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PRELIMINARY SURVEY OF INVASIVE MOSQUITO SPECIES (DIPTERA: CULICIDAE) AT TWO ALTITUDINAL LEVELS IN THE VALJEVO MUNICIPALITY OF SERBIA

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Abstract

Although invasive mosquito species such as *Aedes albopictus* and *Aedes japonicus* are expanding their distribution across Europe and invading many areas in the Balkans, data on their presence and population dynamics in some regions of Serbia remain limited. This study implemented active surveillance in the municipality of Valjevo, western Serbia, to assess the occurrence of invasive *Aedes* species across urban and rural habitats at two altitudinal levels. In the urban area (city of Valjevo), only *Ae. albopictus* was detected, with a total of 2,389 eggs collected during the one-month sampling period at approximately 275 m a.s.l. However, both *Ae. albopictus* and *Ae. japonicus* were present in the rural village of Leskovice, where 3,500 eggs were collected at higher altitudes of 773–777 m a.s.l. The mean number of *Ae. albopictus* eggs per five traps, collected across four sampling events, was higher in the rural area (700.00±442.82) compared to the urban site (477.80±211.37). These findings contribute to the current knowledge of invasive mosquito populations in western Serbia.

KEYWORDS: *Aedes albopictus*, *Aedes japonicus*, surveillance, distribution, altitude

Introduction

Several invasive species play an important role as vectors of pathogens and parasites, and, when present at high population densities, can also constitute a nuisance due to their aggressive biting behavior. Ongoing climate change has created increasingly favorable conditions for mosquito expansion, facilitating their spread across Europe over recent decades (Medlock *et al.*, 2015). Besides climate change, global trade and tourism,

characterized by continuous human movement, have further facilitated the introduction and spread of invasive mosquito species (Giunti *et al.*, 2023).

Currently, four invasive species belonging to the genus *Aedes* are known to have established populations in Europe (Vojtíšek *et al.*, 2022): *Aedes albopictus* Skuse, 1894, *Aedes aegypti* (Linnaeus, 1762), *Aedes japonicus* (Theobald, 1901), and *Aedes koreicus* (Edwards, 1917). To date, *Ae. albopictus* and *Ae. japonicus* have been recorded in Serbia (Kavran *et al.*, 2023). Both species have been confirmed in neighboring countries, Croatia and Bosnia and Herzegovina (Janssen *et al.*, 2020; Hoxha *et al.*, 2025; Klobučar *et al.*, 2020).

Aedes albopictus (Asian tiger mosquito) is native to Southeast Asia and was first reported in Europe in 1979 in Albania (Adhami & Murati, 1987). A second record was in 1990 in Italy (Sabatini *et al.*, 1990), from where the species started to spread to other European countries. In the subsequent years, *Ae. albopictus* has established stable populations across many European countries (ECDC, 2016; Giunti *et al.*, 2023). The Asian tiger mosquito exhibits high adaptability and competitiveness (Kesavaraju *et al.*, 2014), including the ability to overwinter in temperate climates, which has contributed to its successful global invasion (Kramer *et al.*, 2021; Tippelt *et al.*, 2020). This species is an opportunistic feeder with a broad host range, showing a preference for humans while also feeding on domestic and wild mammals, birds, reptiles, and amphibians (Eritja *et al.*, 2005; Paupy *et al.*, 2009; Scholte & Schaffner, 2007). Therefore, *Ae. albopictus* is most commonly seen in urban and suburban areas (Cevidanes *et al.*, 2023; Li *et al.*, 2014; Manica *et al.*, 2016; Mogi *et al.*, 2020).

Aedes albopictus is of major public health concern due to its role as a competent vector of more than 20 arboviruses, most notably Chikungunya and Dengue viruses (Bohers *et al.*, 2024; Giunti *et al.*, 2023), and parasitic nematodes such as *Dirofilaria immitis* (Leidy, 1856) (Cancrini *et al.*, 2003; Ivănescu *et al.*, 2025). As of December 2025, several autochthonous chikungunya outbreaks have been reported in Europe (France and Italy), confirming local transmission (ECDC, 2025a). Since 2010, numerous outbreaks involving autochthonous cases of dengue fever have been reported in Europe, including cases in neighboring Croatia (ECDC, 2025b). It also represents a significant nuisance species, characterized by aggressive daytime biting behavior, which can substantially reduce the quality of life to both humans and animals in affected areas (Aranda *et al.*, 2006; Cevidanes *et al.*, 2023; Medlock *et al.*, 2015; Scholte & Schaffner, 2007).

The first detection of the Asian tiger mosquito in Serbia was reported in 2009 at the Batrovci border crossing with Croatia (Petrić, 2009). This record marked the initiation of its systematic active monitoring, which has since progressively expanded to an increasing number of locations in the northern part of the country. Extensive *Ae. albopictus* monitoring was implemented across the Autonomous Province of Vojvodina and in western Serbia (Mačva county), but in the latter only within the Municipality of Loznica (Kavran *et al.*, 2023). The establishment of *Ae. albopictus* in Serbia was presumed to have occurred from 2017, as prior to this period egg detections were recorded at the borders with Croatia and Montenegro during the peak travel season (Kavran *et al.*, 2023). In the city of Novi Sad, the Asian tiger mosquito has been established since 2018 (Kavran *et al.*, 2023). The species has since been reported by citizens in several additional towns and villages in Vojvodina, as well as the capital city of Belgrade, the western Serbian city of Valjevo, and as far south as Niš, indicating a continued geographic expansion within the country.

Aedes japonicus, known as the Asian bush mosquito, originates from East Asia and was first detected in Europe in 2000 in France (Schaffner *et al.*, 2003). Since its introduction, this species has spread widely across central Europe (Koban *et al.*, 2019; Schaffner *et al.*, 2009), with additional records also reported from the Balkan region (Janssen *et al.*, 2020). Like *Ae. albopictus*, *Ae. japonicus* is also a container-breeding mosquito, adapting well to man-made habitats such as cemetery vases, fountains, used tires, and rainwater tanks (Andreadis *et al.*, 2001). This species is more frequently found in rural, suburban, and agricultural areas adjacent to forests (Andreadis *et al.*, 2001; Kampen & Werner, 2014; Medlock *et al.*, 2015). The widespread establishment of *Ae. japonicus* in Europe could be attributed to its high tolerance of organic matter in water

and its ability to undergo diapause at the egg stage (Versteirt *et al.*, 2009) or larval stage during winter (Schaffner *et al.*, 2003), as well as its early seasonal emergence, which may confer a competitive advantage over other mosquito species (Kaufman & Fonseca, 2014). In addition, *Ae. japonicus* exhibits prolonged seasonal activity. In Italy, larval activity has been reported from as early as April until November (Montarsi *et al.*, 2019).

In contrast to *Ae. albopictus*, hot and dry summer conditions typical of urban areas may negatively affect the distribution of *Ae. japonicus*, whereas such conditions are generally more favorable for the development of the Asian tiger mosquito (Cevidanes *et al.*, 2023; Eritja *et al.*, 2021; Giunti *et al.*, 2023).

Aedes japonicus preferentially feeds on humans during daytime hours, typically outdoors, but occasionally indoors (Schaffner *et al.*, 2003; Turell *et al.*, 2005). It also feeds on a wide range of other vertebrate hosts, including rodents (Dussault *et al.*, 2018) and birds (Schönenberger *et al.*, 2016). Although it is not considered a primary vector of disease (Schaffner *et al.*, 2003), this species is of particular concern due to its rapid adaptability to new habitats, broad climatic tolerance, and wide host range, which together contribute to its importance as a nuisance biting pest (Medlock *et al.*, 2015). Laboratory studies have demonstrated its potential vector competence for several arboviruses, including West Nile virus (WNV) (Wagner *et al.*, 2018), Japanese encephalitis virus (Huber *et al.*, 2014), Rift Valley fever (Turell *et al.*, 2013), and others. In the USA, field-collected *Ae. japonicus* specimens have repeatedly tested positive for WNV (Turell *et al.*, 2005), highlighting its potential epidemiological relevance.

In Serbia, the Asian bush mosquito was first detected in 2018 at the Ljuba border crossing with Croatia (Kavran *et al.*, 2019). So far, its presence has also been confirmed at Mt. Fruška Gora, near Novi Sad (Kavran, unpub. data), in the Loznica municipality (Kavran *et al.*, 2023), and in the capital city of Belgrade (Mitrović *et al.*, 2025). Based on data obtained through passive surveillance (reports by citizens), the current distribution of *Ae. japonicus* in Serbia is likely underestimated (Kavran *et al.*, 2023).

Given that active monitoring of invasive mosquito species has not been conducted in many regions of Serbia, including Valjevo (where the only previous record of *Ae. albopictus* originated from passive monitoring via citizen reporting), the aim of this study was to implement targeted monitoring to confirm the presence of the Asian tiger mosquito and to assess the possible occurrence of other invasive mosquito species at two significantly different altitudes within the municipality of Valjevo.

Materials and Methods

In this study, two locations were selected within the Municipality of Valjevo: one covering an area of 19 acres in the village of Leskovice (rural), and the other covering 10 acres in the city of Valjevo (urban) (Fig. 1). Valjevo is the administrative center of the Kolubara District, and is located in Šumadija, western Serbia. According to the 2022 census, it had 56,059 inhabitants, while the wider area of Valjevo comprised 82,169 people. The city center is situated in a basin through which the Kolubara River flows. Valjevo is among the larger and more developed settlements in Serbia and has a favorable geographical position due to its proximity to several important transport routes. The climate can be characterized as moderately continental, with certain specific features manifested as elements of subhumid and microthermal conditions. Geographic and climatic features, along with orographic and hydrographic characteristics, contribute to generally favorable living conditions in the Valjevo region, with relatively stable climate patterns and rare extreme weather changes. The mean annual air temperature is 11.0°C, with January being the coldest month, averaging -0.2°C, and July the warmest, averaging 21.4°C. The relative air humidity, with an average annual value of 74.6%, indicates moderate humidity but with variations within a relatively wide range, including a secondary increase in late spring and

early summer. Precipitation follows the Central European (Danubian) pattern of annual distribution. The average annual precipitation is 785.7 mm; June is the wettest month (100.1 mm), while February is the driest (45.9 mm) (Đukanović, 2008).

The village of Leskovice is within the Municipality of Valjevo in the Kolubara District. According to the 2022 census, the population of the village was only 327 inhabitants. Leskovice is at the southern end of the expansive Leskovićka Plateau. The village extends deep into the border mountains of this region and thus represents a true mountain settlement and the highest settlement in this area. The village is on the plateau, either on the slopes of individual mountain rises or in the hollows between separate hills. Through the middle of the village, in an eastward direction, Mt. Magleš stretches and then divides the village into two almost equal parts.

Monitoring of invasive mosquito species in these two locations was carried out using ovitraps, in accordance with the guidelines by ECDC (2012). Ovitraps function by attracting females to lay eggs in water-filled containers. In total, 10 ovitraps were positioned at the two selected sites (5 traps in the rural area and 5 in the urban area). Monitoring was conducted from 6th August to 3rd September 2024 in the village of Leskovice, and from 23rd July to 25th August 2024 in the city of Valjevo. Due to the unsynchronized start of monitoring at the two locations, the collections are not suitable for comparison.

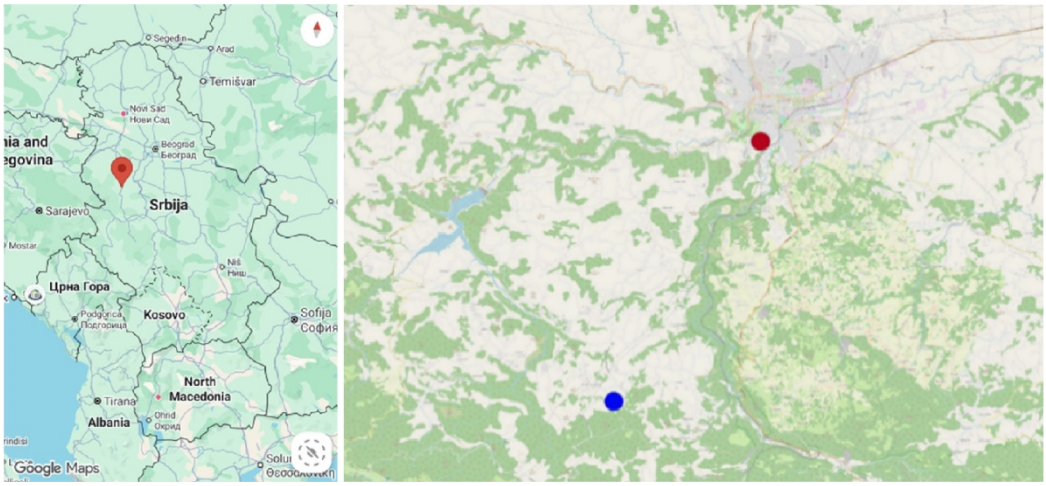


Figure 1. Municipality of Valjevo on the map of Serbia (left) and the two study sites: the city of Valjevo (red point) and the village of Leskovice (blue point).

Geolocations, altitudes, and descriptions of the trap points are given in Table I. The distance between ovitraps was very short (≥30 m). The traps were placed outdoors, directly on the ground, and protected from wind, partially from rain, and from direct sunlight.

Table I. Geocoordinates, altitude, and description of the sites where traps were placed in the urban area (Valjevo) and in the rural area (Leskovice).

Valjevo (city)			
Trap No.	**Coordinates**	**Altitude**	**Description of points**
1	44.258589, 19.883385	280m	Garden
2	44.258799, 19.883445	283m	Hedge next to a pond
3	44.258590, 19.883748	278m	Garden under a fig tree
4	44.258512, 19.884173	272m	Meadow in bushes
5	44.258383, 19.883735	276m	Yard, next to the septic tank
Leskovice (village)			
1	44.168626, 19.816099	773m	Yard
2	44.168262, 19.815930	775m	Yard, under the grapevine
3	44.168428, 19.815689	773m	Yard, under an apple tree
4	44.168215, 19.816325	776m	Yard, next to the water tank
5	44.1681432, 19.816754	777m	On a street, in a hedge

Wooden sticks (medical tongue depressors) 15 cm long, 1.8 cm wide, and 1 mm thick were used as an oviposition substrate (Fig. 2). One side of the stick was completely smooth, while the other side was treated with a coarse metal rasp to create a surface more attractive to invasive female mosquitoes for oviposition. Each oviposition trap consisted of a black plastic container 13 cm in height, 12 cm in diameter, and with a 1 L volume, filled with clean tap water to two-thirds of its volume. Only two-thirds of the wooden stick was submerged in water. Females laid eggs on the rough surface of the wooden stick, above the water level in the container. At 7-day intervals, the traps were inspected, and the water and sticks were replaced. The used water from the ovitraps was transported to the laboratory to detect any larvae or pupae present and to rear them to the adult stage.

The used sticks were also transported to the Laboratory of Medical and Veterinary Entomology at the Faculty of Agriculture, University of Novi Sad, where they were examined under a stereoscope to determine the presence of eggs and to count the deposited eggs. Sticks bearing eggs were air-dried for seven days to complete embryogenesis, then placed in clean tap water in plastic cups to allow larval hatching. Hatched larvae were fed a single cat-food granule (Zoovet, Novi Sad) at the start of rearing until pupation. Further feeding was determined by larval density and water turbidity. Once the first pupae appeared, the cups were covered to prevent adult escape. The mosquitoes were reared at ambient temperature. After full adult emergence, the specimens were morphologically identified using the key of Becker *et al.* (2020).

Data analysis was performed using the software Statistica TIBCO Software Inc. (2020) version 14.0.0.15 (Data Science Workbench, version 14. http://tibco.com). Descriptive statistics included the total, minimum, maximum, and mean ± SD number of eggs per trap, as well as the total and mean ± SD egg count per week at both locations.

Temperatures (ºC) and relative humidity (RH, %) were obtained from the meteorological station in the village Pričević, located 13.2 km from Valjevo and 12 km from Leskovice (Supplementary Table). Mean daily temperatures and RH were recorded at this station, which was situated in an apple orchard.



Figure 2. Site where the ovitrap was placed (Photo: Tripković, J. 2024)

Results

During four weeks of sampling in the urban environment of Valjevo, the total number of collected eggs was 2,389, and in the rural environment of Leskovice, 3,500. In Valjevo, the highest mean number of eggs per ovitrap was found in ovitrap 4 (184.3±138.4), while the lowest mean number of eggs was in ovitrap 5 (42.0±48.8). In Leskovice, the highest mean number of eggs per ovitrap was higher, with the highest number of eggs in ovitrap 4 (328.5±366.2), and the lowest (47.5±88.5) in ovitrap 5 (Table II). The total number of eggs in the two locations and four sampling events is presented in Figs. 3 and 4.

From the 23.07. till 03.09, the mean daily temperature was 19.5±3.2, the maximum was 22.4±5.8, and the minimum was 16.4±3.0. The mean daily RH was 83.4±16.4. These conditions can be considered suitable for the development of invasive mosquito species.

Table II. Mean number of invasive mosquito eggs per trap per week with minimum, maximum, and standard deviation at all sampling sites during the four-week sampling period in Valjevo (VA) and Leskovice (LE).

	Sampling dates								
VA	week 31	week 32	week 33	week 34					
Trap ID	23 Jul-4 Aug	4-11 Aug	11-18 Aug	18-25 Aug	**Min**	**Max**	**Mean**	**St dev**	**∑**
1	83	13	398	73	13	398	141.8	173.6	567
2	138	188	55	19	19	188	100.0	77.0	400
3	56	215	157	89	56	215	129.3	71.0	517
4	81	258	342	56	56	342	184.3	138.4	737
5	108	11	49	0	0	108	42.0	48.8	168
Mean	93.2	137.0	200.2	47.4			-	-	477.8
st dev	31.1	116.8	162.1	37.1			-	-	211.4
∑	466	685	1001	237			-	-	2,389
	Sampling dates								
LE	week 32	week 33	week 34	week 35					
Trap ID	6-13 Aug	13-20 Aug	20-27 Aug	27 Aug-3 Sep	**Min**	**Max**	**Mean**	**St dev**	**∑**
1	292	128	360	153	128	360	233.3	111.1	933
2	111	107	76	103	76	111	99.3	15.8	397
3	98	135	313	120	98	313	166.5	98.8	666
4	114	282	859	59	59	859	328.5	366.2	1314
5	0	180	10	0	0	180	47.5	88.5	190
Mean	123.0	166.4	323.6	87.0	-	-	-	-	700.0
St dev	105.5	69.9	334.6	59.3	-	-	-	-	442.8
∑	615	832	1618	435	-	-	-	-	3,500

Descriptive statistics for egg collections across different weeks (Table II) indicated that the highest mean number of eggs in Valjevo was recorded in week 33 (200.2 ± 162.1), whereas in Leskovice, the highest mean was recorded in week 34 (323.6 ± 334.6).

No oviposition was recorded in weeks 32 and 35 in trap number 5. At the Valjevo site in week 34 females did not oviposit the eggs in trap number 5. The highest number of eggs per trap was recorded in Valjevo in week 33 (398 eggs in trap 1) and in Leskovice in week 34 (859 eggs in trap 4). The presence of invasive mosquitoes in the two locations (Valjevo and Leskovice) is shown by the total number of eggs collected over the four-week sampling period in five ovitraps per location (Figs. 3 and 4).



Figure 3. Total number of invasive mosquito eggs collected during four weeks in the city of Valjevo

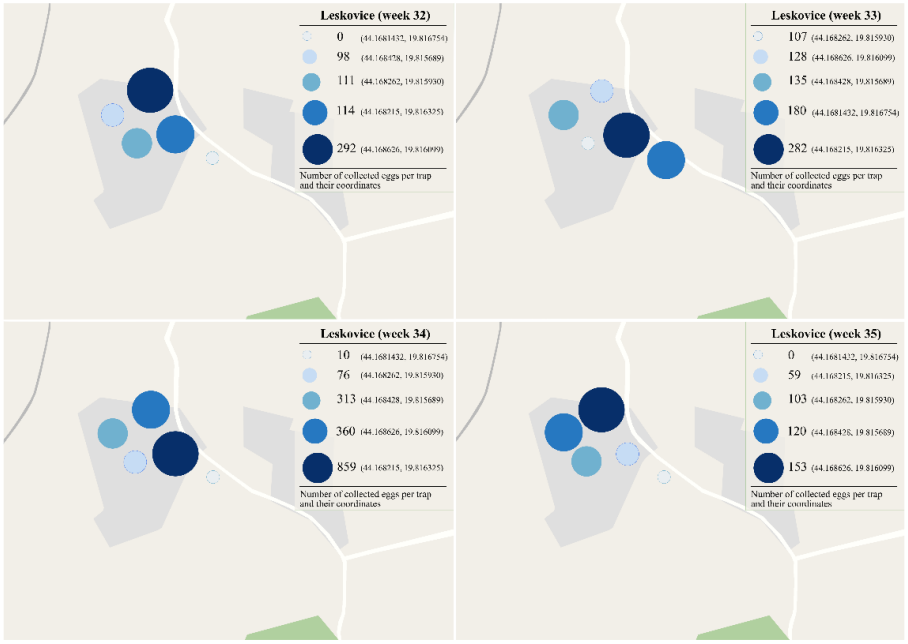


Figure 4. Total number of invasive mosquito eggs collected during four weeks in the village of Leskovice.

The number of eggs in Valjevo increased in week 33 and declined in week 34 (Fig. 5). In Leskovice, the recorded number of eggs was highest in week 34, after which the number of eggs decreased.

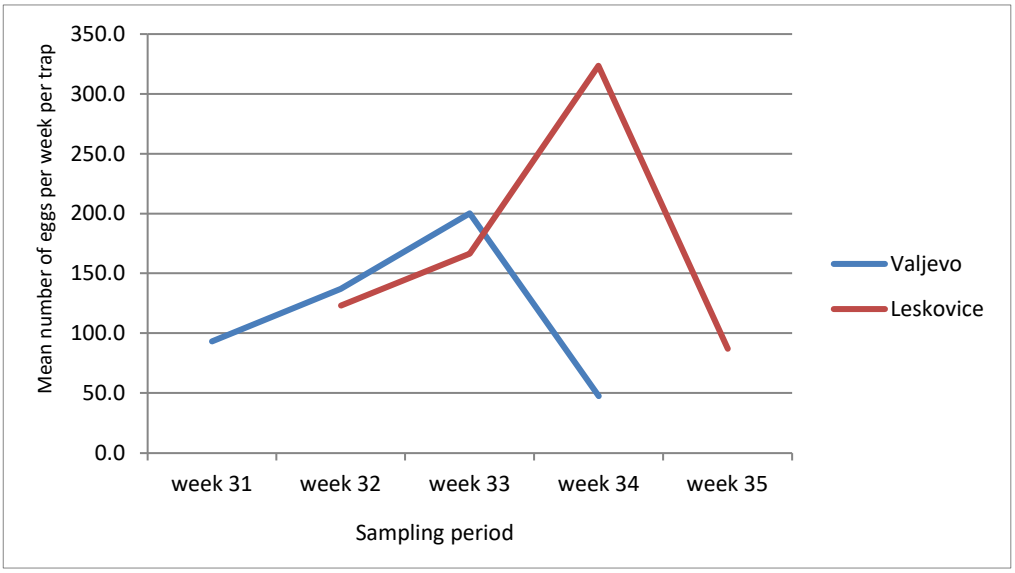


Figure 5. Mean number of eggs per week per trap in Valjevo and Leskovice.

Following emergence, 166 adults were identified to species level. In Valjevo (Table III), 158 mosquitoes were identified as *Ae. albopictus* and 8 as the native species *Culex pipiens*. *Ae. albopictus* was recorded in all five traps. Although egg numbers were high in week 33, the number of emerged adults was lower.

Table III. Adult mosquitoes reared from the eggs oviposited in five traps in Valjevo.

	Valjevo								
	23 Jul-4 Aug		4-11 Aug		11-18 Aug			18-25 Aug	
	week 31		week 32		week 33			week 34	
	Alb		*Alb*		*Alb*		*Pip*	*Alb*	
VA	f	m	f	m	f	m	m	f	m
1	9	5	5	3	5	3	3	7	1
2	9	6	8	5	1	1	0	2	5
3	1	7	4	3	3	1	1	5	3
4	2	6	4	4	4	2	1	5	11
5	3	2	7	4	1	1	3	0	0
∑	24	26	28	19	14	8	8	19	20

Alb= Ae. albopictus; Pip= Cx. Pipiens

In Leskovice, 242 adult mosquitoes were identified (Table IV). Three species were recorded: *Ae. albopictus* (214), *Ae. japonicus* (25), and *Cx. pipiens* (3). All three species were present in each of the five traps.

Table IV. Adult mosquitoes reared from the eggs oviposited in five traps in Leskovice.

	Leskovice																			
	6-13 Aug					13-20 Aug					20-27 Aug					27 Aug-3 Sep				
	week 32					week 33					week 34					week 35				
	Alb		*Jap*		*Pip*	*Alb*		*Jap*		*Pip*	*Alb*		*Jap*		*Pip*	*Alb*		*Jap*		
LE	f	m	f	m	f	f	m	f	m	f	f	m	f	m	f	f	m	f	m	
1	5	6	0	0	1	5	3	0	0	0	11	9	3	2	0	11	3	0	2	
2	14	8	0	0	0	3	5	2	0	0	8	6	1	2	1	4	1	2	1	
3	4	8	1	1	0	2	13	0	0	0	10	6	1	2	0	3	5	0	0	
4	8	3	1	1	0	3	1	0	0	1	12	9	1	0	0	10	7	1	0	
5	0	0	0	0	0	1	0	0	0	0	4	3	0	1	0	0	0	0	0	
∑	31	25	2	2	1	14	22	2	0	1	45	33	6	7	1	28	16	3	3	

Alb= Ae. albopictus; Jap= Ae. japonicus; Pip= Cx. pipiens

Discussion

The invasive mosquito species *Ae. albopictus* and *Ae. japonicus*, successfully established populations at multiple locations in Serbia, with records dating from 2009 for *Ae. albopictus* and from 2018 for *Ae. japonicus* (Kavran *et al.*, 2019; Petrić 2009). The populations continued to spread to several cities, towns, and villages in Serbia. As part of the regular monitoring program in Vojvodina, *Ae. albopictus* has been consistently detected each year. By focusing on microlocations suitable for the Asian tiger mosquito, the populations of *Ae. japonicus* have been overlooked in previous years.

In western Serbia, there is no monitoring program for invasive mosquito species. The only data originate from Loznica, where the Faculty of Agriculture from Novi Sad (LME), conducts quality control of mosquito control measures. Both invasive species have been detected in previous years in Loznica and its surroundings.
This study provides better insight into the current populations of invasive mosquito species in the Valjevo area, encompassing both urban (city of Valjevo) and rural (village of Leskovice) environments. In the urban environment, only *Ae. albopictus* was detected, and the total number of eggs collected during the sampling period was 2,389. The maximum number of eggs (398) was recorded in week 33.

In the rural environment, both invasive species, *Ae. albopictus* and *Ae. japonicus* were detected. The total number of eggs collected during the sampling period for both species was 3,500. The maximum number of eggs (859) was recorded during week 34.

During the monitoring period, peak oviposition intensity in both environments occurred in the second half of August (week 33 in the urban area and 34 in the rural area). Similar results were obtained during a four-year monitoring in Zagreb, Croatia, carried out between 2017 and 2020. The highest number of positive traps was recorded in weeks 33 and 34 (second half of August) in all years except 2018 (Klobučar *et al.*, 2024). Furthermore, monitoring in the Lazio region in Italy carried out from September 2017 to December 2019, showed peak oviposition in the second-third decade of August (around week 34) (Romiti *et al.*, 2021).

Although *Ae. albopictus* is generally considered a strongly anthropophilic species, with populations concentrated in urban and suburban areas (Cevidanes *et al.*, 2023; Medlock *et al.*, 2015), the present study

showed its presence in both the urban (city of Valjevo) and the rural environment (village of Leskovice), with a higher mean number of eggs recorded in the rural area. The altitudes at which this species was recorded ranged from 272 m a.s.l. in the urban area to 777 m a.s.l. in the rural area. According to Tisseuil *et al.* (2018), in Albania this species occurs up to altitudes of 1,200 m a.s.l., with the highest abundance observed in urban, suburban, and rural areas below 550 m a.s.l., and high abundance also recorded up to 700 m a.s.l. in both the northern and central transects. Additionally, in Italy *Ae. albopictus* has been recorded across all monitored altitudes (98–1,193 m a.s.l.), with the most established population observed at approximately 900 m a.s.l. However, both abundance and activity period (number of active days) decreased by 95% and 34%, respectively, from the lowest to the highest altitudinal range (Romiti *et al.*, 2022).

The other invasive species, *Ae. japonicus*, which generally prefers peri-urban and rural areas with a higher variety of available mammal hosts to feed on (Cevidanes *et al.*, 2023), was present only in the rural area (village of Leskovice). The altitudes on which this species was present ranged from 773-777 m a.s.l. According to Janssen *et al.* (2020), the high percentage of *Ae. japonicus* breeding sites are found around or above 700 m a.s.l in southeastern Europe. This species has also been recorded at altitudes of up to 1,200 m a.s.l. in the German Black Forest and 1,500 m a.s.l. in the southern Appalachians, USA. In the present study, species was not detected in the monitored urban areas but only the rural area on higher altitudes.

Conclusions

According to these preliminary results, two invasive mosquito species, *Aedes albopictus* and *Aedes japonicus*, have been recorded in the Valjevo municipality. Invasive mosquito species have successfully colonized ecologically distinct locations. *Aedes albopictus* was recorded in both urban and rural environments, whereas *Aedes japonicus* was absent from urban areas and confined to higher-altitude, forested habitats characteristic of the village of Leskovice.

Given the limited scope of the study and methodological constraints that precluded statistical analysis, no firm conclusions can be drawn regarding behavior or population establishment. Future, more comprehensive studies should include a representative sampling of invasive mosquitoes and extend the monitoring period to cover the onset, peak, and end of seasonal activity.

Nevertheless, these findings provide a basis for further research on the biology and behavior of these two invasive species in the Valjevo municipality. The results may also inform the development of a local Integrated Mosquito Management (IMM) program, as advocated by Giunti *et al.* (2023).

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Supplementary Table. The mean, maximum, and minimum daily temperature and mean daily relative humidity in Pričević (approximately 12-13 km from the study locations).

Date	Mean t (°C)	Max t (°C)	Min t (°C)	RH (%)
23.07.2024	25.27	32.34	19.93	82.05
24.07.2024	19.39	20.63	18.07	99.93
25.07.2024	20.14	21.46	17.88	91.07
26.07.2024	17.2	18.09	15.64	91.45
27.07.2024	22.43	31.99	11.52	64.4
28.07.2024	16.7	18.16	16.2	99.66
29.07.2024	24.7	30.13	16.08	51.55
30.07.2024	17.6	19.2	16.01	62.17
31.07.2024	12.23	14.69	10.01	95.28
01.08.2024	12.17	14.52	10.31	99.05
02.08.2024	18.01	23.15	10.8	76.28
03.08.2024	19.84	20.74	19.19	95.63
04.08.2024	20.98	29.02	12.07	67.55
05.08.2024	16.45	18.06	15.03	94
06.08.2024	17.46	19.02	15.91	88.73
07.08.2024	21.42	30.62	10.68	66.22
08.08.2024	16.33	16.97	15.87	99.6
09.08.2024	20.66	22.74	15.85	83.36
10.08.2024	19.79	20.01	19.58	86.72
11.08.2024	25.19	35.12	15.62	65.03
12.08.2024	17.81	20.27	16.62	99.38
13.08.2024	17.91	20.47	16.17	99.73
14.08.2024	21.32	22.93	17.15	78.59
15.08.2024	22.01	24.2	19.02	58.72
16.08.2024	23.3	24.06	22.54	57.69
17.08.2024	23.02	23.91	22.13	67.77
18.08.2024	21.71	25.05	17.92	77.72
19.08.2024	17.73	18.35	17.33	100
21.08.2024	17.51	18.38	16.44	100
22.8.2024	18.78	20.65	16.92	99.9
23.08.2024	17.03	17.03	17.03	100
24.08.2024	17.27	17.27	17.27	99.57
25.08.2024	17.69	17.69	17.69	96.99
26.08.2024	18.6	18.6	18.6	73.07
27.08.2024	18.87	18.87	18.87	87
28.08.2024	18.76	18.76	18.76	99.89
29.08.2024	19.23	19.23	19.23	99.58
30.08.2024	19.94	19.94	19.94	94.55
31.08.2024	23.98	32.92	14.65	62.36
01.09.2024	24.54	33.84	16.39	52.85
02.09.2024	23.65	34.36	13.37	53.63
03.09.2024	15.41	18.16	13.94	84.07
04.09.2024	24.49	34.7	13.79	50.22
05.09.2024	17.09	18.42	15.78	73.24
Mean	19.5	22.4	16.4	83.4
SD	3.2	5.8	3.0	16.4

МОНИТОРИНГ ИНВАЗИВНИХ ВРСТА КОМАРАЦА (DIPTERA: CULICIDAE) НА РАЗЛИЧИТИМ НАДМОРСКИМ ВИСИНАМА НА ТЕРИТОРИЈИ ОПШТИНЕ ВАЉЕВО

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Извод

Иако се инвазивне врсте комараца као што су *Aedes albopictus* и *Aedes japonicus* шире Европом и освајају многа подручја на Балкану, подаци о њиховој присутности и динамици популација у неким регијама Србије остају ограничени. Ово истраживање је имало за циљ мониторинг инвазивних врста на територији општине Ваљево, западна Србија, како би се проценила појава инвазивних врста рода *Aedes* у урбаним и руралним срединама на различитим надморским висинама. У урбаном подручју (град Ваљево) детектован је само *Ae. albopictus*, са укупно прикупљених 2.389 јаја током периода узорковања на надморским висинама у распону од 272-283 м. Међутим, и *Ae. albopictus* и *Ae. japonicus* били су присутни у руралној средини (село Лесковице), где је прикупљено 3.500 јаја на већим надморским висинама од 773-777 m. Просечна бројност *Ae. albopictus* је била већа у руралном подручју у поређењу са урбаним локалитетом. Ови налази проширују тренутно знање о популацијама инвазивних комараца у западној Србији и наглашавају еколошке разлике које утичу на њихову локалну дистрибуцију.

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