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SHORT NOTES

A NEW SITE OF OCCURRENCE OF *ARION LUSITANICUS* MABILLE, 1868 (*GASTROPODA: PULMONATA: ARIONIDAE*) IN POLAND

JAN KOZŁOWSKI

Institute of Plant Protection, Miczurina 20, 60-318 Poznań, Poland
e-mail: j.kozlowski@ior.poznan.pl

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Arion lusitanicus Mabille is a slug originating from the Iberian Peninsula. Initially it occurred only in northern Spain and Portugal (Simroth 1891; Altena van Regteren 1971; Chevallier 1972) but during the last 30 years this species has spread over a significant part of Europe (Fig. 1). So far it was recorded in: Andorro, Italy, Liechtenstein (Altena van Regteren 1971), Bulgaria (Altena van Regteren 1971; Wiktor 1983), the Netherlands (de Winter 1989), Belgium (Rish and Backeljau 1989), Switzerland (Altena van Regteren 1971; Frank 1998), Austria (Reischutz 1984), Germany (Schmid 1970), Sweden (von Proschwitz 1992), Norway (von Proschwitz 1994; von Proschwitz and Winge 1994) and on the British Isles (Quick 1952; 1960; Ellis 1965; Davies 1987) and Azores, France (Altena van Regteren 1971; Chevallier 1972).

For the first time *A. lusitanicus* was noticed in Poland in 1993 (Kozłowski 1995; Kozłowski and Kornobis 1994; 1995). It initially occurred patchily, mainly in the region of Albigowa and Markowa near Łańcut (Kozłowski and Kornobis 1995) but the subsequent years it rapidly spreaded over the neighborhood. Detailed studies conducted during 1997–1999 on the area of Podkarpackie province (foothills of the Carpathians) showed the occurrence of that slug in 93 sites located in the UTM squares EA and FA (Kozłowski 2000). The largest number of its sites was found in Albigowa, Łańcut and Wysoka (Fig. 2). *A. lusitanicus* inhabits there very different habitats of horticultural and agricultural crops as well as inarable lands. It abundantly occurs in orchards, parks, cemetaries and shrubberies on the river banks, but most frequently in habits plant crops and adjacent to them trenches, baulks, inarable lands and shrubberies. In Poland, like in many other countries of Central and Western Europe, *A. lusitanicus* is a dangerous pest of many vegetable, agricultural, horticultural and ornamental plant species (Reischutz 1984; Davies 1987; Frank 1998; Briner and Frank 1998; Kozłowski 1995; 1999; Kozłowski and Kozłowska 1998; von Proschwitz 1992; Reischutz 1984).

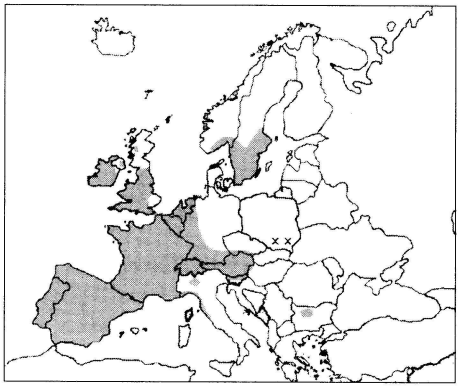

Fig. 1. Distribution of *Arion lusitanicus* Mabille in Europe

Intensive survey conducted in 2000 in plant crops throughout Poland revealed a new site of occurrence of *A. lusitanicus* (Fig. 2). It is located in Poznachowice Górne village of Raciechowice commune in Małopolskie province (UTM DA 43). The area occupied by the slug is not large, covering a dozen or so hectares of several farms. A predominant part of this area are farmlands under vegetable, agricultural, horticultural and ornamental plant production as well as farm buildings. The Krzyworzeka river (a branch of the Raba river) is

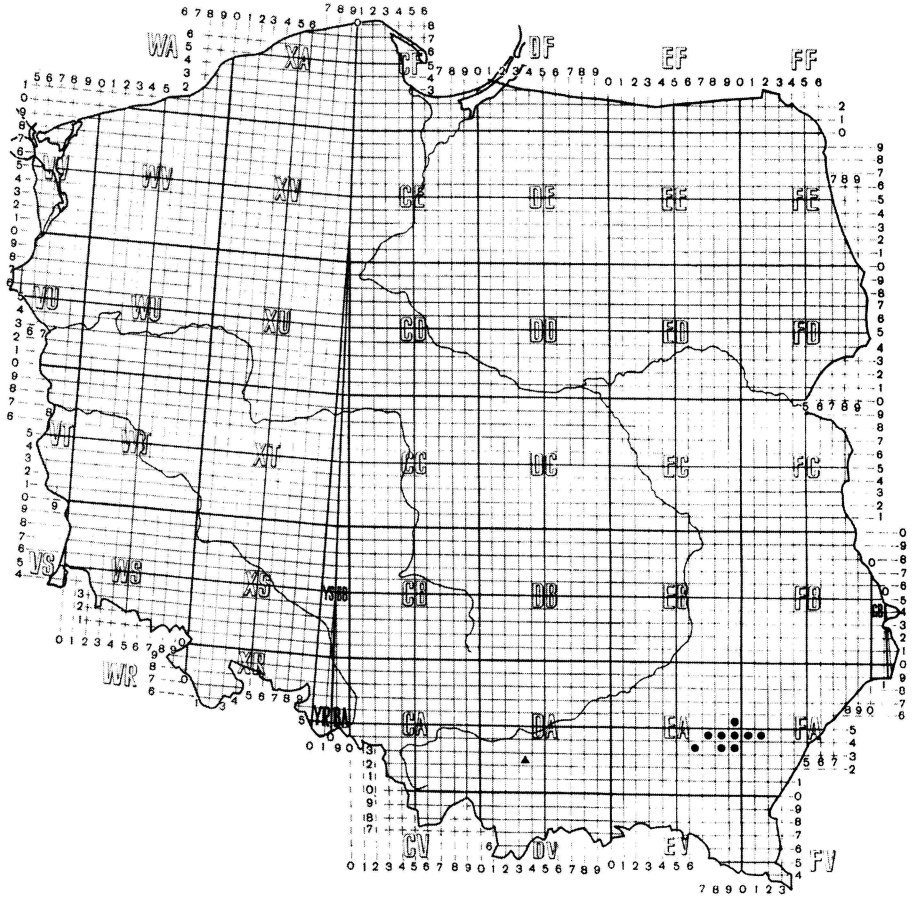

Fig. 2.Distribution of *Arion lusitanicus* Mabille in Poland (● – places of the slug occurrence found in 1997–1999; ▲ – the place of occurrence found in 2000)

running from south up north. The river banks are overgrown with thick bushes suitable for slug reproduction and survival. Natural conditions of that habitat and available food (different plant crops) are also favourable to the development of the slug. The intensity of its occurrence amounted to 30 individuals per 1 m^2. Damages of seedlings and young vegetable plants, such as lettuce, cabbage, beets, carrots, pototatoes were noted. Medium to severe damages was also noted on cereal (wheat, maize), oilseed plants (oilseed rape, sunflower) as well as on bush fruits and ornamental plants (perennials, flowers).

The intensity of the slug occurrence indicates that this species being of Mediterranean origin has successfully adapted to the new temperate climate. On account of its high harmfulness it presents a serious threat to cultivated plants.

REFERENCES

1. Altena C.O. van Regteren. 1971. Neue Fundorte von *Arion lusitanicus* Mabille. Arch. Moll., 101: 183–185.
2. Briner T., Frank T. 1998. The palatability of 78 wildflower strip plants to the slug *Arion lusitanicus*. Ann. appl. Biol., 133: 123–133.
3. Chevallier H. 1972. *Arionidae* (*Mollusca, Pulmonata*) des Alpes et du Jura francais. Haliotis 2: 7–23.
4. Davies M.J. 1987. *Arion flagellus* Collinge and *A. lusitanicus* Mabille in the British Isles: A morphological, biological and taxonomic investigation. J. Conch., 32: 339–354.
5. Ellis A.E. 1965. *Arion lusitanicus* Mabille in Devon. J. Conch., 25: 345–347.
6. Frank T. 1998. Slug damage and numbers of the slug pests, *Arion lusitanicus* and Deroceras reticulatum in oilseed rape grown beside sown wildflower strips. Agric. Ecos. Environ., 67: 67–78.
7. Kozłowski J. 1995. Ślimaki *Arion lusitanicus* Mab. i *Arion rufus* (L.) – nowe groźne szkodniki w Polsce południowo-wschodniej. Ochrona Roślin nr 9: 3–4.
8. Kozłowski J. 1999. Ślimaki (*Gastropoda: Stylommatophora*) – niedoceniane szkodniki roślin uprawnych w Polsce. Post. Nauk Roln., nr 6: 39–50.
9. Kozłowski J. 2000. Distribution and places of occurrence of the slug *Arion lusitanicus* Mabille (*Gastropoda*: *Pulmonata*: *Arionidae*). Bull. Pol. Acad. Scien., 38 (4): 309–415.
10. Kozłowski J., Kornobis S. 1994. *Arion sp.* (*Gastropoda: Arionidae*) – szkodnik zagrażający roślinom uprawnym w województwie rzeszowskim. Materiały 34. Sesji Nauk. Inst. Ochr. Roślin, cz. 2: 237–240.
11. Kozłowski J., Kornobis S. 1995. *Arion lusitanicus* Mabille, 1868 (*Gastropoda: Arionidae*) w Polsce oraz nowe stanowisko *Arion rufus* (Linnaeus, 1758). Przegl. Zool., 39 (1–2): 79–82.
12. Kozłowski J., Kozłowska M. 1998. Food preferences of the slug *Arion lusitanicus* Mab. (*Gastropoda: Stylommatophora*), in south-east part in Poland. J. Plant Protection Res., 38 (1): 81–83.
13. Quick H.E. 1952. Rediscovery of *Arion lusitanicus* Mabille in Britain. Proc. Malac. Soc. Lond., 29: 93–101.
14. Quick H.E. 1960. British slugs (*Pulmonata: Testacellidae, Arionidae, Limacidae*). Bull. Brit. Mus. (nat. Hist). Zool. Lond., 6: 103–226.
15. Proschwitz T. von. 1992. Spanska skogssnigeln – *Arion lusitanicus* Mabille – en art i snabb spridning med människan i Sverige. Göteborgs Naturhistoriska Museum, Arstryck: 35–42.
16. Proschwitz T. von. 1994. *Oxychillus cellarius* (Müller) and *Oxychillus draparnaudi* (Beck) as predators on egg-clutches of *Arion lusitanicus* Mabille. J. Conch. Lond., 35: 183–184.
17. Proschwitz T. von, Winge K. 1994. Iberiaskogsnegl – en art po spredning i Norge. Fauna 47: 195–203.
18. Reischutz P.L. 1984. Zum massenhaften Auftreten von *Arion lusitanicus* Mabille in den Jahren 1982 und 1983. Mitt. Zool. Ges. Braunau 4: 253–254.
19. Rish P., Backeljau T. 1989. On the occurrence of *Arion lusitanicus* Mabille, 1868 in Belgium (*Mollusca*: *Pulmonata*). Annls Soc. R. Zool. Belg. , 118 (1): 25–38.
20. Schmid G. 1970. *Arion lusitanicus* in Deutschland. Arch. Moll., 100: 95–102.
21. Simroth H. 1891. Die Nacktschnecken der portugiesisch-azorischen Fauna. Nova Acta Ksl. Leop. – Carol. dtsch. Akad. Nat. – forsch., 56: 201–424.

22. Wiktor A. 1983. The slugs of Bulgaria (*Arionidae, Milacidae, Limacidae, Agriolimacidae – Gastropoda, Stylommatophora*). Ann. Zool., 37: 71–206.
23. Winter A.J. de. 1989. *Arion lusitanicus* Mabille in Nederland (*Gastropoda, Pulmonata, Arionidae*). Basteria 53: 49–51.

Jan Kozłowski

NOWE STANOWISKO WYSTĘPOWANIA *ARION LUSITANICUS* MABILLE, 1868 (*GASTROPODA: PULMONATA: ARIONIDAE*) W POLSCE

STRESZCZENIE

W 2000 roku stwierdzono nowe stanowisko występowania ślimaka *Arion lusitanicus* Mabille. Było ono zlokalizowane w Poznachowicach Górnych (UTM DA 43) w siedlisku upraw rolniczych. Ślimak bardzo dobrze zaadoptował się w nowym siedlisku i jest groźnym szkodnikiem roślin uprawnych.

APPLICATION OF THE PARAFFIN RING METHOD FOR PREPARATION OF TEMPORARY MOUNTS WITH NEMATODES

TOMASZ DOBIES[1], JOANNA ZAMOJSKA[2]

[1]Agricultural University of Poznań, Department of Forest and Environment Protection, Wojska Polskiego 71 C, 60-625 Poznań, Poland
[2]Institute of Plant Protection, Department of Agricultural Zoology, Miczurina 20, 60-318 Poznań, Poland
e-mail: s.kornobis@ior.poznan.pl

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The necessity of identification of great numbers of soil and plant nematodes is a basic element of nematologists' work. Nematodes can be observed and distinguished only with the help of a microscope, and for that reason there is a need for preparing microscopic slides. In many cases samples of soil and plants, subjected to nematological research contain up to several thousands of specimens. Therefore there is a hope that applying such technique for preparation of temporary mounts will facilitate nematode identification.

Among different methods of preparation of microscopic slides, simple temporary mounts are most often used for tentative identification of examined species. For long years, such slides were prepared with the help of one of the most standard methods, that is the "glass wool supports" method (Hooper 1986). Moreover, this method has some disadvantages. It is very laborious and time-consuming, that results from the necessity of fixing glass wool supports for the cover glass. Apart from this, during placing on the cover glass, pieces of glass fibres and nematodes often float to the edges of the slide, thus making the identification impossible.

An attempt to adapt the paraffin ring method, known in literature as a method for making permanent mounts (Maeseneer and D'Herde 1963; Hooper 1986), for preparation of temporary mounts was made in our laboratories. The results turned out to be very successful. In order to prepare such temporary mounts, nematodes are fixed in 2% formalin solution (the Seinhorst procedure is omitted), and placed in a drop of 2% formalin solution on a microscopic slide within a ring of paraffin wax. After placing the cover glass, the slide is gently heated over a flame until the paraffin is molten. While the paraffin is setting, a visible ring of wax arises, preventing the contents inside from drying and floating beyond a cover glass.

Temporary slides prepared with this method are much more stable than the ones prepared in the traditional way with glass wool supports. They can last without drying out for several weeks. After such a long time all nematodes' structures are still distinctly visible providing that paraffin after being set isolates the suspension with nematodes from the outside within the whole periphery of a cover glass. The wax plays a role of cover glass supports. Thus laborious fixing of the glass fibres is not necessary. It makes the method much less time-consuming.

Paraffin used for preparation of temporary mounts must be of possibly the lowest melting temperature (not higher than 55–60°C).

REFERENCES

1. Hooper D.J. 1986. Handling, fixing, staining and mounting nematodes. p.75–76. In "Laboratory Methods for Work with Plant and Soil Nematodes" (Southey, ed.). London: Her Majesty's Stationery.
2. Maeseneer J. de, d'Herde J. 1963. Méthodes utilisées pour l'étude des anguillules libres du sol. Revue de l'Agriculture, Bruxelles 16: 441–447.

TOMASZ DOBIES, JOANNA ZAMOJSKA

ZASTOSOWANIE METODY PARAFINOWEJ DO WYKONYWANIA TYMCZASOWYCH PREPARATÓW Z NICIENIAMI

STRESZCZENIE

Dotychczasową metodę wykonywania preparatów tymczasowych, wykorzystującą podpórki z waty szklanej, zastąpiono metodą parafinową, która dotąd była zalecana do wykonywania preparatów trwałych. Z doświadczeń wynika, że może ona być z powodzeniem stosowana do preparatów tymczasowych.