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## FIRST RECORD OF *OZOGNATHUS CORNUTUS* (LECONTE, 1859) (COLEOPTERA PTINIDAE) FROM SARDINIA, ITALY

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Bazzato E., Marignani M., Ancona C., Caria M., Cillo D., Serra E. - First record of *Ozognathus cornutus* (LeConte, 1859) (Coleoptera Ptinidae) from Sardinia, Italy.

*Ozognathus cornutus* (LeConte, 1859) is recorded on the invasive alien tree *Robinia pseudocacia* L. (Fabaceae) in an urban area in Italy. The species has already been reported in two other Italian regions, but this is the first record for the Sardinian fauna. Due to the great adaptability of this alien species and the increasingly cosmopolitan trend, we suggest monitoring it with caution for early detection and to plan an appropriate rapid management response.

KEY WORDS: Bostrichoidea, Ernobiinae, Alien species, *Robinia pseudoacacia*

### INTRODUCTION

The genus *Ozognathus* LeConte, 1861 (Bostrichoidea, Ptinidae, Ernobiinae) currently includes twelve described species from the Nearctic and Neotropical regions (ZAHRADNÍK & MIFSUD, 2005).

Among these, *Ozognathus cornutus* (LeConte, 1859) was described in California (USA) (LECONTE, 1859, as *Anobium cornutum*); its type specimen is deposited in the California Academy of Sciences (WHITE, 1982). Confirmed in California (WHITE, 1982), in the areas adjacent to Mexico, in South America (e.g., in Chile; HONOR & ROTHMANN, 2017), as well as in Réunion in the Indian Ocean (LEMAGNEN, 2013), this species recently spread to Australia (Sydney, New South Wales) (PLANT HEALTH AUSTRALIA, 2019), New Zealand (BERCEDO *et al.*, 2005), Israel (MIŁKOWSKI, 2019), Tunisia (ZAHRADNÍK & MIFSUD, 2005) and, recently, in Europe. It has been recorded in Latvia (around Ulbroka) (TELNOV *et al.*, 2016), Great Britain (Eccles) (STENHOUSE, 2017), Germany (Tübingen), Switzerland (Zurich) (GERMANN & SCHMIDT, 2017; CHITTARO & SANCHEZ, 2019), southern France (Pourcieux) (ALLEMAND *et al.*, 2008), Spain (Cadiz, Catalonia, Alicante, Valencia) (BERCEDO *et al.*, 2005; VIÑOLAS & VERDUGO, 2012, TRÓCOLI *et al.*, 2020), Madeira Island (Funchal) (ZAHRADNÍK & MIFSUD, 2005), Gibraltar (GONHS, 2020), Canary Islands (Island of La Palma and Island of Tenerife) (VIÑOLAS *et al.*, 2018), and Malta (Marsa, TalMuxar, Żejtun) (ZAHRADNÍK & MIFSUD, 2005). The first published Italian records were reported from Sicily (Palermo) and Campania (Portici) regions by CUSIMANO *et al.* (2014) and subsequently reconfirmed, without further details, for Sicily by SIDOTI *et al.* (2016).

We provide the first records of *Ozognathus cornutus* (LeConte, 1859) in Sardinia based on an intensive sampling conducted in Southern-Sardinia from April 2018 to December 2019.

### MATERIALS AND METHODS

#### STUDY AREA

Sardinia, one Mediterranean hotspot for biodiversity conservation (MARIGNANI *et al.*, 2017a, b; MÉDAIL, 2017), located in the middle of the Mediterranean Sea, is the second-largest Mediterranean island, after Sicily, covering a surface area of around 24,000 km<sup>2</sup> (PALUMBO *et al.*, 2020). Thanks to its variety of landforms, complex orographic patterns (with hilly lands, plateaus, mountain and plains), heterogeneous geological substrata and climate variability (BAZZATO *et al.*, 2021), the island is characterized by high levels of biodiversity and different vegetation types (BACCHETTA *et al.*, 2009).

We collected the species during a field campaign aimed to investigate the impact of land-use matrices on plants and arthropod communities of Small Woodlots Outside Forests (hereafter, SWOFs) in the Metropolitan City of Cagliari (PALUMBO *et al.*, 2020; E.Bazzato, PhD dissertation 2021). We randomly selected 30 SWOFs (Fig. 1) ranging from 0.1 to 0.5 hectares, by means of a stratified random sampling design in proportion to the number of target SWOFs present in each land-use stratum: 11 sites in natural and semi-natural (NAT) and agricultural (AGR) areas, 8 in urban and artificial surfaces (URB). All sampled sites were listed following the site code assigned based on the correspondent land-use stratum (Tab. 1).

#### DATA COLLECTION

In the centroid of each SWOF, we placed at 5–10 meters above ground a Cross-vanes Window Flight Trap (CWFT, Fig II) for a total of 30 traps. Traps were active starting from July to October for the first year (2018), and from June to December for the second year (2019). Traps were re-triggered every 30–40 days (except for the last period ranging from August to December 2019) with ethylene glycol as non-attractive liquid preservative. All specimens from each site and trap were sorted

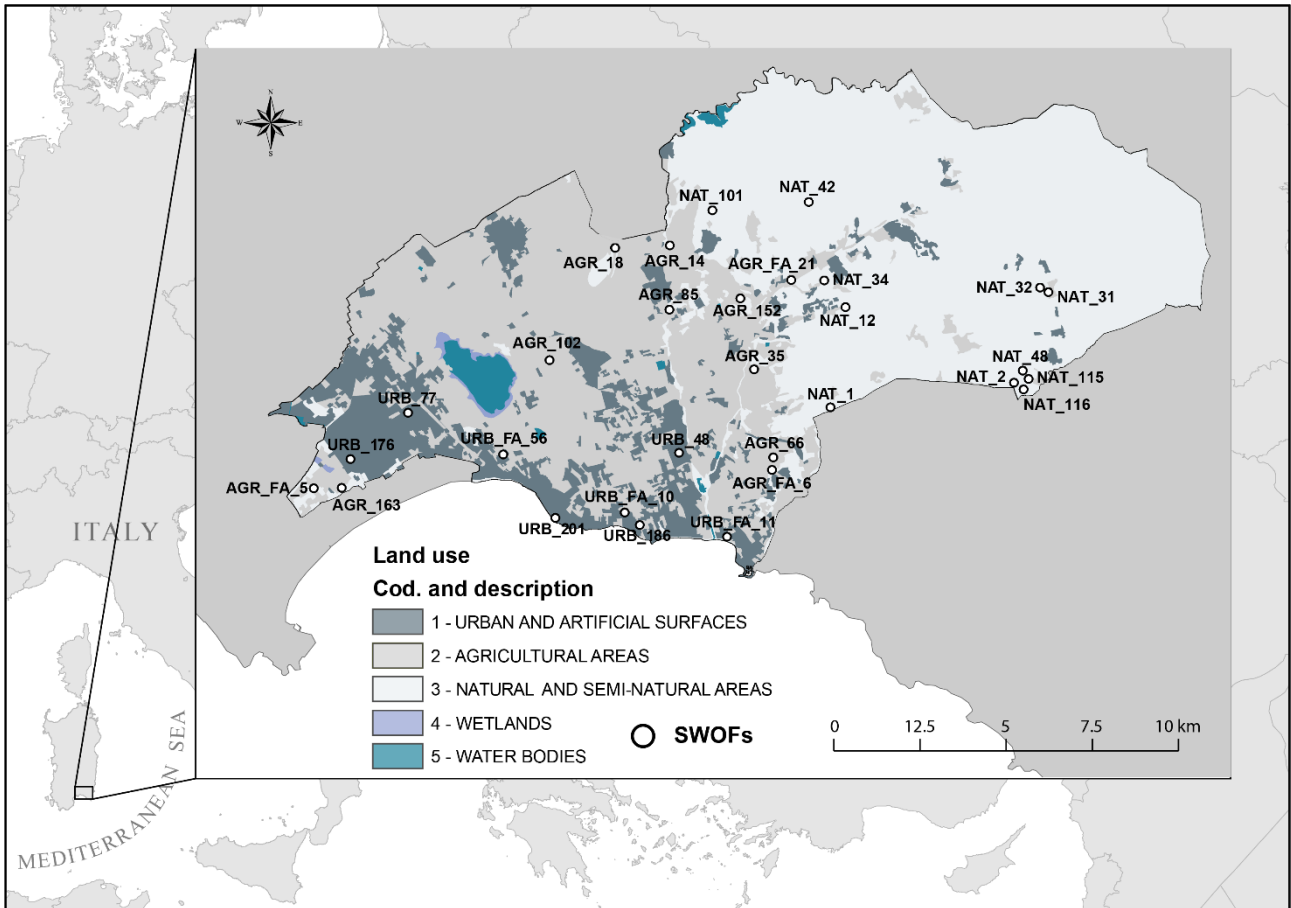


Fig. I - Study area located in the Metropolitan City of Cagliari (southern Sardinia, Italy), characterized by a gradient of land-use intensification from natural and semi-natural areas to urbanised coastline zones.



Fig. II - Cross-vanes Window Flight Trap (CWFT) placed on *Robinia pseudoacacia* within the SWOF located in Quartu Sant’Elena (Is Arenas, Via Pizzetti; site code URB 176) (photo by E. Bazzato).

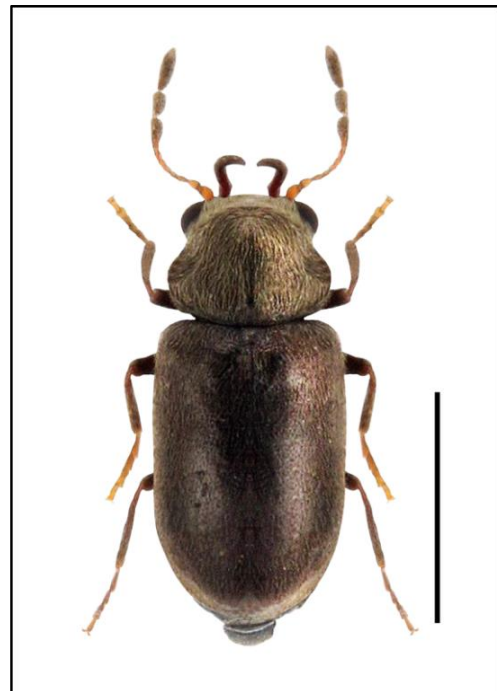


Fig. III - Habitus of *Ozognathus cornutus* (LeConte, 1859) ♂ (photo by C. Ancona; scale bar 1 mm).

and stored by the authors (EB, MC, CA). The determination is still in progress.

#### IDENTIFICATION AND NOMENCLATURE

Specimens were examined using an Optika SZM-T stereomicroscope. They were morphologically identified by the authors (EB, CA, DC) using photographs reported by ZAHRADNÍK & MIFSUD (2005), as well as dichotomous key provided by FALL (1905). Habitus photograph was taken with a Pentax K7 digital camera attached to a Optika SZM-T stereoscope (Fig. III). Dry specimens were prepared and deposited in the private collection of the first and fifth authors (EB & DC).

The species has been reported on several host plant species (Tab. 2): nomenclature of host plant species follows BARTOLUCCI *et al.* (2018, 2020), GALASSO *et al.* (2018, 2020), FREIBERG *et al.* (2020), and ROSATI *et al.* (2020).

## RESULTS AND DISCUSSION

### *Ozognathus cornutus* (LeConte, 1859) (Fig. III)

EXAMINED MATERIAL: Sardinia: Quartu Sant'Elena (Cagliari province), Is Arenas, Via Pizzetti, site code URB 176: 19.VII–19.VIII.2019, 1 ♂ window trap on *Robinia pseudoacacia*, E. Bazzato, M. Caria & C. Ancona legerunt, det. E. Bazzato & C. Ancona; 19.VIII–03.XII.2019, 1 ♂ window trap on *Robinia pseudoacacia*, E. Bazzato, M. Caria & C. Ancona legit, det. E. Bazzato & D. Cillo.

The biology of *O. cornutus* is poorly known (STENHOUSE, 2017; VIÑOLAS, 2017), although recently its distribution range increased considerably in the temperate areas of the Euro-Mediterranean region, with the possibility of a further spread in Mediterranean territories in a relatively short time (ZAHRADNÍK & MIFSUD, 2005; VIÑOLAS, 2017; MIŁKOWSKI, 2019). This species is known as polyphagous and easily adapts to a multitude of climates and a wide variety of microhabitats (dried fruit, galls produced by insects), herbaceous plants, as well as in the bark and wood of various deciduous and coniferous trees (STENHOUSE, 2017; VIÑOLAS, 2017). The species seems to spread easily: in Switzerland, some specimens hatched from a head of garlic (*Allium sativum*) from Sicily bought on a market in Zurich (CHITTARO & SANCHEZ 2019; GERMANN & SCHMIDT, 2017).

Given its known adaptability, it is not surprising that *O. cornutus* has been found in different part of plants and different species. In particular, previous records were mainly attributable to Asteraceae family (Tab. 2), for a total of six species belonging to six genera (*Achillea* L., *Argyranthemum* Webb, *Baccharis* L., *Helianthus* L., *Scolymus* L., *Silybum* Vaill.) and secondly, to Fagaceae family, with four species belonging to a genus (*Quercus* L.). Furthermore, other

families fairly represented by these records are Araucariaceae and Rosaceae, each with three species (Tab. 2).

To a lesser extent, with one or two species, Acanthaceae, Aizoaceae, Amaryllidaceae, Arecaceae, Ebenaceae, Euphorbiaceae, Fabaceae, Lauraceae, Lythraceae, Moraceae, Oleaceae, Passifloraceae, Pinaceae, Rutaceae, Proteaceae and Simmondsiaceae families are mentioned (Tab. 2).

We recorded samples from 30 cross-vanes window flight traps placed in 30 individual trees belonging to 8 families, for a total of 9 genera and 11 different species considered (Tab. 1). Data reported were gathered in 30 randomly selected small woodlots outside forest along an area with an increasing urbanization gradient: notably, we found two individuals of *O. cornutus* only in one of those traps, placed on the invasive alien tree *Robinia pseudoacacia* L., native to eastern North America, (WESTBROOKS, 1998; REJMÁNEK & RICHARDSON, 2013), within a SWOF located in a public garden of the urban area, at the extreme of our gradient of land-use intensification.

Our finding, as well as being the first record from Sardinia island, reports an association with an invasive alien plant species not yet reported in other studies. Furthermore, although *O. cornutus* is able to colonize different environmental condition and climates, finding it only in an urban area suggests that its introduction could have occurred accidentally and in recent times, mainly due to the international trade in fruit, vegetables and alien plants (CUSIMANO *et al.*, 2014).

Data on the presence of alien species are important since early detection and rapid response are key components for the successful management of Invasive Alien Species (COUGHLAN *et al.*, 2020): our data suggest a relatively recent introduction on the island and the hypothesis of a possible rapid expansion of this species into other areas.

## CONCLUSIONS

Monitoring of newly introduced species is of great importance for preventing new biological invasions, which can cause damage to biodiversity, economy and human well-being (GENOVESI & SHINE, 2004). As for now, *O. cornutus* is considered to be harmful to heritage works (MANACHINI, 2017); nevertheless, although there is no particular evidence in the literature of phytosanitary emergencies caused by *O. cornutus* (PENCE, 1950; BERCEDO *et al.*, 2005), due to the behavior of the species (polyphagia, adaptability, marked propensity to passive transport), its rapid expansion in other urban areas up to natural ones cannot be excluded. Hence, this species deserves to be monitored with caution and, in case of discovery, it would be good practice to inform the competent bodies of the sector by providing location data to monitor the dispersal capacity of the species and evaluate the expansion of its distribution range.

Table 1 – List of the 30 Small Woodlots Outside Forests investigated along the gradient of land-use intensification. Municipality, locality, coordinates (expressed as metric units in the Monte Mario/Italy Zone 1 reference system, EPSG 3003), altitude (m a.s.l.) and plant species hosting the cross-vanes window flight trap are listed.

Site code	Municipality	Locality	E	N	Altitude	Family	Plant species
AGR_14	Maracalagonis	Corongiu, Sirigragiu	1524102	4348373	81	Myrtaceae	<i>Eucalyptus tereticornis</i> Sm.
AGR_18	Maracalagonis	Corongiu, Carroghedda	1522637	4348319	85	Myrtaceae	<i>Eucalyptus camaldulensis</i> Dehnh. subsp. <i>camaldulensis</i>
AGR_35	Quartucciu	Piscina Nuxedda	1526348	4345063	52	Oleaceae	<i>Olea europaea</i> L.
AGR_66	Quartu S.E.	Cani Nieddu, Fraponti,	1526881	4342688	84	Oleaceae	<i>Olea europaea</i> L.
AGR_85	Maracalagonis	Corongiu	1524097	4346644	60	Myrtaceae	<i>Eucalyptus camaldulensis</i> Dehnh. subsp. <i>camaldulensis</i>
AGR_102	Quartu S.E.	Simbirizzi, Sa Guardia Lada	1520859	4345293	35	Myrtaceae	<i>Eucalyptus camaldulensis</i> Dehnh. subsp. <i>camaldulensis</i>
AGR_152	Maracalagonis	Gruxi Lillius, Bacca Aruis	1525980	4346952	99	Myrtaceae	<i>Eucalyptus camaldulensis</i> Dehnh. subsp. <i>camaldulensis</i>
AGR_163	Quartu S.E.	Stagno di Quartu, C. D'Aquila	1515340	4341892	3	Oleaceae	<i>Olea europaea</i> L.
AGR_FA_6	Quartu S.E.	Str. Comunale Cani Nieddu	1526824	4342368	68	Oleaceae	<i>Olea europaea</i> L.
AGR_FA_21	Maracalagonis	Riu Piscina Nuxedda	1527337	4347432	80	Myrtaceae	<i>Eucalyptus camaldulensis</i> Dehnh. subsp. <i>camaldulensis</i>
NAT_1	Quartucciu	Corti de Perda	1528394	4344041	120	Myrtaceae	<i>Eucalyptus camaldulensis</i> Dehnh. subsp. <i>camaldulensis</i>
NAT_2	Maracalagonis	Sette Fratelli, Co-doleddu	1533610	4344508	700	Salicaceae	<i>Salix atrocinerea</i> Brot. subsp. <i>atrocinerea</i>
NAT_12	Maracalagonis	Riu Monte Nieddu	1528748	4346698	140	Myrtaceae	<i>Eucalyptus camaldulensis</i> Dehnh. subsp. <i>camaldulensis</i>
NAT_31	Sinnai	Sette Fratelli, Monte Cresia	1534230	4347117	663	Ericaceae	<i>Arbutus unedo</i> L.
NAT_32	Sinnai	Sette Fratelli, Monte Cresia	1534003	4347255	677	Ericaceae	<i>Arbutus unedo</i> L.
NAT_34	Maracalagonis	Villagio dei Gigli	1528227	4347442	120	Myrtaceae	<i>Eucalyptus camaldulensis</i> Dehnh. subsp. <i>camaldulensis</i>
NAT_42	Sinnai	Burranca	1527821	4349531	150	Myrtaceae	<i>Eucalyptus camaldulensis</i> Dehnh. subsp. <i>camaldulensis</i>
NAT_48	Maracalagonis	Sette Fratelli, Co-doleddu	1533816	4344788	714	Salicaceae	<i>Salix atrocinerea</i> Brot. subsp. <i>atrocinerea</i>
NAT_101	Maracalagonis	Corongiu, Sedda Brandanu	1525242	4349318	140	Salicaceae	<i>Populus canescens</i> (Aiton) Sm.
NAT_115	Maracalagonis	Sette Fratelli, Co-doleddu	1533989	4344598	706	Salicaceae	<i>Salix atrocinerea</i> Brot. subsp. <i>atrocinerea</i>
NAT_116	Maracalagonis	Sette Fratelli, Co-doleddu	1533830	4344308	700	Fagaceae	<i>Quercus suber</i> L.
AGR_FA_5	Quartu S.E.	Stagno di Quartu, Bingia Spada	1514588	4341874	5	Myrtaceae	<i>Eucalyptus camaldulensis</i> Dehnh. subsp. <i>camaldulensis</i>
URB_48	Quartu S.E.	Via delle Bouganvillee	1524342	4342823	22	Tamaricaceae	<i>Tamarix canariensis</i> Willd.
URB_77	Quartu S.E.	Sant'Antonio, Via Belgio	1517111	4343897	9	Myrtaceae	<i>Eucalyptus camaldulensis</i> Dehnh. subsp. <i>camaldulensis</i>
URB_176	Quartu S.E.	Is Arenas, Via Pizzetti	1515564	4342648	6	Fabaceae	<i>Robinia pseudoacacia</i> L.
URB_186	Quartu S.E.	Sant'Andrea, Via Rimini	1523304	4340905	4	Pinaceae	<i>Pinus halepensis</i> Mill. subsp. <i>halepensis</i>

CONTINUED TABLE 1

URB_201	Quartu S.E.	Foxi, Via IschiaAll	1521044	4341091	1	Oleaceae	<i>Olea europaea</i> L.
URB_FA_10	Quartu S.E.	Porticciolo, Via Riccione	1522893	4341230	11	Pinaceae	<i>Pinus pinea</i> L.
URB_FA_11	Quartu S.E.	Via Lago di Varese	1525605	4340594	2	Myrtaceae	<i>Eucalyptus camaldulensis</i> Dehnh. subsp. <i>camaldulensis</i>
URB_FA_56	Quartu S.E.	Margine Rosso, Via Valenzia	1519664	4342794	37	Pinaceae	<i>Pinus halepensis</i> Mill. subsp. <i>halepensis</i>

Table 2 - List of host plant species and families reported for *O. cornutus*

Family	Current accepted host plant name	Reference and host plant name originally reported
Acanthaceae	<i>Acanthus mollis</i> L.	LÜER, 2020, as <i>Acanthus mollis</i> L.
Aizoaceae	<i>Carpobrotus edulis</i> (L.) N.E.Br.	KNAPP, 2014, as <i>Carpobrotus edulis</i> (L.) N.E.BROWN, 1926
Amaryllidaceae	<i>Allium sativum</i> L.	GERMANN & SCHMIDT, 2017, as <i>Allium sativum</i>
Apiaceae	<i>Eryngium campestre</i> L.	YUS RAMOS <i>et al.</i> , 2019, as <i>Eryngium campestre</i> L.
Apiaceae	<i>Foeniculum vulgare</i> Mill.	BERCEDO <i>et al.</i> , 2005, as <i>Foeniculum vulgare</i>
Araliaceae	<i>Schefflera arboricola</i> (Hayata) Merr.	TRÓCOLI <i>et al.</i> , 2020, as <i>Schefflera arboricola</i> (Hayata) Merr. 1916
Araucariaceae	<i>Araucaria angustifolia</i> (Bertol.) Kuntze	LÜER, 2020, as <i>Araucaria angustifolia</i> (Bertol.) Kuntze
Araucariaceae	<i>Araucaria bidwillii</i> Hook.	LÜER, 2020, as <i>Araucaria bidwillii</i> Hook.
Araucariaceae	<i>Araucaria heterophylla</i> (Salisb.) Franco	LÜER, 2020, as <i>Araucaria heterophylla</i> (Salisb.) Franco
Arecaceae	<i>Phoenix dactylifera</i> L.	TRÓCOLI <i>et al.</i> , 2020, as <i>Phoenix dactylifera</i> L. 1753
Asteraceae	//	BERCEDO <i>et al.</i> , 2005, as <i>Cardo</i>
Asteraceae	<i>Achillea millefolium</i> L.	TRÓCOLI <i>et al.</i> , 2021, as <i>Achillea millefolium</i> L., 1753
Asteraceae	<i>Argyranthemum</i> spp.	GARCÍA <i>et al.</i> , 2016, as <i>Argyranthemum</i> spp
Asteraceae	<i>Baccharis pilularis</i> D.C.	TILDEN, 1951, as <i>Baccharis pilularis</i> De Candolle
Asteraceae	<i>Helianthus annuus</i> L.	LÜER, 2020, as <i>Helianthus annuus</i> L.
Asteraceae	<i>Scolymus hispanicus</i> L.	BERCEDO <i>et al.</i> , 2005, as <i>Scolymus hispanicus</i>
Asteraceae	<i>Silybum marianum</i> (L.) Gaertn.	GARCÍA <i>et al.</i> , 2016, as <i>Silybum marianum</i> (L.) Gaertn.
Betulaceae	<i>Alnus</i> sp.	VIÑOLAS & VERDUGO, 2011, as <i>Alnus</i> sp.
Ebenaceae	<i>Diospyros kaki</i> L.f.	LÜER, 2020, as <i>Diospyros kaki</i> L. f.
Euphorbiaceae	<i>Euphorbia characias</i> L.	TRÓCOLI <i>et al.</i> , 2020, as <i>Euphorbia characias</i> L. 1753
Fabaceae	<i>Retama monosperma</i> (L.) Boiss.	BERCEDO <i>et al.</i> , 2005, as <i>Retama monosperma</i> ; GARCÍA <i>et al.</i> , 2016, as <i>Retama rhodorhizoides</i> Webb & Berthel.
<b>Fabaceae</b>	<b><i>Robinia pseudoacacia</i> L.</b>	<b>Present work</b>
Fabaceae	<i>Tamarindus indica</i> L.	TRÓCOLI <i>et al.</i> , 2020, as <i>Tamarindus indica</i> L. 1753
Fagaceae	<i>Quercus agrifolia</i> Née	TRÓCOLI <i>et al.</i> , 2020, as <i>Quercus agrifolia</i> Neé, 1801
Fagaceae	<i>Quercus crassipes</i> Kunth	VIÑOLAS, 2017, as <i>Quercus crassipes</i> Bonpl.
Fagaceae	<i>Quercus obtusata</i> Kunth	VIÑOLAS, 2017, as <i>Quercus obtusata</i> Bonpl.
Fagaceae	<i>Quercus suber</i> L.	BERCEDO <i>et al.</i> , 2005, as <i>Quercus suber</i> L.
Lauraceae	<i>Persea americana</i> Mill.	PENCE, 1950; EBELING, 1959, as <i>Avocado</i>
Lythraceae	<i>Punica granatum</i> L.	LÜER, 2020, as <i>Punica granatum</i> L.
Moraceae	<i>Ficus carica</i> L.	BERCEDO <i>et al.</i> , 2005, as <i>Ficus carica</i> ; MILKOWSKI, 2019, as <i>Ficus carica</i> L.
Oleaceae	<i>Fraxinus angustifolia</i> subsp. <i>syriaca</i> (Boiss.) Yalt.	MILKOWSKI, 2019, as <i>Fraxinus angustifolia</i> subsp. <i>syriaca</i> (Boiss.)
Passifloraceae	<i>Passiflora caerulea</i> L.	LÜER, 2020, as <i>Passiflora caerulea</i> L.
Pinaceae	<i>Pinus</i> sp.	WHITE, 1982; PHILIPS, 2002, as <i>Pine</i>
Proteaceae	<i>Macadamia</i> sp.	USDA, 1970, as <i>Macadamia</i>
Rosaceae	<i>Prunus dulcis</i> (Mill.) D.A. Webb	ALLEMAND <i>et al.</i> , 2008, as <i>Prunus dulcis</i>
Rosaceae	<i>Rhaphiolepis bibas</i> (Lour.) Galasso & Banfi	USDA, 1964, as <i>Locus tree</i> ; TRÓCOLI <i>et al.</i> , 2020, as <i>Eriobotrya japonica</i> (Thunb.) Lindl.
Rosaceae	<i>Rosa</i> sp.	LÜER, 2020, as <i>Rosa</i> sp.
Rutaceae	<i>Citrus limon</i> (L.) Osbeck	PENCE, 1950, as <i>Lemon</i>
Simmondsiaceae	<i>Simmondsia chinensis</i> (Link) C.K.Schneid.	PINTO & FROMMER, 1980, as <i>Simmondsia chinensis</i> (Link) Schneider

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