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# A persistent population of the chocolate-band snail *Eobania vermiculata* (Gastropoda: Helicidae) in Belgium

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*Eobania vermiculata* (O.F. MÜLLER, 1774) is a large land snail species, with a maximum shell width of 33 mm. The species occurs in a variety of habitats, usually in dry vegetation, in hedgerows, gardens, vineyards and agricultural fields, often in coastal areas. Reproduction takes place in autumn. About 60 to 80 eggs are laid in the soil. The snails reach maturity two years after hatching. Adult snails hibernate in a hole in the soil and develop an epiphragma. Juveniles usually hibernate under stones or leaves [1,2]. *Eobania vermiculata* is a circum-Mediterranean species. Its native range extends from Spain to Turkey in Europe and along the North-African coast at least from Morocco to Libya, although it is absent as a native species in the SE of the Mediterranean region. The species has been introduced into several European countries, including Germany, Hungary, and The Netherlands. Introduced populations also occur in the USA, Australia, Japan, South Africa, Egypt, Israel, Saudi Arabia, Jordan, and Iran [1-9].

On September 17th 2014 five empty shells of *E. vermiculata* were collected near the Zeebrugge harbour (51°20'16"N; 3°10'47"E) in Belgium. The locality at Zeebrugge is a steep, SE-facing sandy slope situated between a road and a railroad track used for container traffic. Vegetation consisted of short grasses (mainly *Elytrigia atherica*), herbs and young *Rubus caesius*. During an additional half hour search carried out by two persons on November 9th 2014 twenty living juvenile and adult *E. vermiculata* and > 40 empty shells were found at the same locality. Most living *E. vermiculata* were found amongst rubble, mainly wooden planks and plastic, and in drainage pipes. Approximately one year after the species was first recorded, on September 9th 2015, a follow-up survey was carried out during a conchological excursion with a group of twelve persons. A 15-minute search yielded a total of 144 live *E. vermiculata* including 15 juveniles, and 22 empty shells. Finally, on September 10th, an extra 409 adult individuals, 49 juveniles, and 45 empty shells were found by two persons during a 45 minute collecting effort. In 2015, most *E. vermiculata* were found scattered among the short vegetation. Several individuals had formed an epiphragma, which may suggest that they were going into hibernation. These finds constitute the first evidence of a persistent *E. vermiculata* population in Belgium.

Considering the close vicinity of the Zeebrugge harbour, container traffic is the most likely pathway of introduction. Container shipments are known to be an important means by which land molluscs can colonize areas outside their native range. Snails may attach to the exterior of containers or may unintentionally be transported along with ornamental plants or vegetables [10]. In The Netherlands, living *E. vermiculata* have been found on cauliflower imported from Italy [11]. *Eobania vermiculata* is also traded and transported for human consumption [12].

There had been doubts about the species' ability to survive the winters in a temperate climate [4], although a population in The Netherlands has

persisted for at least five years [13]. The low effort required to collect large quantities of living adult and juvenile *E. vermiculata* at Zeebrugge one year after the population was first discovered shows that the species is most probably capable of surviving the Belgian winters. Several other Mediterranean land molluscs proved to be ecologically flexible and have established persistent populations in Belgium, including *Lehmannia valentiana* [14] and more recently *Hygromia cinctella* [15].

*Eobania vermiculata* is considered a potentially invasive species [16]. The early detection of *E. vermiculata* in Belgium allows close monitoring of the small, introduced population and measures to be taken to prevent further spread. Eradication of potentially invasive species is considered the most effective measure in the early stages of invasion, when populations are small and localized [17]. Therefore, in 2015, all *E. vermiculata* collected at Zeebrugge were removed and euthanized. Additional eradication efforts will be carried out in the near future.

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