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CAUCASOTACHEA VINDOBONENSIS - AN INCREASINGLY PRESENT SNAIL IN MIXED GARDENS

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Abstract. *In mixed gardens in Western Romania, the Austrian snail (Caucasotachea vindobonensis) is increasingly present. It is less known as a pest, rather it has a neutral role. However, little information is not precise regarding its preference for food, that is, with decomposing plant debris. That is why we proposed to see what the current situation is and clarify some aspects of abundance especially in mixed gardens, where it was frequently observed and also try to make a feeding association with certain living plants. Thus, in the period 2020-2023 we analyzed the abundance of snails in 3 mixed gardens (vegetables, ornamental shrubs and lawn) under frequent irrigation systems, medium irrigation and non-irrigated. As a result, we observed and its abundant presence (over 3 individuals/m2 or a shrub) in spring and autumn when had a more active feeding period. Among the plant species (5 vegetable species, 4 shrubs, 1 lawn), lettuce was preferred as a feeding in spring and Japanese quince as a hiding place on hot summer days. Among the 3 irrigation systems, most snails were present in the garden with medium irrigation. The covering of the leaves and stems with the specific mucus is questionable, we consider that it indirectly affects the good functionality of the plant. As a conclusion, although the species does not seem to be a real danger for the agro-horticultural sector, increased attention must be paid in future, a large population may lead to adaptability to a new feeding style.*

Keywords*: Austrian snail, abundance, gardens, pest role*

INTRODUCTION

The snail *Caucasotachea vindobonensis* (Mollusca: Gastropoda: Stylommatophora: Helicidae) (formerly also known as *Cepaea vindobonensis*) (NEIBER ET AL., 2026) is widespread in Central and Eastern Europe, but in recent decades it has experienced an expansion of its range.

It is currently common in Central and Eastern Europe (Romania, Ukraine, Bulgaria, Hungary, Serbia, Slovakia, Austria and the Czech Republic) (IUCN, 2020).

It then expanded eastwards (into Russia) and westwards (into Germany, Poland, Switzerland, France, Italy) (ARTEMYEVA AND SEMENOV, 2017).

Recently, the species has been introduced into the USA and Canada (HAUSDORF ET AL., 2021).

The species can have a great diversity depending on the regions (SYCHEV ET AL., 2024; SNEGYN ET AL., 2024).

In Romania, Cepaea snail is known to have a significant presence in the southern and eastern regions of the country. It is a terrestrial species, commonly found in the steppe and forest-steppe regions of Romania, preferring calcareous soils and open habitats. It is adaptable to various environmental conditions and can be found in meadows, forest edges, ruderal areas and even in less disturbed urban areas. Paleontological studies show the presence of fossils of this species in deposits from the Upper Pliocene of Romania, suggesting a long presence in this region (GHENEA, 1970; KAJTOCH ET AL., 2017).

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Thus, *Caucasotachea vindobonensis* is a stable component of the terrestrial mollusc fauna of Romania, with a wide distribution in areas favorable to its habitat. It has also been observed in wide areas (West, Center) and just as in Poland, it has been observed expanding beyond its continuous range, appearing in new locations probably due to human-assisted dispersal (MIERZWA, 2009) we expect it to be the same in Romania, which we will demonstrate through this study.

It is xerothermophilic, meaning it prefers hot and dry conditions, but needs humidity, especially during its activity period. Among the favorable areas are those with a temperate and slightly warm climate. During dry periods, it enters aestivation (a kind of summer hibernation), hiding to conserve water. It survives well in urban and suburban environments, as long as there are occasional sources of humidity (e.g. irrigated gardens, mulched or composted gardens).

Food is diverse from decaying plant debris to moss, fallen fruit to green plants. Plants are consumed mainly in the growing area (GRIME AND BLYTHE, 1969). As other shelled snails, they are generalist herbivores and consume a wide range of plant materials (GROZEA, 2015). Indirectly, snails leave shiny marks (mucus) on leaves, stems or soil, which signals that the plant has been visited by these gastropods (TERENCE ET AL., 2013).

In laboratory or garden conditions, lettuce is often enthusiastically consumed by snails of the family Helicidae (PALAGESIU ET AL., 2000; GROZEA, 2006), which includes Cepaea. This is because lettuce has a high-water content, making it easy to ingest, is soft, and therefore easy to scrape with the radula (the snail's toothed tongue). It has few defensive substances (phytotoxins), which makes it more attractive than other bitter or toxic leaves. Thus, even though it is not a plant they naturally find in their habitats, lettuce is readily accepted and frequently preferred in captivity by snails (HATZIIOANNOU ET AL., 1997).

Considering the few studies on the helicid *C. vindobonensis*, we set out, amid an increase in populations in the western region of Romania, to see what the preference is for habitat and food, especially if garden irrigation influences their reproduction.

MATERIAL AND METHODS

The observations were made in 3 localities of Timis County (Timisoara, Giarmata and Dumbravita) in gardens of the same type (mixed). The plants present were diverse, from vegetables and trees to lawns and ornamental shrubs. Approximately the same combinations of plants and the same surface of 700 m^2 were considered. They differed in location and irrigation system, such as non-irrigated system (at Giarmata), medium irrigated (at Dumbravita) and frequent irrigated (at Timisoara) (Table 1).

Table 1

Characteristics of the study sites

Place	Locality	Irrigation system	Plant category		
			Vegetables	Shrubs and ornamental plants	lawn
Place 1	Giarmata	Non-irrigated	Lettuce Tomatoes Peppers Parsley (leaves) Spinach	Lily of the valley Japanese quince Lilac Bridal wreath	Grass + clover
Place 2	Dumbravita	Medium irrigated			
Place 3	Timisoara	Frequent irrigated			

Annual observation period was from June to October, for 4 years (2020-2023).

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The abundance in the 3 irrigation systems and the identification of potential food sources and breeding habitats were the indicators we followed.

The identification of the specimens found was carried out through macroscopic studies directly in the habitat but also through detail, under the binocular magnifying glass at Phytosanitary Diagnostic and Expertise Laboratory within the ULST.

RESULTS AND DISCUSSION

As a result of observations of the evolution of the total number of Austrian snails recorded for different crops, over four years, depending on the irrigation system used, it was observed that in the period 2020-2023 it was progressive with a slight increase from year to year. Thus in 2020, 107 individuals were recorded in all gardens, on all plants analyzed and throughout the entire period, that is, from April to October. Then in 2021 their number increased to 174, in 2022 to 220 and in 2023 to 306 (Figure 1).

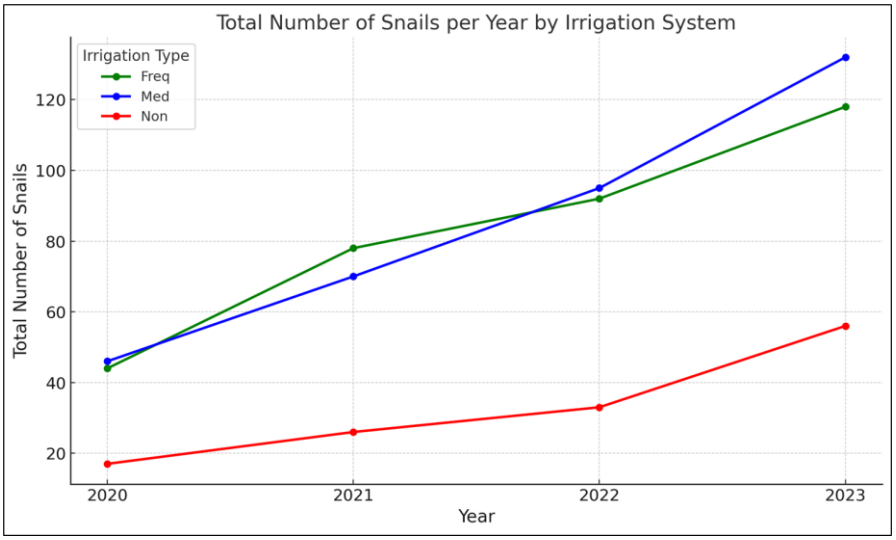

Figure 1. Evolution of the annual values of Austrian snails under 3 irrigation systems; where: Non is non-irrigated area; Med is medium irrigated area¸ Freq is frequent irrigated

Medium irrigation was associated with the highest number of snails, the differences compared to the abundance recorded in gardens with frequent irrigation are very small. The lack of irrigation generated lower, but still visible values (Figure 2).

The situation by year is slightly different, that is, in 2020 and 2022 the differences in abundance between the sites analyzed under frequent and medium irrigation were very small, but very far from what was in the non-irrigated ones (Figure 1). In 2021 and 2023 the differences in abundance were clearly spaced but also very far from the values recorded in the non-irrigated ones (Figure 1).

It is clear that moderately and frequently irrigated gardens attracted and created survival conditions for the Asturian snail, which found a favorable environment.

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It can be said that non-irrigated gardens attracted and maintained the fewest snails throughout the vegetation period, probably due to the dryness of the soil and the lack of dense vegetation.

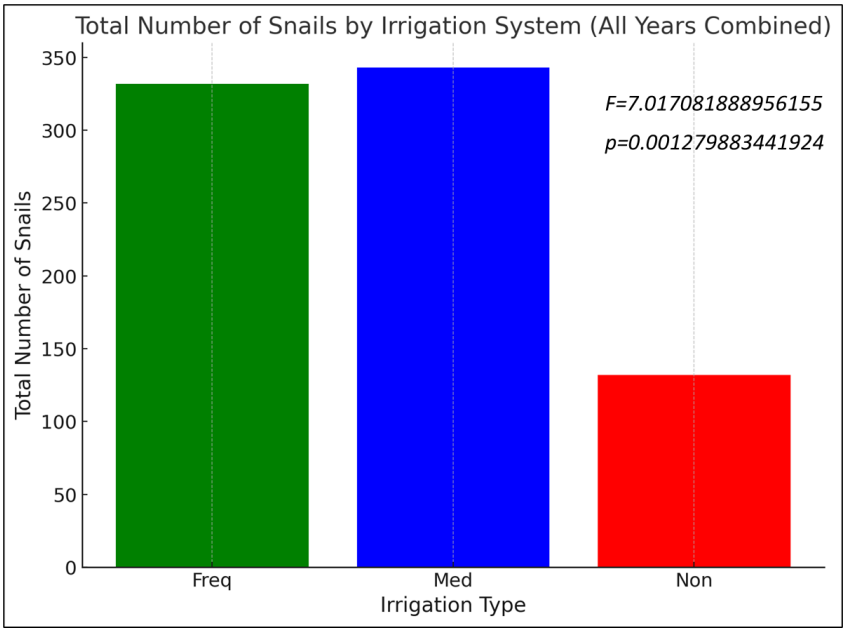

Figure 2. Comparison between the 3 irrigation systems of the recorded values without taking into account the years; where: Non is non-irrigated area; Med is medium irrigated area¸ Freq is frequent irrigated

The result of the ANOVA test for comparing the number of snails between the three irrigation systems (without taking into account the year or the plant) is p=0.0013. The p-value is lower than the standard significance threshold (0.05), which means that there are statistically significant differences between the number of snails recorded in at least one of the three irrigation types (non-irrigated, medium irrigation and frequent irrigation) (Figure 2).

The differences between the unirrigated gardens and the other two irrigated (frequently or moderately) are statistically significant ($p < 0.05$). Between the unirrigated gardens and the frequently irrigated one's p =0.0056 and the moderately irrigated ones, p=0.0033; while between the frequently and moderately irrigated ones there is no significant difference (p=0.9835).

Figure 3. Snails caught on various plants and areas; a, on plant debris; b) in lawn; c) on lettuce; d) in Convallaria; e) in Spirea shrub; f) in lilac shrub

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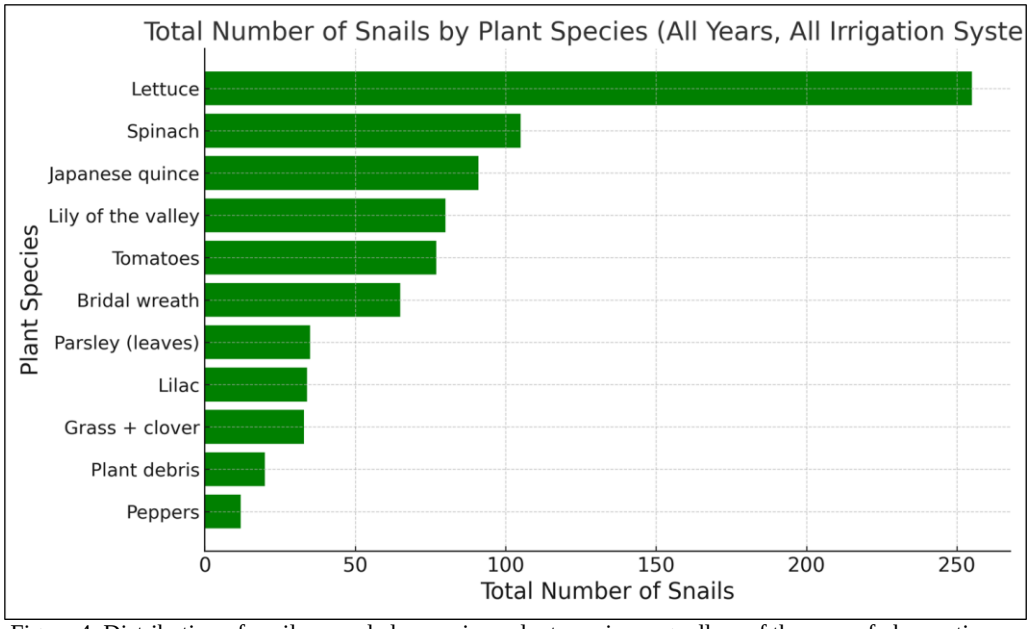

Figure 4. Distribution of snails recorded on various plant species, regardless of the year of observation or type of irrigation

The graph in Figure 4 shows the total distribution of snails recorded on various plant species (Figure 3), regardless of the year of observation or the type of irrigation. It provides a clear perspective on the plants that attract or favor the presence of snails the most. Plant species such as lettuce and spinach show the highest snail counts, indicating increased vulnerability or a favorable environment for snail development. Ornamental plants such as lilac (*Syringa vulgaris*) or Lily of the Valley (*Convallaria majalis)* have notable counts, suggesting that snails are not only attracted to edible plants. Species such as Bridal Wreath (*Spiraea vanhouttei*) or Japanese Quince (*Chaenomeles japonica*) have significantly lower snail counts, which may indicate natural resistance, less favorable habitat, or a shorter observation period.

Not all plants were attacked. Unlike lettuce, spinach and parsley (leaves) which showed large perforations and holes, on Japanese quince, lilac, Spirea, Convallaria and other vegetables (tomatoes and peppers) the snails were only observed without any activity other than reproduction. In shrubs and between the dense leaves of Convallaria they were observed especially in summer, on hot days. The lawn was only a passage space between the vegetable area and the ornamental plants. Also, in spring the snails were observed on the ground among vegetable debris, probably consuming them.

CONCLUSIONS

From the results, it seems that in recent warm years, the Austrian snail (*Caucasotachea vindobonensis*) appears more frequently in irrigated areas, especially at constant or medium levels. High humidity accompanied by heat and abundant vegetation are favorable factors for the reproduction and survival of snails, while the lack of controlled humidity limits their survival. The presence of snails also varies significantly depending on the

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plant species. This information can be essential for pest management in agriculture and gardening, helping to identify susceptible crops and optimize protection strategies.

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