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The first discovery of the genus *Meira* Jacquelin du Val outside the western mediterranean area, with description of a new species (Coleoptera, Curculionidae, Entiminae)

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Abstract

A new species of *Meira* Jacquelin du Val, 1852 from northeast Italy is described: *Meira mariaesilvanae* **sp. n.** This is the first discovery of the genus *Meira* in the northeast of Italy outside the hitherto known distribution. Ecological and distributional data are provided for the new species. Photos of habitus, some morphological details, genitalia and of the type locality illustrate the work. In addition we provide a dichotomous key to Italian species and a checklist to known *Meira* species.

Key words: Peritelini, *Meira mariaesilvanae* **sp. n**., taxonomy, ecology, phenology

Riassunto

Viene descritta una nuova specie di *Meira* Jacquelin du Val, 1852 del nord-est dell'Italia: *Meira mariaesilvanae* **sp. n.** Questo è il primo ritrovamento del genere nel nordest dell'Italia, al di fuori della sua distribuzione finora conosciuta. Della nuova specie vengono fornite informazioni sulla distribuzione e sulla ecologia. Foto dell'habitus della nuova specie, di alcuni particolari morfologici, degli apparati genitali e della località tipica illustrano il lavoro. Viene inoltre fornita una chiave dicotomica per l'identificazione delle specie italiane ed una checklist delle specie di *Meira* attualmente note.

Introduction

This work stems from passion for the natural science by the second author, which made possible an unexpected and somewhat sensational discovery of a new species of *Meira* Jacquelin du Val, 1853. This is the first discovery of a *Meira* outside of its known distribution, specifically the northern part of the western mediterranean area (sensu Vigna Taglianti *et al.*, 1999), about 200 km away from the Apennines, the nearest area from where it was previously known (Figs.12, 13). In addition it is the first discovery of a Peritelini weevil, not of the genus *Simo* Dejean, 1821, in the northeast of Italy. The type locality (Fig. 15) of the new species is located halfway along the eastern shore of Garda Lake, at 260 meters of altitude on the gentle slope of Mount Baldo in a typical prealpine xerothermic"oasis". This unexpected finding encouraged the first author to conduct more intensive and extensive field research which led to the discovery of several additional specimens in two new places and new and interesting ecological and phenological observations. This discovery increases our knowledge about the peculiar insect fauna of the prealpine xerothermic biotope (Magistretti & Ruffo, 1959; Osella, 1968, 1970).

Meira is a taxonomically complex genus on which there have been a number of recently published works (Delaunay, 2011; Delanauy & Melle, 2013; Osella *et al.*, 2005; Pierotti & Bellò, 1994, 1997, 1998, 2010; Pierotti & Fink, 2013; Pierotti & Rouault, 2010; Pierotti, 2011, 2012, 2013a, 2013b, 2013c; Rouault, 2013; Pierotti *et al.*, 2010; Tinti *et al.*, 1994). The Catalogue of Palaeartic Coleoptera recently published (Pierotti, 2013c) lists 16

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species of *Meira*, a number increased in the checklist presented herein to 30 species and subspecies currently known. In addition to the description of the new species we provide a dichotomous key to all Italian species.

Material and methods

The research was carried out in a radius of about 50 km from the locality of the first discovery, in similar xerothermic habitats that were identified by the presence of *Olea europaea europaea* var. *europaea* L. (Figs.15, 16, 17) and/or *Olea europaea europaea* var. *sylvestris* (Mill.), sieving the soil near and under *Sedum album* L. (Fig.18). During the hot dry months of the year most specimens were collected by sifting leaf-litter using sieves with meshes progressively from 10 to 3 millimeters and exposing the litter to the sun on white plastic sheets waiting from 10 to 30 minutes for insects to start moving. During the cold months, the leaf-litter was left in a Berlese funnel for one to several weeks.

The last two abdominal sternites, plus aedeagus, tegmen and spiculum gastrale of males, and spiculum ventral, spermatheca and gonocoxite of females were dissected and mounted in DMHF (Dimethyl Hydantoin-Formaldehyde Resin). Measurements were taken by using an Olympus SZH10 stereomicroscope with an ocular grid, as follows: total length from base of rostrum to tip of elytra; pronotal length from anterior margin to base in front of scutellum; pronotal width at the widest point; elytral length from an imaginary line connecting humeri to tip; elytral width at the widest point.Terminology of weevil characters follows Morris (2002) and Lyal (2013). Studio pictures were taken by F. Sacco with a Nikon D90 provided with an objective AF Micro-Nikkor 60 mm, later processed with the software Helicon Focus 5.3 and Photoshop CS4 Extended. Field pictures were taken by C. Bellò with a digital Olympus C-5050 ZOOM.

Collections holding the type specimens are indicated by the following acronyms: CBA = coll. Cosimo Baviera, Messina, Italy; CBE = coll. Cesare Bellò, Castelfranco Veneto, Italy; ECO = coll. Enzo Colonnelli, Roma, Italy; GOS = coll. Giuseppe Osella, Verona, Italy; HPI = coll. Helio Pierotti, Treviso, Italy; MCZR = coll. Museo Civico di Zoologia, Roma, Italy; MSNG= coll. Museo Civico di Storia Naturale "Giacomo Doria", Genova, Italy; MSNM: coll. Museo Civico di Storia Naturale, Milano, Italy; MSNV: coll.Museo Civico di Storia Naturale, Verona, Italy. Collections acronyms follow Evenhuis (2013) except where noted.

Results

Meira mariaesilvanae sp. n.

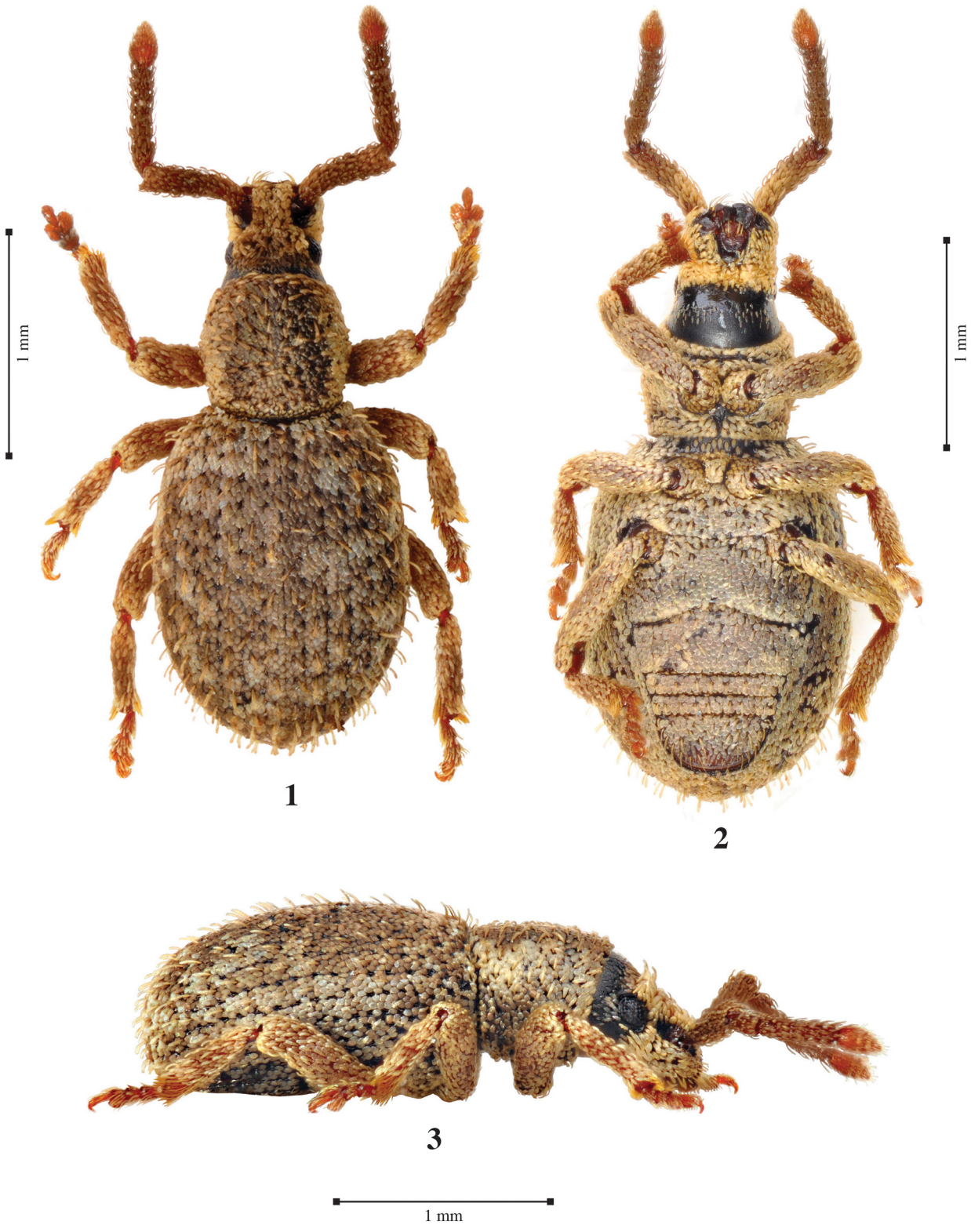
(Figs 1–11)

Diagnosis. A medium-sized (2.50–3.00 mm) *Meira* with shortly oval shape, pterygia hardly prominent, antennae very robust, pronotum hardly transverse, elytra with erect or semi-erect slender and elongate setae.

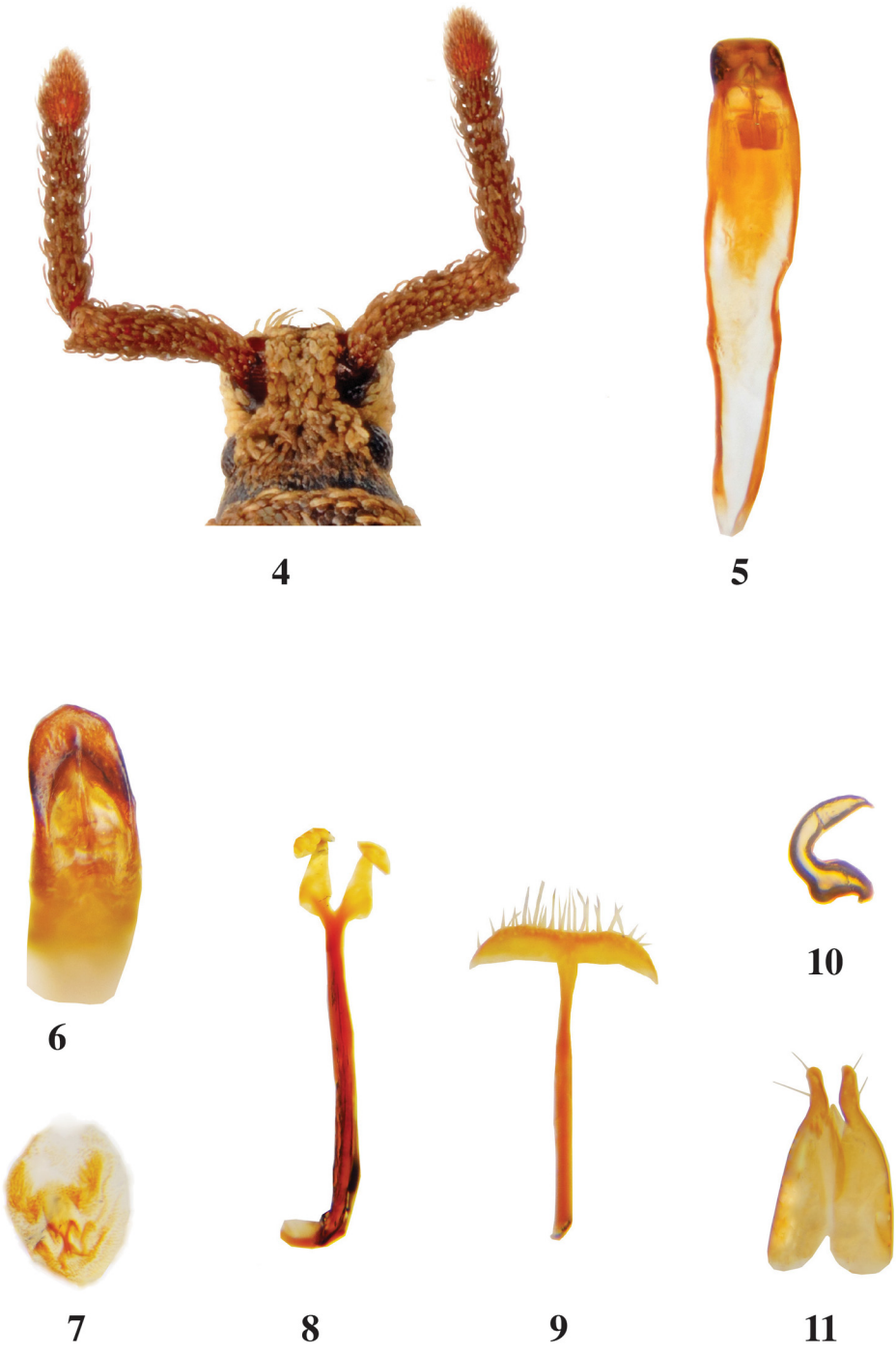
Type series. Holotype male (Fig.1) (CBE) with the following labels: [transparent label with genitalia in DHMF], "♂" [white, printed], "I, Ven.[eto], VR [Verona], Brenzone, loc.[alità] Biasa, 260 m, v.[ag]lio *Olea* + *Sedum* 24 IV '13" [white, printed]; " N 45°41.398' E 10°45.535' legg. Bellò & Chemello" [white, printed]; "coll. Cesare Bellò" [green, printed]; "*Meira mariaesilvanae* sp. n., Holotype, dett. Bellò & Baviera 2013" [red, printed] (CBE).

Paratypes (60 males and 43 females): "I, Ven.[eto], VR [Verona], Brenzone, loc.[alità] Biasa, 260m, v.[aglio]*Olea* + *Sedum* 14 IV '13 N 45°41.398' E 10° 45. 535' legg. Baviera, Bellò & Chemello (CBA, CBE): 10 males, 4 females. I, Ven.[eto], VR [Verona], Brenzone, loc.[alità] Biasa, 260 m, v.[ag]lio *Olea* + *Sedum* 24 IV '13 , N 45°41.398' E 10° 45.535' legg. Bellò & Chemello (CBE): 21 males, 19 females. I, Ven.[etc], VR [Verona], Brenzone, loc.[alità] Biasa, 260m, vaglio *Olea* + *Sedum* 14 IX 2013, N 45°41.393' E 10° 45. 538' legg. Bellò & Chemello (CBE, ECO, GOS, HPI, MCZR, MSNG, MSNM, MSNV): 29 males, 20 females. Genitalia of 13 (8 males and 5 females) were studied.

Other material. Two males and two females labeled: "I, Lombardia, BS [Brescia], Limone Garda, 140m, vaglio *Sedum* sp. in oliveto, 13 V 2013; N 45°48. 226' E 10° 46. 689' legg. Bellò & Chemello (CBE). A male labeled: I, Lombardia, BS [Brescia], Limone sul Garda, 140m, v.[ag]lio *Sedum,* 14 VI 2013; N 45°48. 12.8 E 10° 46. 56.0 legg. Bellò & Chemello (CBE). A male and two females labeled: I, Lombardia, BS [Brescia], Limone sul Garda, vaglio *Sedum* sp.in oliveto, 14 IX'13; N 45°48'12. E 10° 46' 56. legg. Bellò & Chemello (CBE). A female labeled: I, Ven.[eto], VR [Verona], (CBE) Garda loc.[alità] Castei, 60m, vaglio bosco misto 9 V 2013; N 45°35.326' E 10° 40. 086' legg. Bellò & Chemello (CBE).



FIGURES 1–3. Habitus of *M. mariaesilvanae* **sp.n.** (scale bar: 1 mm). 1—Dorsal view holotype ♂; 2—Ventral view paratype ♀; 3—Lateral view paratype ♀.



FIGURES 4–11. 4—Antennae paratype ♀. 5–11—Genitalia ♂ and ♀ of *M. mariaesilvanae* **sp.n.**: 5—Aedeagus dorsal view; 6—Apex of the penis; 7—Internal sac; 8—Spiculum gastrale; 9—Spiculum ventrale; 10—Spermatheca; 11—Gonocoxites.

Holotype male (Fig.1): Length: 2.50 mm. Body shape short and ovate. Dorsal vestiture of imbricate, golden brown or silvery scales with metallic sheen; elongate and raised setae on pronotum, slender-elongate and erect or semi-erect ones on elytra. Rostrum transverse; epistomal keel hardly present; pterygia hardly prominent, clypeus rather gibbous. Frons always transverse, with a short longitudinal groove in the middle; almost twice as wide as clypeus between antennae. Eyes round, small, convex. Antennae highly robust: antennal scape more robust than funicle, hardly curved at basal quarter and progressively thickening towards apex; funicle with first segment shorter than the combined length of the following two articles, 2–7 strongly transverse; club fusiform slightly wider than funicle, with first article widely cup-shaped. Pronotum transverse (length: 0.60 mm, width: 0.64 mm), not or only slightly wider at base than at anterior margin, rounded on its sides, with maximum width just beyond

midlength, disc with densely spaced deep simple punctures. Elytra oval, short (length: 1.50 mm, width: 1.15 mm), hardly rounded on sides; humeri not evident; striae with closely set punctures, and narrow, flat to only slightly convex interstriae.Legs short and robust; femora clubbed, edentate; protibiae almost straight, strongly widened at apex on external margin; metatibiae with open apical corbels; pretarsus short and robust, third joint shortly bilobed, onychium curved, claws short and fused at base. Penis in lateral view strongly curved towards apex, in dorsal view gradually narrowing towards apex, then scutiform (Figs. 5, 6). Spiculum gastrale: Fig. 8. Genital armature, internal sac: Fig.7. Spiculum ventrale: Fig. 9.

Female genitalia and variabilty. Spermatheca with cornus and ramus developed (Fig.10). Ventral spiculum of females sinuous at apex with manubrium widened and gonocoxite of the ovipositor suddenly narrowed in the distal half (Fig.11). No significant differences were observed in non-paratype specimens. Holotype and males paratypes are normally shorter than female paratypes; females have funicle articles 2–7 more transverse than males.

Distribution. Italian endemic, known only in the xerothermic biotope around Garda Lake (Figs. 14–15).

Etymology. Dedicated to Maria Silvana Chemello, wife of the first author, as an acknowledgement of her contribution to the field research and her pride in the discovery of this unexpected new species.

Ecology and Phenology. *Meira mariaesilvanae* was collected during the months of April and September, sieving calcareous soil in an olive grove with blooming *Sedum album* L..Research in the summer months gave negative results suggesting that the *Meira* are not present during this time. Fresh recently emerged specimens are collected in early spring and at the end of the summer.

Comparative notes. The new species is distinguished at first sight from all Italian and Spanish, ~~a~~nd from some of the French species by the presence of elongate raised setae. On the other hand *M. mariaesilvanae* can be separated from French and Spanish species having the same kind of setae by its oval shape, and thick scape very abruptly curved at the end of the basal quarter. *Meira mariaesilvanae* shares with species of the French *sedilloti* and *crassicornis* groups (Delaunay & Melle, 2013) and with the Spanish *Meira medae* Pierotti, Bellò & Alonso-Zarazaga, 2010 the elongate erect setae, although the new species is closer to the Italian *Meira* in the shape of the gonoxites of the female genitalia as in the figure 8 rather than in figure 9 drawn by Pierotti (2013b).

Key to Italian *Meira*

1. Elytral setae almost straight, very elongate, erect or semi-erect (angle with elytral surface ≥ 75°). Amphigonic. 2.5–3.0 mm. Northeast Italy: Veneto. . . . . *M. mariaesilvanae* **sp. n.**
1'. Elytral setae curved, short or elongate, flattened, recumbent, raised or semierect (angle with elytral surface 0°–75°). 2
2. Body shape elongate. Elytra with short setae, flattened (angle with elytral surface ≤ 15°). Parthenogenetic. 2.8–3.3 mm. Central Italy: Abruzzes. . . . . *M. straneoi* F. Solari
2'. Body shape oval or globose. Elytral setae short or elongate, recumbent, raised or semierect (angle with elytral surface 15°–75°) 3
3. Elytra globose (length/width ratio: 1.1–1.2) 4
3'. Elytra oval or elongate-oval (length/width ratio: 1.3–1.5) 5
4. Elytra with setae elongate, raised (angle with elytral surface approximately 45°). Amphigonic. 2.8 mm. Central Italy: Latium . . . . . *M. baudii* Stierlin
4'. Elytra with setae elongate, raised or semierect (angle with elytral surface 45°–75°). Amphigonic. 2.6–3.4 mm. Northwest Italy: Liguria. . . . . *M. diottii* Pierotti & Fink
5. Elytra oval (length/width ratio: 1.3–1.4). Elytral setae short 6
5'. Elytra elongate-oval (length/width ratio: 1.4–1.5). Elytral setae elongate 7
6. Elytral setae recumbent or raised (angle with elytral surface 30°– 45°). Eyes rounded. Amphigonic. 2.3–3.0 mm. Central Italy: Umbria. . . . . .*M. umbra* Pierotti
6'. Elytral setae raised (angle with elytral surface approximately 45°). Eyes oval. Parthenogenetic. 2.8–3.2 mm. Southern Italy: Basilicata. . . . . *M. oenotria* Pierotti
7. Elytral setae recumbent . (angle with elytral surface 15°– 30°). Eyes convex. Amphigonic. 2.4–3.5 mm. Central Italy: Tuscany . . . . . *M. etrusca* Pierotti
7'. Elytral setae raised (angle with elytral surface 30°– 45°). Eyes flat. Amphigonic. 2.7–3.5 mm. Central Italy: Abruzzes. . . . . *M. sabina* Pierotti

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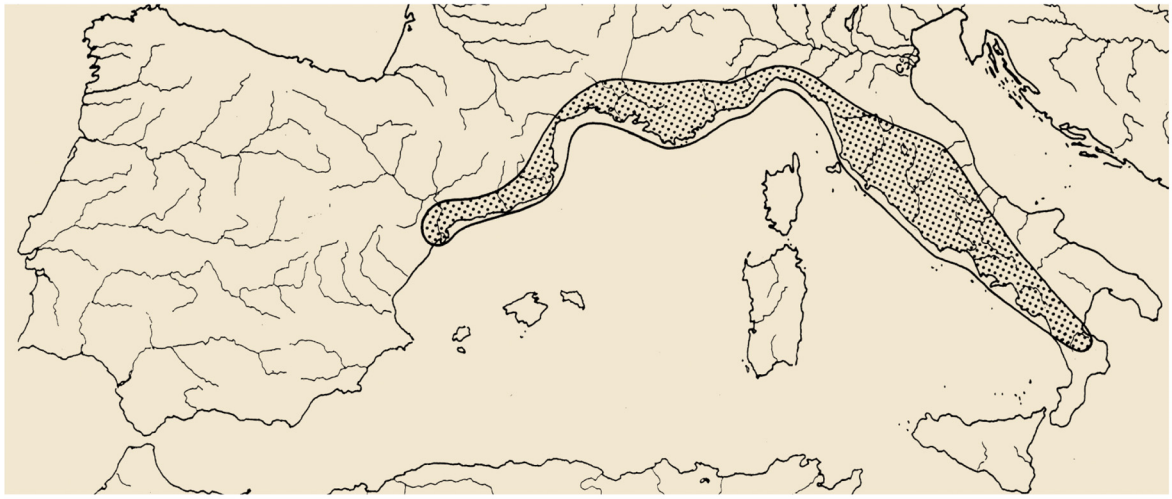

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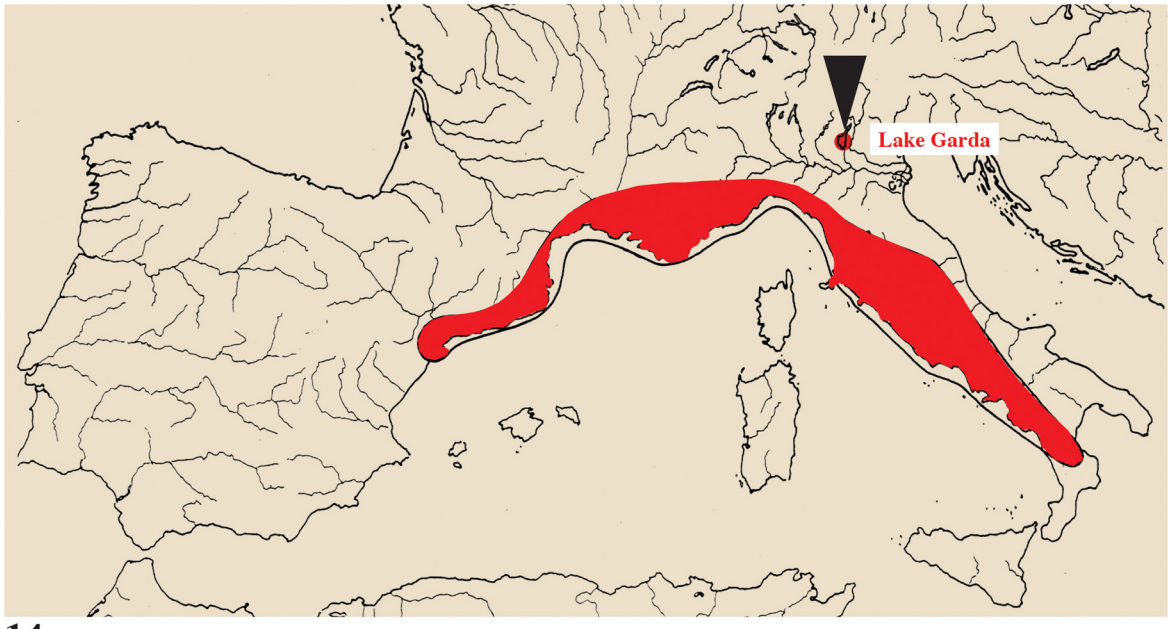

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FIGURE 12–14. 12—Distribution of the genus *Meira* at 1998 (Pierotti & Bellò, 1998); 13—Distribution of the genus *Meira* as of 2010 (Pierotti *et al.*, 2010); 14—Current distribution of the genus *Meira* with the disjunct area for *M. mariaesilvanae*.

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FIGURES 15–18. 15—Lake Garda, Verona, Brenzone, type locality of *M. mariaesilvanae* **sp.n.**; 16—Verona, Brenzone, type locality of *M. mariaesilvanae* **sp.n**.: olive grove; 17—Verona, Brenzone, type locality of *M. mariaesilvanae* **sp.n**.: particular; 18—*Sedum album* L..

Checklist of species of *Meira*

Species	Country	Type locality
allemandi Rouault, 2013	France	Drôme, Bouvante, Col de la Bataille
baudii Stierlin, 1892	Italy	Roma, campagne bei Rome, Rocca di Papa (!)
crassicornis Jacquelin du Val, 1853	France	Montpellier
crassicornis ssp. *coironensis* Delaunay & Melle, 2013	France	Ardèche, Mirabel, massif du Coiron, mont Redon
curvipes Pierotti, 2011	France	Vaucluse: Beaumont du Ventoux
diottii Pierotti, 2013	Italy	Piemonte: Cuneo, Col di Capraùna
etrusca Pierotti, 2012	Italy	Toscana: Uccellina, località Grotte
fagniezi Desbrochers, 1908	France	Vaucluse: mont Luberon
gerundana Pierotti, Bellò & Alonso-Zarazaga, 2010	Spain	Catalonia: Mola de Colldejou
gourvesi Pierotti, 2011	France	Pyrénées Orientales: Prieuré de Serrabonne
lavagnei Pierotti & Bellò, 1994	France	Saint Guilhem le Désert
lavagnei ssp. *komezai* Delaunay & Melle, 2013	France	Midi Pyrénées: Tarn, Le Vintrou
lavagnei ssp. *lata* Delaunay & Melle, 2013	France	Herault: Saint Julien, col du Poirier
mariaesilvanae Bellò & Baviera, **sp. nov.**	Italy	Veneto: Verona, Brenzone
medae Pierotti, Bellò & Alonso-Zarazaga, 2010	Spain	Gerona: Islas Medas, Meda Pequena
mellei Delaunay, 2011	France	Ardéche: Massif central, mont Tanargue
moraguesi Pierotti & Rouault, 2010	France	Alpes de Haute Provence: montagne de Lure
oenotria Pierotti, 2013	Italy	Basilicata: Potenza, P.N.Pollino, Serra del Prete
perezi Pierotti & Rouault, 2010	France	Alpes Maritimes: col de Ferrier
rolandi Delaunay & Melle, 2013	France	Herault: Grabels, la Soucarède
ronani Delaunay & Melle, 2013	France	Herault: Grabels, plaine des Fraysses
rouaulti Pierotti, 2011	France	Gard: Collias
sabina Pierotti, 2012	Italy	Abruzzo: Popoli, sorgente fiume Pescara
sedilloti C. Brisout, 1882	France	Bourg Saint Andéol
sedilloti ssp. *chobauti* Delaunay & Melle, 2013	France	Gard: Saint Geniès de Comolas
stierlini Sainte Claire Deville, 1906	France	Nice: mont Vinaigrier
straneoi F. Solari, 1955	Italy	Abruzzo: Sella di Corno
tarraconensis Pierotti, Bellò & Alonso-Zarazaga, 2010	Spain	Gerona: L'Estartit, El Montgri
umbra Pierotti, 2013	Italy	Umbria: Perugia, Trevi, monte Brunette
vauclusiana Desbrochers, 1898	France	Vaucluse: Fontaine de Vaucluse

Remarks

The surprising discovery of a flightless weevil outside the hitherto known distribution of other members of its genus gives rise to three possible hypotheses about its presence in a subalpine region. 1. About 15000 years ago moranich hills from the last Wurmian glaciation gave rise to Garda Lake and its territory, previously entirely covered by ice (Bhagwat & Willis, 2008). It is thus possible that the colonization by *Meira mariesilvanae,* łike other xerothermic weevils of several prealpine "oases", is relatively recent dating back to post-glacial times from 10000 years ago (Osella, 1968, 1970). 2. The genus *Meira*, having a probable distribution centered in the Provence region, expanded eastward, colonized the Veneto and Lombardy prealpine xerothermic"oases" during interglaciations in separate warm stages (Bhagwat & Willis, 2008). 3. The similarity of female genitalia of *M. mariaesilvanae* with other Italian species suggests a possible more recent colonization through the Po Valley, starting from populations living in the Apennines (Osella, pers. comm.). All three above hypotheses, and in

particular the last one, suggest that evolution of allopatric taxa could be much faster than usually believed. A possible introduction as a result of human activity related to the distribution of olive trees could be suggested but this is very unlikely. In all cases it is essential to continue field research in northern Italy to improve our entomological knowledge of such important wildlife areas and biodiversity hot spots as these prealpine xerothermic"oases".

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