°E	2021	*A. artemisiifolia*	15.07	larvae, adults
			05.09	adults
Pantelimon Park 44.439605°N ; 26.195217°E	2021	*A. artemisiifolia*	22.08	eggs, larvae, pupae, adults
Bucharest Sector 4				
Văcărești Natural Park 44.392639°N; 26.135370°E 44.394997°N; 26.129559°E	2020	*A. artemisiifolia*	28.08	eggs, larvae, adults
			29.08	eggs, larvae, adults
			02.09	larvae. adults
			13.09	adults
			20.09	adults
			26.09	adults
			28.09	eggs, larvae, adults
			03.10	adults

		Xanthium italicum Moretti	13.09	larvae, adults
	2021	*A. artemisiifolia*	05.07	larvae, adults
			07.07	pupae, adults
			10.07	adults
			22.07	eggs, larvae, pupae, adults
			28.07	adults
			04.08	adults
			11.08	eggs, pupae, adults
			28.08	eggs, larvae, adults
			23.09	adults
		Ambrosia trifida L.	22.07	eggs, pupae, adults
		X. italicum Moretti	22.07	adults
			24.08	eggs, adults

Bucharest Sector 5				
Kogălniceanu Boulevard 44.435089°N ; 26.079012°E	2020	*A. artemisiifolia*	10.10	larvae, adults
Bucharest Sector 6				
Lacul Morii Island 44.458738°N; 26.029230 °E	2021	*A. artemisiifolia*	25.09	adults
Ilfov County Popești-Leordeni				
Oituz Street 44.375335°N; 26.151164°E	2021	*A. artemisiifolia*	13.08	eggs, larvae, pupae, adults
			11.09	eggs, larvae, pupae, adults
		X. strumarium	13.08	adults
Oituz Street 44.376725°N; 26.149494°E	2021	*A. artemisiifolia*	13.08	adults
			11.09	eggs, larvae, pupae, adults
		X. strumarium	13.08	adults
Oituz Street 44.376816°N; 26.149914°E	2021	*A. artemisiifolia*	13.08	adults
		X. strumarium	13.08	larvae, pupae, adults

Natural enemies: The eggs, larvae, adults or pupae were attacked by several predators: *Perillus bioculatus* Fabr., *Zicrona caerulea* L.

A recently new established shield bug species for Romania, found by Eugenia Petrescu in Bucharest, is the two spotted stink bug - *Perillus bioculatus* Fabr. (Rădac et Teodorescu, 2021). This bug seems to be the main predator for *Ophraella communa*; we found the predatory shield bug attacking all of the beetles's life stages (Fig 3.a, b, c, Table 2) and almost always sitting on *Ophraella*'s main host plant, the common ragweed, *Ambrosia artemisiifolia*, but also occasionally on the large cocklebur, *Xanthium strumarium*, another host plant for the beetle (Table 2).

Zicrona caerulea L. is another predatory shield bug feeding on *Ophraella communa*, but not as common as *Perillus bioculatus*; we only found the blue shield bug in connection with the beetle in Văcărești Natural Park, in Pantelimon Park and in a field in the vicinity of the boulevard Theodor Pallady (Fig.3d, Table 2)

Fig. 3 Natural enemies of *Ophraella communa*: *Perillus bioculatus* – a adults (photo by Alexandru-Ștefan-Fotin), b. *P. bioculatus* – nymph on *O. communa* pupa (photo by Alexandru-Ștefan Fotin), c. *P. bioculatus feeding* with an adult of *Ophraella* (photo by Eugenia Petrescu), d. *Zicrona caerulea* eating a nymph of *O. communa* (photo by Eugenia Petrescu)

Table 2

Interactions between *Ophraella communa* LeSage and natural predators (2020-2021)

Park or street in the vicinity/ Geographical coordinates	Date of observation	Predator		*Ophraella communa* Life stage	Host plant
		species	Life stage		
Bucharest					
Tei Park 44.465309°N; 26.128231°E	25.08.2021	*Perillus bioculatus*	nymph	adult	*Ambrosia. artemisiifolia L.*
Râul Colentina Park 44.454791°N; 26.149718°E	21.08.2021	*Perillus bioculatus*	nymph	pupa	*A. artemisiifolia*
Theodor Pallady Boulevard 44.406 909°N; 26.184 472°E	15.09.2021	*Perillus bioculatus*	adult	pupa	*A. artemisiifolia*
	23.09.2021	*Perillus bioculatus*	adult	adult	*A. artemisiifolia*
Theodor Pallady Boulevard 44.407 444°N; 26 187 091°E	18.07.2021	*Perillus bioculatus*	adult	adult	*X. strumarium*
	21.08.2021	*Perillus bioculatus*	nymph	larva	*X. strumarium*
	11.10.2021	*Perillus bioculatus*	adult	adult	*A. artemisiifolia*
Theodor Pallady Boulevard 44.409 021°N; 26.186 801°E	03.09.2020	*Perillus bioculatus*	adult	adult	*A. artemisiifolia*
	24.09.2020	*Perillus bioculatus*	2 adults	adult	*A. artemisiifolia*
		Perillus bioculatus	adult	adult	*A. artemisiifolia*
		Perillus bioculatus	nymph	adult	*A. artemisiifolia*

	04.10.2020	*Perillus bioculatus*	adult	adult	*A. artemisiifolia*
Văcărești Natural Park 44.394997°N; 26.129559°E	02.09.2020	*Perillus bioculatus*	adult	larva	*A. artemisiifolia*
	23.09.2021	*Perillus bioculatus*	adult	adult	*A. artemisiifolia*
Kogălniceanu Boulevard 44.435 089°N; 26. 079012°E	10.10.2020	*Perillus bioculatus*	nymph	larva	*A. artemisiifolia*
Văcărești Natural Park 44.394997°N; 26.129559°E	13.09.2020	*Zicrona caerulea*	adult	larva	*Xanthium italicum*
Theodor Pallady Boulevard 44.407 444°N; 26 187 091°E	06.09.2020	*Zicrona caerulea*	adult	larva	*A. artemisiifolia*
Pantelimon Park 44.439605°N; 26.195217°E	22.08.2021	*Zicrona caerulea*	adult	larva	*A. artemisiifolia*
Ilfov-County (Popești Leordeni, Oituz Street)					
44.375335°N; 26.151164°E	13.08.2021	*Perillus bioculatus*	adult	adult	*A. artemisiifolia*

CONCLUSIONS

Ophraella communa LeSage is reported to be an effective species for the biological control of *Ambrosia artemisiifolia* L. Because this species also attacks the sunflower, careful monitoring of its numbers as well as new research on its biology and ecology are required.

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