Zootaxa 2432: 45–58 (2010)
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

Contribution to the knowledge of the weevil subgenus *Arammichnus* Gozis, genus *Otiorhynchus* Germar (Coleoptera, Curculionidae) from Sicily and the Sicilian islands

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Abstract

New data are presented on the taxonomy and distribution of some species of *Otiorhynchus* Germar, subgenus *Arammichnus* Gozis, in Sicily. *Otiorhynchus (Arammichnus) ferrarii* Miller is recorded from Sicily for the first time. Three new species are described: *Otiorhynchus (Arammichnus) vagans* **n. sp.**, *Otiorhynchus (Arammichnus) pseudosetosulus* **n. sp.**, and *Otiorhynchus (Arammichnus) adrianus* **n. sp.** The number of known *Otiorhynchus* (*Arammichnus*) species thereby rises to 66; 25 of which are present in Sicily and the lesser Sicilian islands.

Key words: Curculionidae, new records, new species, Sicily

Introduction

In the course of an inventory of the biodiversity of Sicily various species of *Otiorhynchus* Germar belonging to subgenus *Arammichnus* Gozis were collected. Among these, some were poorly known with regards to their distribution in Sicily, one species is newly recorded for the fauna of the island, and three other species are new to science.

Magnano (1992a, 1992b, 1993a, 1993b, 1996, 1999) systematically reviewed the species of *Otiorhynchus* (*Arammichnus*). He recognized 63 species, 38 of which were recorded as present in Italy. Subsequently Osella *et al.* (2005) reported 21 species from Sicily including the Sicilian islands.

It is remarkable that 11 out the 19 species groups proposed by Magnano in the above cited papers are represented in Sicily. As for the geographic distribution of the Sicilian species, it is furthermore noteworthy that all species are endemic, except the cosmopolitan *O. cribricollis* Gyllenhal and *O. calabrensis* Stierlin which also occurs in Calabria. Most of the Sicilian species are recorded from a single site or a small area, whereas *O. ocellifer* Reitter and *O. scabrosoides* Stierlin – which were never collected again following their respective descriptions in 1912 and 1877 – are only known to occur in "Sicily".

Material and methods

All studied specimens were collected using beating trays, entomological nets, and litter reducers, or by looking under stones. The collected specimens were glued on entomological label paper. If extracted, the genital apparatus was soaked in diluted KOH and mounted in Euparal on another label placed on the same pin of the specimen from which it was extracted. Photomicrographs were made using a Nikon digital camera DXM1200 mounted on a Nikon SMZ1000 stereomicroscope. Measurements of body length exclude the head. The descriptive terminology follows van der Berg (1972). Types and other specimens will be stored in the

Accepted by N. Franz: 9 Mar. 2010; published: 21 Apr. 2010

following collections: CMME = Cambria Museum, Department of Animal Biology and Sea Ecology of University of Messina, Messina, Italy; LMC = Luigi Magnano collection, Siena, Italy; CBC = Cosimo Baviera collection, Messina, Italy.

Results

O. bagnolii species group

This group consists of nine species distributed throughout Sicily, the Thyrrenic Islands, the Sicilian Channel, Malta, and in one case on the Italian mainland (Magnano 1999).

Otiorhynchus (Arammichnus) meligunensis Magnano

Distribution. Endemic to the Aeolian Archipelago; previously known only from Lipari, Salina and Vulcano (Osella *et al*. 2005).

New record. Sicily – Messina: Aeolian Archipelago, Stromboli Island, 09.IV.2006, leg. Baviera C.; Filicudi Island, 01.IX.2006, leg. Baviera C. (CBC).

Otiorhynchus (Arammichnus) ferdinandi Reitter

Distribution. Endemic to Sicily; until now only a single specimen was known in addition to the type, collected in 1920 on the northern slope of Mount Etna (Linguaglossa) (Osella *et al*. 2005).

New records. Sicily – Messina: Peloritani Mountains, Montalbano Elicona, Malabotta Forest, 1300m a.s.l., 23.V.2006, 1 ex., leg. Baviera C.; idem, 1 ex., 23.VI.2006; idem, 2 ex. 25.VII.2006; Catania: Mount Etna, North, Rifugio Brunek, 1500m a.s.l., 1 ex., 20.VI.2006, leg. Baviera C.; Piano Provenzana, 1800m a.s.l., 20.VI.2006, 4 ex., leg. Baviera C.; idem, 1 ex., 23.VIII.2006; Mount Etna, Est, Bosco Cerrita, 1500m a.s.l., 01.VII.2004, 5 ex., leg. Baviera C.; idem, 1 ex., 23.VIII.2006 (CBC).

Otiorhynchus striatosetosus species group

This group consisted previously of two species endemic to Sicily (Magnano 1999), to which we add two new species described below.

Otiorhynchus (Arammichnus) vagans sp. n.

Figs. 1A–C; 2A–C

Type material. Holotype: male, labeled "Sicilia, Trapani, R. N. O. "Zingaro", 700m ca., 26–29.III.2006, leg. Baviera C." (CMME) (Fig. 1). **Paratypes:** 1 male, 2 females, same data as holotype. 1 female with terminalia extracted and mounted in Euparal (CMME, LMC, CBC).

Diagnosis. Similar to *O. striatosetosus* Boheman yet differing from it by the rostrum which is longer than wide, larger punctures on the pronotum, less rounded sides of the prothorax, longer antennae, a more rounded apex of the mesophallus and a much more abruptly curved spermatheca.

Description. *Holotype* – Body length 7.5 mm, maximum elytral width 3.5 mm. Body black, tibiae, tarsi, and antennae brownish. Rostrum as long as wide. Posterior margin of epistome widely rounded to obtusely angled, slightly keeled. Frons anteriorly folded downwards, smooth, shiny, with shallow punctures. Lateral sides of frons convergent towards the eyes, with quite deep punctures and a transverse impression in the

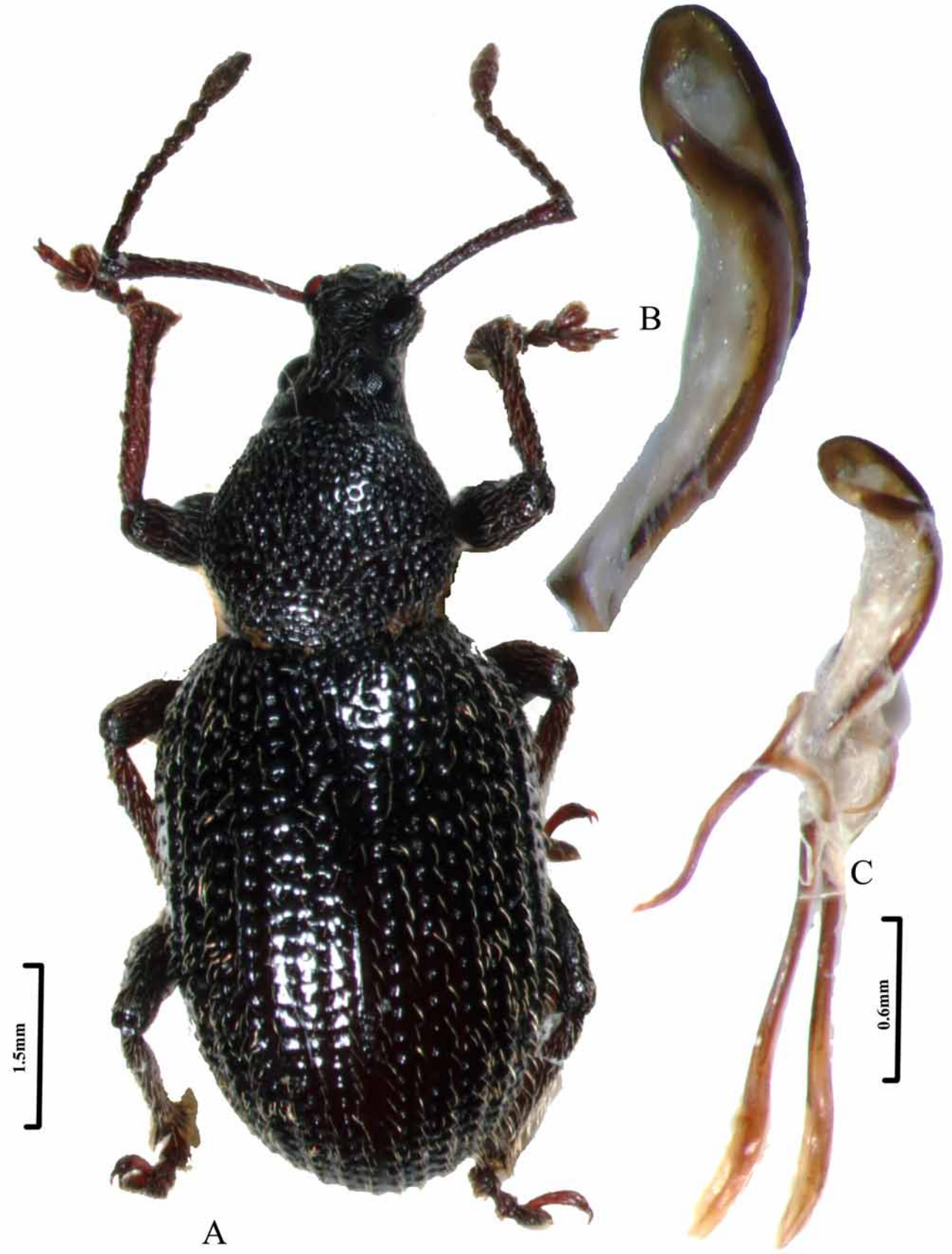

FIGURE 1. *Otiorhynchus (Arammichnus) vagans* **sp. n.** Holotype male: (A) habitus; (B) aedeagus, apex; (C) aedeagus.

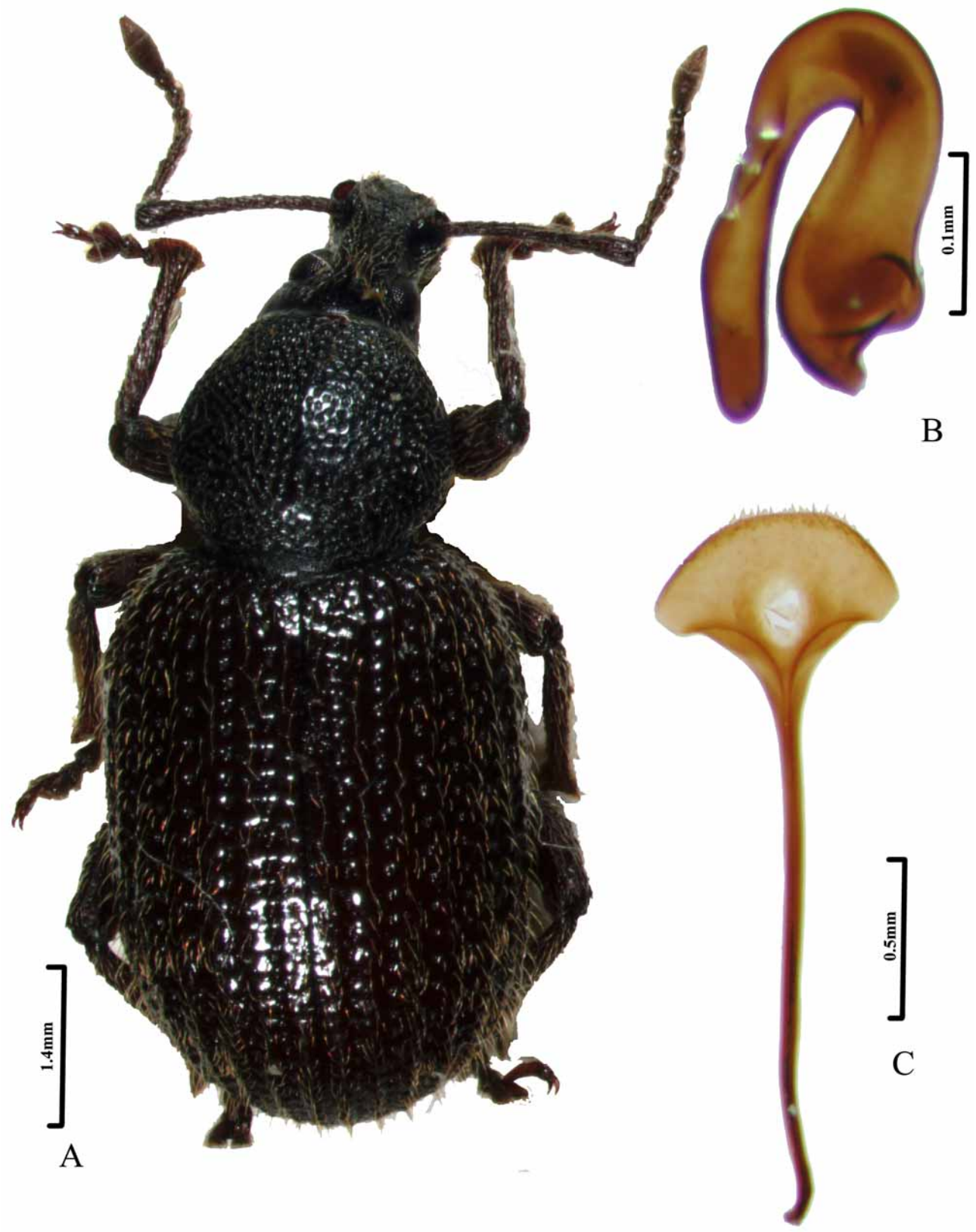

FIGURE 2. *Otiorhynchus (Arammichnus) vagans* **sp. n.** Paratype female: A habitus; B spermatheca (damaged); C spiculum ventrale.

anterior half. Antennal scape slightly clavate and curved; funicular joints as follows: I 2.3x as long as its apical width, II 3x as long as its apical width, III 1.8x as long as wide, IV 1.5x as long as wide, V and VI 1.3x as long as wide, VII 1.5x as long as wide; club fusiform, 2.2x as long as wide, as long as funicular joints V to

VII combined. Head 1.8x longer than wide, eyes feebly convex, inter-ocular space 0.5x as wide as width of rostrum at antennal insertion, slightly wider than maximum width of an eye. Head and rostrum puncturated, each puncture with a white, recumbent, 5–6x longer than wide seta. Pronotum (Fig. 5C) as wide as long, lateral margins strongly rounded, maximum width behind its midpoint, much narrower apically than at base, dorsal surface slightly convex. Disc with punctures mesally directed, larger on central area than on sides, intervals about as wide as half diameter of punctures; granules mesally directed, similar in size to lateral punctures; punctures and granules with semi-erect white setae, 2–3x longer than wide. Elytra (Fig. 6C) 1.37x longer than wide, elliptic, sub-parallel sided; punctures of striae slightly oval and sharply delineated, each with a small white seta on anterior margin. Intervals of striae smooth and shiny, 1.5x as wide as striae, with a median row of small punctures, each with a white seta, 1.5x longer than wide, inserted at a 45° angle; with scarce groups of golden hair-like setae. Urosternites smooth and shiny, scarcely puncturated, each puncture with a seta 2–3x longer than wide; 5th anal urosternite with thin striae on its anterior half. Femora unarmed, fore tibiae slightly expanded apically. Aedeagus quite regularly curved dorsoventrally, basal apodemes slightly longer than mesophallus, apex rather evenly rounded, only slightly less so in the middle (Fig. 1B–C).

Paratypes. The length of paratypes varies from 6.5 to 8 mm. The punctures of the strial intervals are deeper in some specimens. The lateral sides of the elytra are more rounded and the 5th anal urosternite lacks striae in females. The spermatheca is very abruptly curved in the middle, the spiculum ventrale is palette-like and setose at the apex, apodeme about 3 times longer than the expanded apex (Fig. 2B–C).

Etymology. The new species takes its name from its type locality: Zingaro (= gipsy) Natural Reserve.

Distribution. The new species is known only from the Natural Reserve of Zingaro; all samples were collected on the ground under stones.

***Otiorhynchus (Arammichnus) pseudosetosulus* sp. n.**

Fig. 3(A–C)

Type material. Holotype: female, labeled "Sicilia, Messina, Monti Nebrodi, lago Trearie, 1435m, 15.IV.2005, leg. Baviera C." Spermatheca and spiculum ventrale dissected and mounted in Euparal. (CMME)

Diagnosis. Closely related to *Otiorhynchus (Arammichnus) striatosetosus* Boheman 1843 from which it can be differentiated by the much narrower punctures of the pronotum, a smaller size, the stocky shape of the elytra, and erect setae on the prothorax and elytra.

Description. *Holotype* – Body length 6 mm, maximum elytral width 2.5 mm. Body black, legs dark brown. Rostrum 1.5x as long as wide. Posterior margin of epistome widely rounded and keeled. Frons poorly defined, anteriorly folded downwards, with shallow punctures on sides, mesally knurled. Lateral sides of frons convergent towards the eyes, with a longitudinal impression in the middle and dense punctures on sides; each head puncture with a white setae, 3–4x longer than the diameter of a puncture, backwardly directed and raised on tegument. Scape slightly clavate and curved; funicular joints as follows: I and II similar in length, 2x longer than apical width; III 1.5x as long as wide, IV–VII as long as wide. Antennal club fusiform, 1.3x longer than wide and slightly shorter than funicular joints V to VII. Head 2x longer than wide, eyes slightly convex, separated by distance slightly shorter than interantennal space and wider than maximum diameter of an eye. Prothorax (Fig. 5B) as long as wide; lateral margins strongly rounded; surface of disc with dense punctures mesally directed, with narrow and convex intervals; with a smooth and shiny small central area, sides of prothorax with granules of the same size of the dorsal punctures; with white setae, erected on disk, recumbent at sides, 4–5x longer than diameter of the punctures. Elytra (Fig. 6B) elliptical, 1.8x longer than wide; punctures of striae deep, rounded, separated from each other by distance similar to its diameter. Interstriae flattened, 2x as wide as striae, with a median row of tooth-like coarse granules, on which are inserted white setae, as long as interstriae width; anterior margin of the strial punctures with very short white setae. Urosternites I to IV smooth and shiny, with sparse punctures; V with dense minute punctures; punctures with 3–4x longer than wide, recumbent, white setae. Protibiae straight and dorsally expanded at their extreme apex. Femora unarmed. Spiculum ventrale with the fork-like apex not much expanded and apodeme about 4 time longer than it, spermatheca C-like with the basis slighlty inflated and notched (Fig. 3B–C).

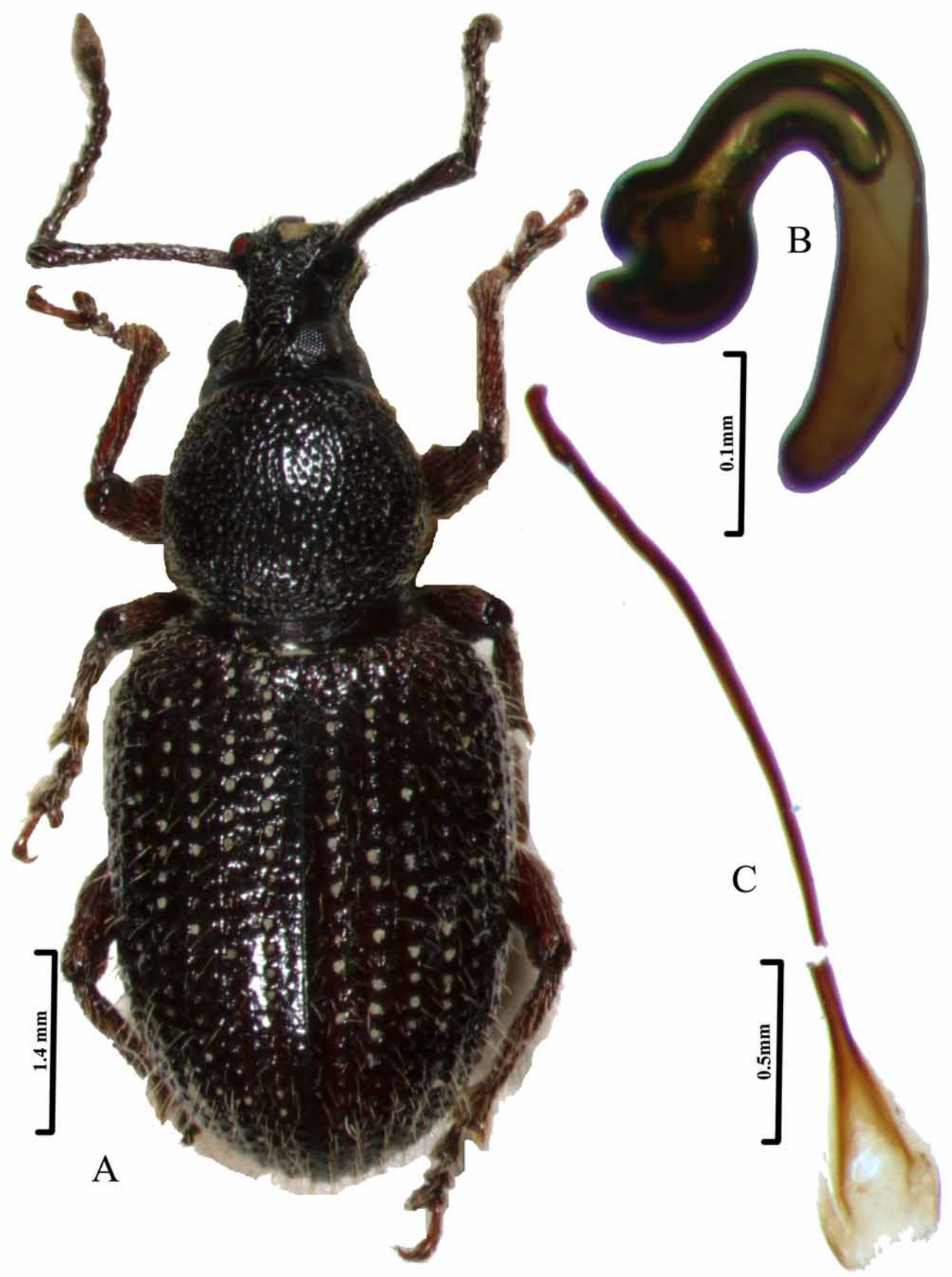

FIGURE 3. *Otiorhynchus (Arammichnus) pseudosetosulus* **sp. n.** Holotype female: A habitus; B spermatheca; C spiculum ventrale.

Etymology. The new species takes its name from its similarity with *Otiorhynchus (Arammichnus) setosulus*.

Distribution. A single specimen is known, collected under stones not far from the shores of Lake Trearie (Nebrodi Mountains).

Comparative notes. The new species differs as follows from other closely related species.

Otiorhynchus vagans: prothorax strongly rounded on sides and dorsally slightly convex, punctures small, mesally directed, separated from each other by distance 0.5x its diameter, elytral setae short, less dense than in *O. striatosetosus*, and erected to 45°. Anterior tibiae straight. Apex of mesophallus parallel-sided and rather regularly curved, spermatheca very abruptly bent in the middle with its base quite regularly widening and only slightly incised, spiculum ventrale with apex strongly and palette-like expanded, apodeme about 3 times longer than the dilated apex (Figs. 1B–C and 2B–C).

Otiorhynchus pseudosetosulus: prothorax moderately laterally expanded, dorsally convex, punctures very small and dense, with convex intervals; elytra with long, erect and sparse setae. Anterior tibiae straight. Spermatheca C-shaped, quite regularly bent in the middle with its base rather abruptly inflated and clearly notched, spiculum ventrale with forked apex only slightly expanded, its apodeme about 4 times longer than the dilated apex (Fig. 3B–C). Male unknown.

Otiorhynchus striatosetosus Boheman: prothorax strongly rounded at sides, dorsally convex, punctures large, mesally directed, separated from each other by distance shorter than 0.5x its diameter; elytra with long, dense, semi-erected setae. Male anterior tibiae straight. Apex of mesophallus parallel-sided and blunt, spermatheca not very abruptly bent in the middle with its base regularly widening and clearly notched, spiculum ventrale with apex strongly and palette-like expanded, its apodeme about 2.5 times longer than the expanded apex.

Otiorhynchus lacertosus Pesarini: prothorax rounded on sides, dorsally flattened, punctures small, mesally directed, separated from each other by distance similar to its diameter; elytra with short, sparse, semi-erect setae. Legs unusually long and strong, front tibiae curved towards the apex. Anterior tibiae straight. Apex of mesophallus slightly dilated at sides and straight. Female unknown.

Otiorhynchus umbilicatoides species group

According to Magnano (1993b, 1999), this group consists of two species from Sicily, *O. umbilicatoides* Reitter and *O. pseudoumbilicatoides* Magnano, in addition to the new species described below.

Otiorhynchus (Arammichnus) adrianus sp. n.

Fig. 4(A–C)

Type material. Holotype: female, labeled "Sicilia (PA) Palazzo Adriano, 700 m, 23.X.2006, leg. Baviera C." (CMME). **Paratype:** female, same data as holotype (LMC).

Diagnosis. Differs from the two other species of this species group by the narrow, 1.7 longer than wide and dorsally depressed elytra, longer setae, and an only slightly dilated apex of the spiculum gastrale which has the apodeme more than 5 times longer than wide.

Description. *Holotype* – Body length 7 mm, maximum elytral width 3 mm. Body black, legs dark brown. Rostrum 1.3x wider than long. Posterior margin of epistome keeled, widely rounded. Frons anteriorly folded downwards, with confluent granules. Rostrum parallel sided, with a shallow median furrow, dense granules and convex intervals. Scape evenly swollen towards apex, slightly curved; funicular joints as follows: I, 3x longer than wide, II 2.5x longer than wide, III–VII 1.5x longer than wide. Antennal club fusiform, 1.3x longer than wide, slightly longer than funicular joints V to VII combined. Head 2x longer than wide, eyes separated by distance similar to width of rostrum at antennal insertion, 2x the diameter of an eye; punctures of rostrum and head with backwardly directed, white, semi-erect setae 2.5x longer than the diameter of a puncture.

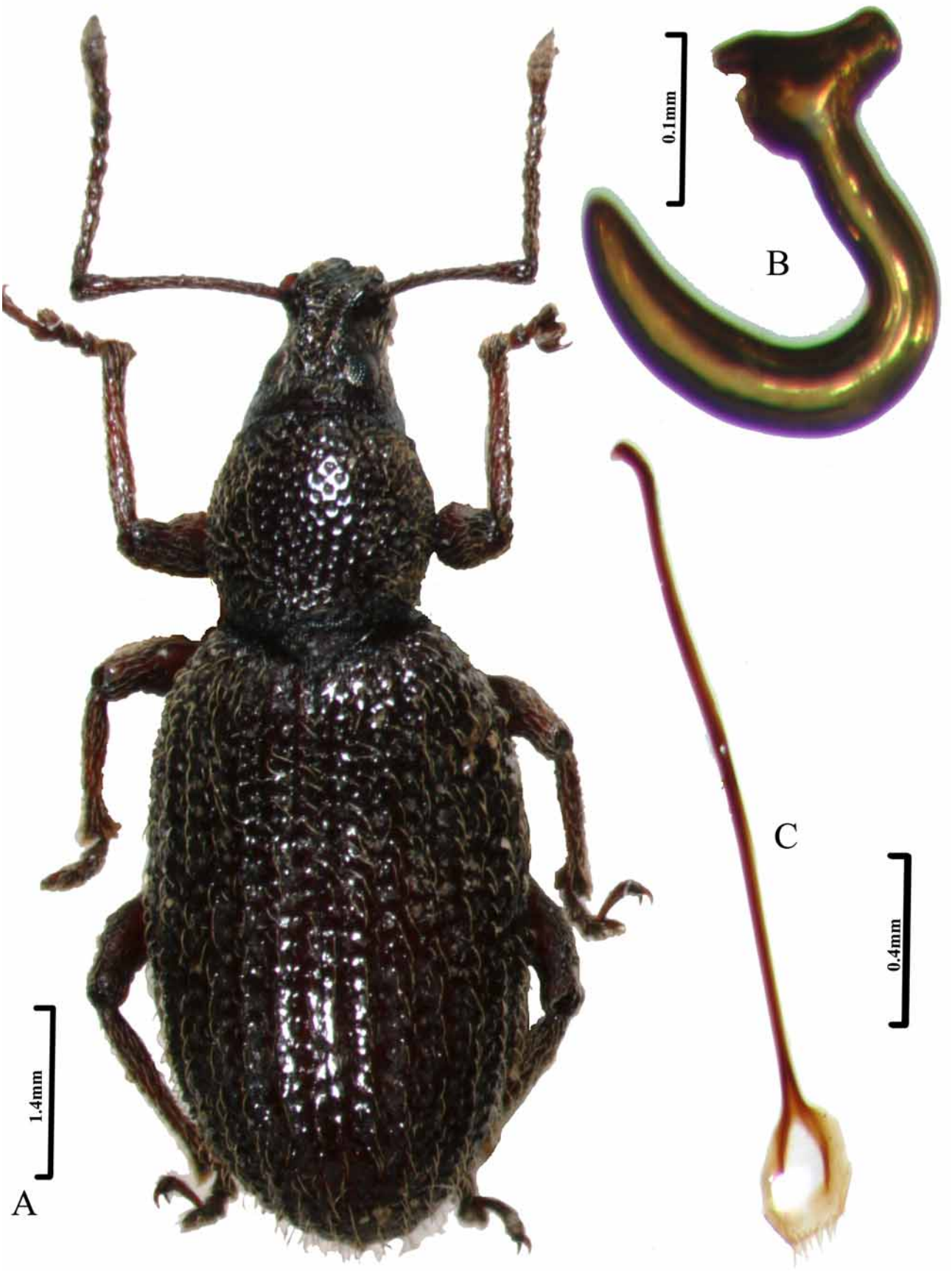

FIGURE 4. *Otiorhynchus (Arammichnus) adrianus* **sp. n.** Holotype female: A habitus; B spermatheca; C spiculum ventrale.

Prothorax (Fig. 5A) slightly longer than wide, dorsally slightly convex, with anterior margin slightly shorter than posterior margin. Pronotum with large, dense mesally directed punctures, separated from each other by 0.5x its diameter, smaller and sparser over the center of the disc; on sides punctures replaced by mesally directed granules; with white setae 2x longer than a puncture diameter, slightly raised and backwardly directed. Elytra (Fig. 6A) elliptical, 1.7 x longer than wide, punctures of striae shallow, separated from each other by distance similar to 0.5x its diameter. Interstriae as wide as striae, with a median row of coarse granules, with curved, white setae, 2x longer than a strial puncture, so that the apex of each reaches the base of the next; anterior margin of strial punctures with very short setae. Urosternites with scattered punctures; urosternite V with smaller and denser punctures on basal half; punctures with appressed white setae, 2–4x longer than the diameter of a puncture. Protibiae straight, not apically expanded. Femora unarmed. Spiculum ventrale and spermatheca as in Fig. 4 (B–C).

Etymology. The new species takes its name from its type locality: Palazzo Adriano on the Sicani Mountains.

Distribution. The new species is known only from the above locality; both specimens have been collected on grass and shrub vegetation.

Comparative notes. *Otiorhynchus adrianus* belongs to the *O. umbilicatoides* Reitter group but differs from the two other species of this group by the almost flattened and slender instead of rather plump and convex body shape, by the elytra 1.7x instead at most 1.5x longer than wide, by the longer, curved and slightly raised setae of the elytral interstriae, and by the shape of spiculum ventrale whose apex is fork-like and only slightly dilated instead of being strongly expanded, and with its apodeme more than 5x instead of about 3x longer than wide.

Otiorhynchus ferrarii species group

This group consists of three species (Magnano 1996) distributed on the Italian mainland and in Sicily, where only *Otiorhynchus rigidisetosus* Magnano had been recorded previously.

Otiorhynchus (Arammichnus) ferrarii Miller

Distribution. Associated with coastal dune environments, widely distributed along the Adriatic coast from Friuli to Basilicata (Osella *et al*. 2005), recorded for Sicily for the first time.

New record. Sicily – Messina: Santo Saba, 04.II.2006, 1 ex., leg. Baviera C. (CBC).

Otiorhynchus lubricus species group

This group consists of four species (Magnano 1993a) distributed on the Italian mainland, Campania and Calabria, with only *O. lubricus lubricus* Boheman previously recorded from Sicily (Magnano 1993a).

Otiorhynchus (Arammichnus) lubricus lubricus Boheman

Distribution. Previously known only from the south-eastern region of Sicily, Eloro and Pachino (Osella *et al*. 2005).

New record. Sicilia – Catania: Mount Etna, Est, S. Alfio, 25.VI–15.VIII.2001, 1 ex., leg. Baviera C. (CBC).

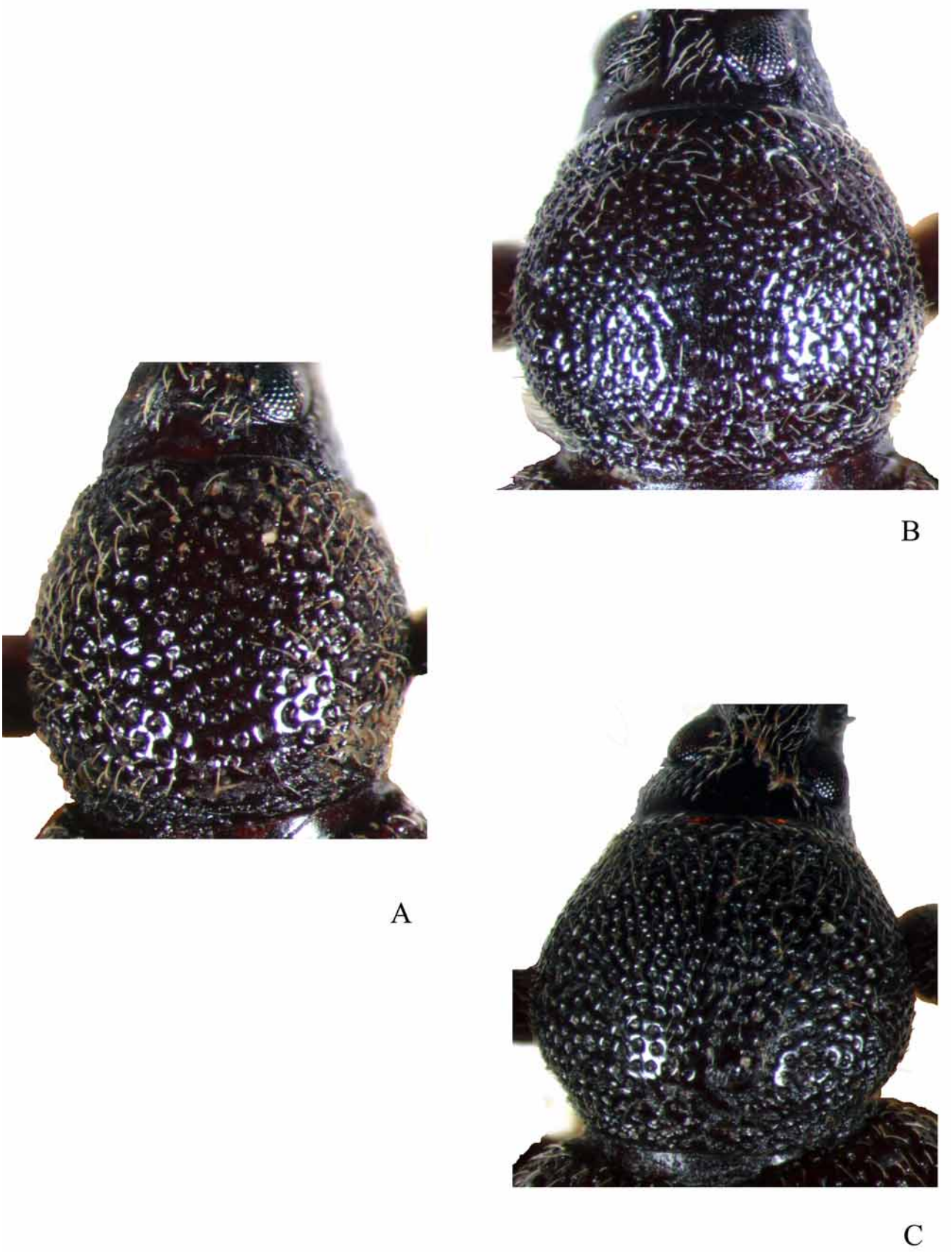

FIGURE 5. Pronotal punctuation and setation of the new species: A: *O. adrianus* **sp. n.**; B: *O. pseudosetosulus* **sp. n.**; C: *O. vagans* **sp. n.**

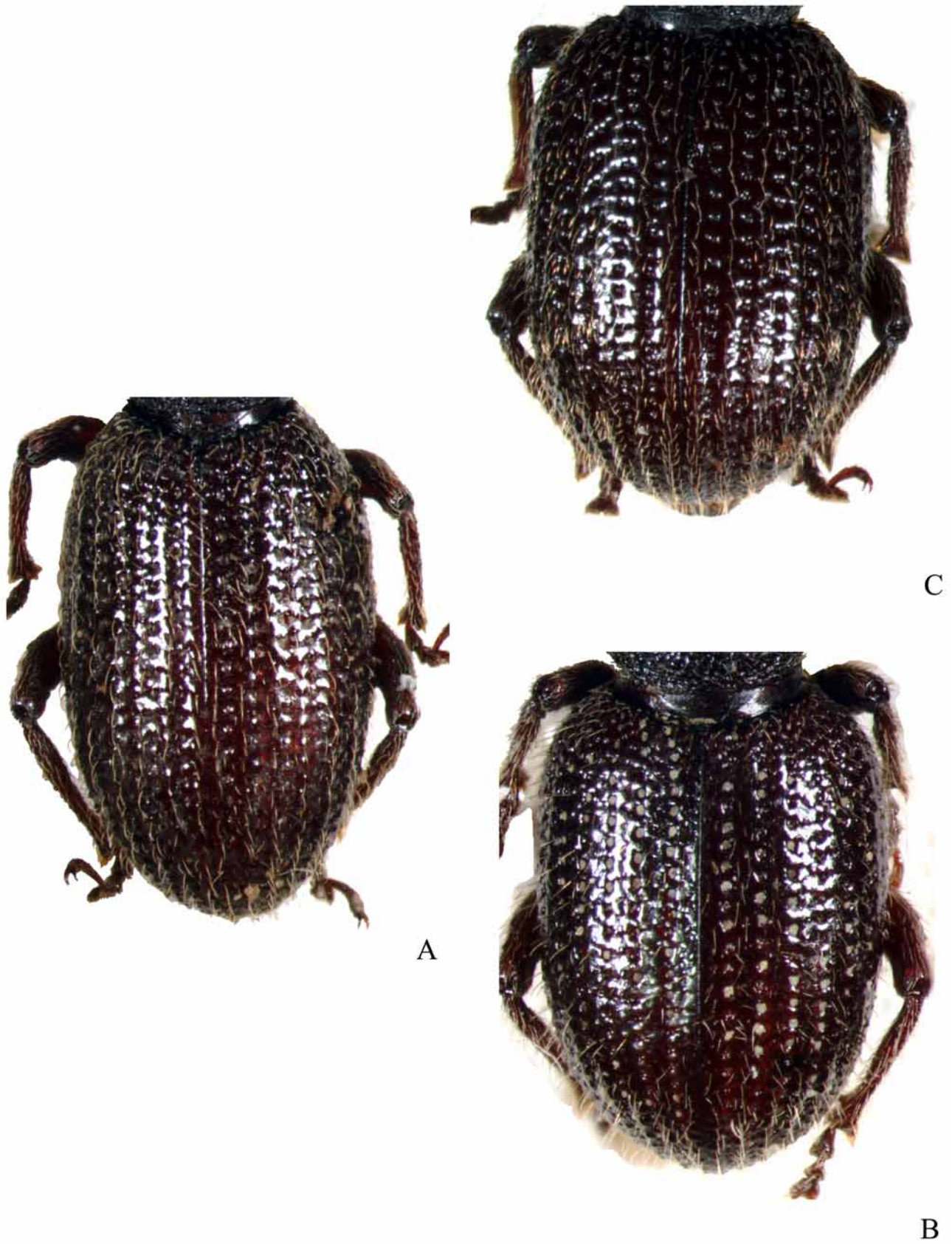

FIGURE 6. Elytral punctuation and setation of new species of *Otiorhynchus*: A: *O. adrianus* **sp. n.**; B: *O. pseudosetosulus* **sp. n.**; C: *O. vagans* **sp. n.**

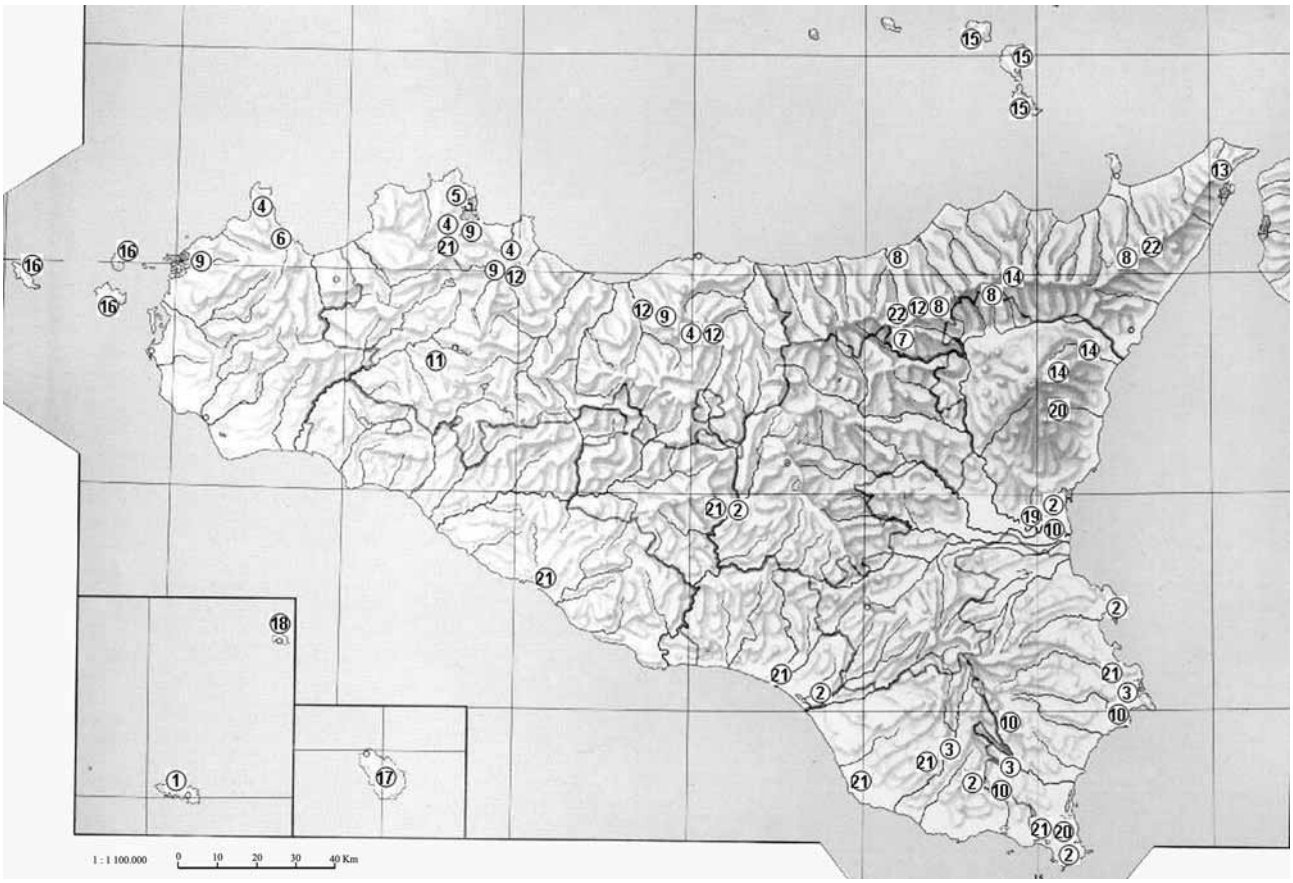

FIGURE 7. Distribution of known species of *Otiorhynchus* of the subgenus *Arammichnus* in Sicily and on the Sicilian islands: (1) *O. lopadusae* A. Solari & F. Solari; (2) *O. reticollis* Boheman; (3) *O. hyblaeicus* Magnano; (4) *O. striatosetosus* Boheman; (5) *O. lacertosus* Pesarini; (6) *O. vagans* **sp. n.**; (7) *O. pseudosetosulus* **sp. n.**; (8) *O. setosulus* Stierlin; (9) *O. umbilicatoides* Reitter; (10) *O. pseudoumbilicatoides* Magnano; (11) *O. adrianus* **sp. n.** (12) *O. rigidesetosus* Magnano; (13) *O. ferrarii* Miller; (14) *O. ferdinandi* Reitter; (15) *O. meligunensis* Magnano; (16) *O. aegatensis* Magnano; (17) *O. cossyrensis* Magnano; (18) *O. linussae* A. Solari & F. Solari; (19) *O. catinensis* Magnano; (20) *O. lubricus lubricus* Boheman; (21) *O. neapolitanus* Stierlin; (22) *O. calabrensis* Stierlin. Three species are not included: *O ocellifer* Reitter and *O. scabrosoides* Stierlin, both reported for "Sicily" but never reconfirmed after their initial respective descriptions, and the cosmopolitan *O. cribricollis* Gyllenhal.

Otiorhynchus calabrensis species group

This group comprises a single species distributed in Calabria and northeastern Sicily.

Otiorhynchus (Arammichnus) calabrensis Stierlin

Distribution. In Sicily this rare species was known only from a single locality: Messina, Nebrodi Mountains, Portella di Femmina morta (Osella *et al.* 2005).

New record. Sicily – Messina: Peloritani Mounts, Antennammare Mount, 1133m a.s.l., 1 ex., 17.X.1998, leg. Baviera C.; idem, 1 ex., 19.II.2006; Salice, 400m a.s.l., 28.X.2006, 1 ex., leg. Baviera C. (CBC).

Conclusions

With the description of three new species and the new record of *O. ferrarii*, the number of species belonging

to *Otiorhynchus* subgenus *Arammichnus* known from Sicily and the Sicilian islands rises from 21 to 25. In the course of this project we identified other rare species from new localities of the Italian mainland, for example *O. ferdinandi* and *O. calabrensis*, or from the lesser Sicilian islands, for example *O. meligunensis*. The *O. striatosetosus* species group appears to be endemic to Sicily and, with the description of the new species *O. vagans* and *O. pseudosetosulus*, the number of its species increases from two to four, all located in western Sicily. With the description of *O. adrianus*, the *O. umbilicatoides* group now includes three species. *Otiorhynchus lubricus* and *O. calabrensis* were found at new localities where their presence had been predicted by Magnano (1993b, 1999).

The species of *Otiorhynchus* subgenus *Arammichnus* according to Magnano (1992a, 1992b, 1993a, 1993b, 1996, 1999) and the present contribution are distributed in the Sicilian Provinces/Lesser Islands as follows (Fig. 7).

Group	Species	Distribution
I.	*Otiorhynchus (Arammichnus) lopadusae* A. Solari & F. Solari	Lampedusa Island
II.	*Otiorhynchus (Arammichnus) reticollis* Boheman	Caltanissetta, Ragusa, Syracuse
	Otiorhynchus (Arammichnus) cribricollis Gyllenhal	Cosmopolitan
	Otiorhynchus (Arammichnus) hyblaeicus Magnano	Ragusa, Syracuse
III.	*Otiorhynchus (Arammichnus) striatosetosus* Boheman	Palermo, Trapani, Madonie Mountains
	Otiorhynchus (Arammichnus) lacertosus Pesarini	Pellegrino Mount
	Otiorhynchus (Arammichnus) vagans **sp. n.**	Trapani
	Otiorhynchus (Arammichnus) pseudosetosulus **sp. n.**	Nebrodi Mountains
IV.	*Otiorhynchus (Arammichnus) setosulus* Stierlin	Nebrodi Mountains
V.	*Otiorhynchus (Arammichnus) umbilicatoides* Reitter	Madonie Mountains
	Otiorhynchus (Arammichnus) pseudoumbilicatoides Magnano	Catania, Syracuse
	Otiorhynchus (Arammichnus) adrianus **sp. n.**	Palermo
VI.	*Otiorhynchus (Arammichnus) rigidesetosus* Magnano	Nebrodi and Madonie Mountains
	Otiorhynchus (Arammichnus) ferrarii Miller	Messina
VII.	*Otiorhynchus (Arammichnus) ocellifer* Reitter	"Sicily"
	Otiorhynchus (Arammichnus) ferdinandi Reitter	Etna Mount, Peloritani Mountains
	Otiorhynchus (Arammichnus) meligunensis Magnano	Eolian Archipelago
	Otiorhynchus (Arammichnus) aegatensis Magnano	Egadi Archipelago
	Otiorhynchus (Arammichnus) cossyrensis Magnano	Pantelleria Island
	Otiorhynchus (Arammichnus) linussae A. Solari & F. Solari	Linosa Island
VIII.	*Otiorhynchus (Arammichnus) catinensis* Magnano	Catania
IX.	*Otiorhynchus (Arammichnus) lubricus lubricus* Boheman	Etna Mount, Syracuse
	Otiorhynchus (Arammichnus) neapolitanus Stierlin	Agrigento, Caltanissetta, Palermo, Ragusa, Syracuse
X.	*Otiorhynchus (Arammichnus) scabrosoides* Stierlin	"Sicily"
XI.	*Otiorhynchus (Arammichnus) calabrensis* Stierlin	Nebrodi and Peloritani Mountains

At present Sicily harbours more than one third of the *Otiorhynchus* (*Arammichnus*) species described, most of which are endemic to the island. More extensive surveys are expected to expand the distribution records of the known species, and may lead to the discovery of additional new taxa from Sicily.

Acknowledgments

We wish to thank Carlo Pesarini (Museum of Natural History of Milan, Italy) and Enzo Colonnelli (Rome) for helpful comments on this paper. Antonio Machado, La Laguna, Canary Islands and another anonymous reviewer are thanked for their useful comments on an earlier version of this publication.

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