

Distribution update of *Trigonidium (Trigonidium) cicindeloides* Rambur 1838 (Orthoptera: Trigonidiidae) in Italy from collections and citizen science

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Abstract - Based on data from entomological collections and citizen science, new records of the orthopteran *Trigonidium (Trigonidium) cicindeloides* Rambur 1838 are reported for Italy. The species is documented for the first time in 12 provinces. In addition, it is newly recorded from inland areas of Livorno and Grosseto Provinces, where it was previously known only from Elba and Giglio Islands, respectively.

Key words: faunistics, first records, sword-tail crickets.

Riassunto - Aggiornamento sulla distribuzione in Italia di *Trigonidium (Trigonidium) cicindeloides* Rambur 1838 (Orthoptera: Trigonidiidae) da collezioni e citizen science.

Sulla base di dati provenienti da collezioni entomologiche e citizen science, vengono riportate nuove segnalazioni dell'ortottero *Trigonidium (Trigonidium) cicindeloides* Rambur 1838 in Italia. La specie è riportata per la prima volta in 12 province. Inoltre, è segnalata per la prima volta in aree interne delle province di Livorno e Grosseto, dove era precedentemente nota rispettivamente soltanto sull'Isola d'Elba e sull'Isola del Giglio.

Parole chiave: faunistica, prima segnalazioni, trigonididi.

INTRODUCTION

The genus *Trigonidium* Rambur 1838 includes 40 species in the world (Cigliano *et al.*, 2024). Only one species, *T. cicindeloides* Rambur 1838, is present in Italy (Massa *et al.*, 2012, 2021). It is a thermophilic species which inhabits wetlands (Fontana & Kleukers, 2002) and shows a large range, spanning from Southern Asia, Southern Europe to Africa (see Shishodia *et al.*, 2010; Radhakrishnan & Dharma Rajan, 2024).

In Italy, according to the checklist of Massa *et al.* (2021) – where the distribution is resumed from Ceccolini *et al.* (2020) – *T. cicindeloides* is known in Tuscany, Latium, Molise, Campania, Apulia, Basilicata, Calabria, Sicily, and Sardinia. Recently Scarpa & Mantovan (2024), added further regions where *T. cicindeloides* was found also through records from the platform iNaturalist, testifying once again how citizen science can be valuable. The provinces and the single islands where the species is currently known in Italy from literature are summarised in Table 1.

Although the species is known in most regions, records are scattered and its real distribution in Italy seems little investigated. Benefiting from a large number of citizen-science records, this contribution significantly refines our understanding of the fine-scale distribution of this orthopteran in Italy.

MATERIALS AND METHODS

The material examined consists of collected specimens or photographs obtained from specialized websites whose content is contributed by passionate naturalists (see Material examined paragraph). All listed records were confirmed by the author. *Trigonidium cicindeloides* is recognizable through photo thanks to some characteristic features, like the red legs which contrast with a black body and the particular beetle-like fore wings; nymphs, with their orange-coloured body, are also easily identifiable through photo (Massa *et al.*, 2012).

For each site, the following information is given (when available): locality, coordinates, date of collection, number and sex of specimens, collector or photographer, repository or source. Geographical coordinates are in decimal degrees (datum WGS84). The uncertainty (in meters) of data is indicated according to the point-radius method (Wieczorek *et al.*, 2004).

Regions are listed geographically north to south, and for each region the province division is underscored.

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Received for publication: 2 March 2025
Accepted for publication: 12 September 2025
Online publication: 2 July 2026

Tab. 1 - Distribution of *T. cicindeloides* in Italy from literature divided by province. / Distribuzione di *T. cicindeloides* in Italia dalla letteratura suddivisa per provincia.

Region	Province	References
Trentino-Alto Adige	Trento	Scarpa & Mantovan, 2024
Veneto	Rovigo	Scarpa & Mantovan, 2024
	Venezia	Scarpa & Mantovan, 2024
Liguria	Genova	Scarpa & Mantovan, 2024
	Savona	Scarpa & Mantovan, 2024
Emilia-Romagna	Ferrara	Scarpa & Mantovan, 2024
	Forlì-Cesena	Scarpa & Mantovan, 2024
	Rimini	Scarpa & Mantovan, 2024
Tuscany	Elba (island)	Nadig, 1962
	Giglio (island)	Baccetti, 1958
	Lucca	Bramanti, 2018
	Pistoia	Paggetti & Ceccolini, 2014
Marche	Ancona	Scarpa & Mantovan, 2024
	Ascoli Piceno	Scarpa & Mantovan, 2024
	Fermo	Scarpa & Mantovan, 2024
	Macerata	Scarpa & Mantovan, 2024
Umbria	Perugia	Scarpa & Mantovan, 2024
	Terni	Scarpa & Mantovan, 2024
Lazio	Latina	Schmidt, 1996
	Roma	Zapparoli, 1997
Abruzzo	Pescara	Fontana <i>et al.</i> , 2005
	Teramo	Fontana <i>et al.</i> , 2005
Molise	Campobasso	Ceccolini <i>et al.</i> , 2020; Scarpa & Mantovan 2024
Campania	Napoli	Fontana <i>et al.</i> , 2005
	Salerno	Fontana <i>et al.</i> , 2005
Apulia	Foggia	Schmidt, 1997; Fontana <i>et al.</i> , 2005
	Taranto	Fontana <i>et al.</i> , 2005
	Lecce	Fontana <i>et al.</i> , 2005
Basilicata	Matera	Fontana <i>et al.</i> , 2005
Calabria	Reggio Calabria	Fontana <i>et al.</i> , 2005
Sicily	Agrigento	Riggio, 1888
	Catania	Fontana <i>et al.</i> , 2005
	Messina	Fontana <i>et al.</i> , 2005
	Palermo	Riggio, 1891; Ramme, 1927; Massa & Ragusa, 1999; Fontana <i>et al.</i> , 2005
	Pantelleria (island)	Baccetti <i>et al.</i> , 1995
	Ragusa	Fontana <i>et al.</i> , 2005
	Salina (island)	Fontana <i>et al.</i> , 2005
	Siracusa	Krauss, 1887; Ramme, 1927; Tumbrinck, 2001; Fontana <i>et al.</i> , 2005
	Trapani	Massa & Ragusa, 1999
	Vulcano (island)	Failla <i>et al.</i> , 1973; Fontana <i>et al.</i> , 2005
Sardinia	Cagliari	Galvagni, 1978; Galvagni & Massa 1980; Fontana <i>et al.</i> , 2005
	Caprera (island)	Baccetti, 1991
	Isola della Vacca (island)	Giglio Tos, 1913
	Isola di Cavoli (island)	Baccetti, 1991
	Isola San Pietro (island)	Baccetti, 1991
	Isola Sant'Antioco (island)	Giglio Tos, 1913
	La Maddalena (island)	Baccetti, 1991
	Nuoro	Fontana <i>et al.</i> , 2005
	Oristano	Fontana <i>et al.</i> , 2005
	Sassari	Fontana <i>et al.</i> , 2005
Sud Sardegna	Fontana <i>et al.</i> , 2005	

MATERIAL EXAMINED

The abbreviations used for the material examined are the following:

CFCe = collection Filippo Ceccolini, Rassina (Arezzo), Italy
 CFCi = collection Fabio Cianferoni, Firenze, Italy
 FNM = Forum Natura Mediterraneo (www.naturamediterraneo.com)
 FEI = Forum Entomologi Italiani (www.entomologiitaliani.net)
 OB = observation.org (<https://observation.org>)
 IN = iNaturalist (www.inaturalist.org)
 leg. = legit
 un. = uncertainty

Liguria: Imperia, Borghetto d'Arroschia, 44.05371°N 7.97538°E (un. = 2370 m), 2.XI.2020, 1 nymph, photo by Robert Bischoff (IN) (<https://www.inaturalist.org/observations/64185529>); Savona, Villanova d'Albenga, Pietra Ligure, 44.14838°N 8.2776°E (un. = 10 m), 20.VII.2023, 1 female, photo by "lluvia-passetti" (IN) (<https://www.inaturalist.org/observations/174057541>).
Tuscany: Lucca, Pietrasanta, 43.99214°N 10.17696°E (un. not recorded), 14.IX.2024, 1 nymph, photo by Giacomo Navari (IN) (<https://www.inaturalist.org/observations/241704975>); *idem*, Seravezza, Via Franchetti, 43.98438°N 10.20542°E (un. = 51 m), 9.XI.2024, 1 nymph, photo by "dervafera" (IN) (<https://www.inaturalist.org/observations/251006069>); Pistoia, Pistoia, Via Bartolomeo Sestini, 43.94356°N 10.95526°E (un. = 8 m), 10.XI.2018, 1 female, photo by Emanuele Paggetti (IN) (<https://www.inaturalist.org/observations/18331084>); *idem*, 43.94332°N 10.95564°E (un. = 9 m), 6.VII.2022, 1 male, photo by Emanuele Paggetti (IN) (<https://www.inaturalist.org/observations/125051699>); *idem*, Quarrata, Casa di Zela, 43.85662°N 11.01246°E (un. = 176 m), 29.VIII.2021, 1 female, photo by Davide Nesti (IN) (<https://www.inaturalist.org/observations/93024558>); Città Metropolitana di Firenze, Sesto Fiorentino, 4.I.2015, 1 nymph, photo by Andrea Assilli (FEI) (<http://www.entomologiitaliani.net/public/forum/phpBB3/viewtopic.php?f=120&t=58996&hilit=trigonidi>); *idem*, Via Fontaccia, 43.84757°N 11.26202°E (un. = 7 m), 18.VIII.2020, 1 female, photo by Martina Petralli (IN) (<https://www.inaturalist.org/observations/56821156>); *idem*, Firenze, Lago di Peretola, 43.81348°N 11.19886°E (un. = 165 m), 7.XII.2022, 1 nymph, photo by Nicola Addelfio (IN) (<https://www.inaturalist.org/observations/144075194>); *idem*, Parco delle Cascine, 43.78466°N 11.21081°E (un. = 164 m), 1 nymph female, photo by Nicola Addelfio (IN) (<https://www.inaturalist.org/observations/97655060>); *idem*, 43.77665°N 11.23094°E (un. = 83 m), 12.XII.2020, 1 male, photo by Nicola Addelfio (IN) (<https://www.inaturalist.org/observations/72894106>); *idem*, Varlungo, 43.76629°N 11.30162°E (un. = 10 m), 1.XI.2019, 1 specimen, Fabio Cianferoni leg., CFCi; *idem*, Pontassieve, Le Falle, 43.78973°N 11.38307°E (un. = 3 m), 10.IX.2024, 1 male, photo by "sofia-b" (IN) (<https://www.inaturalist.org/observations/242132397>); *idem*, Certosa di Firenze, 43.73064°N

11.21984°E (un. = 20 m), 13.IV.2024, 1 female, photo by "ilsignorvega" (IN) (<https://www.inaturalist.org/observations/207155836>); *idem*, Capraia e Limite, 43.74411°N 11.00908°E (un. not recorded), 14.VI.2024, 1 female, photo by "nic_zzi" (IN) (<https://www.inaturalist.org/observations/222678132>); *idem*, Vinci, 43.7767°N 10.9425°E (un. = 10 m), 7.VII.2024, 1 female, photo by "Jassie" (OB) (<https://observation.org/photos/96356027/>); *idem*, Empoli, 43.72058°N 10.95169°E (un. = 4 m), 12.X.2024, 1 nymph, photo by "lucigiuniobrutto" (IN) (<https://www.inaturalist.org/observations/247005912>); Pisa, Pisa, 43.7339°N 10.44323°E (un. = 1 m), 10.VIII.2024, 1 adult, photo by Samuele Papeschi (IN) (<https://www.inaturalist.org/observations/234955276>); *idem*, 43.72368°N 10.41044°E (un. = 86 m), 18.IX.2023, 1 male macropteris, photo by Cesare Sandri (IN) (<https://www.inaturalist.org/observations/184089717>); *idem*, Capannoli, 43.5773°N 10.6587°E (un. not recorded), 26.VIII.2024, 1 male, photo by "Stiction" (OB) (<https://observation.org/observation/325809264/>); *idem*, Vicopisano, near Campomaggiore, 43.70518°N 10.5836°E (un. not recorded), 1 nymph, photo by Michele Bertoncini (IN) (<https://www.inaturalist.org/observations/189560481>); *idem*, Pontedera, 43.67065°N 10.64983°E (un. = 2 m), 24.VI.2024, 1 nymph, photo by Samuele Papeschi (IN) (<https://www.inaturalist.org/observations/224917527>); *idem*, 43.67042°N 10.6542°E (un. = 8 m), 21.IX.2024, 1 female, photo by Samuele Papeschi (IN) (<https://www.inaturalist.org/observations/243179561>); *idem*, 43.66954°N 10.65398°E (un. = 2 m), 21.IX.2024, 1 female, photo by Samuele Papeschi (IN) (<https://www.inaturalist.org/observations/243179517>); *idem*, 43.66474°N 10.64264°E (un. not recorded), 30.VII.2024, 1 male macropteris, photo by Samuele Papeschi (IN) (<https://www.inaturalist.org/observations/232658187>); *idem*, 43.66298°N 10.66968°E (un. = 2 m), 18.VIII.2024, 1 male, photo by Samuele Papeschi (IN) (<https://www.inaturalist.org/observations/236796907>); *idem*, Volterra, 43.40707°N 10.89161°E (un. = 30 m), 3.VIII.2024, 1 female, photo by "merdoxpl" (IN) (<https://www.inaturalist.org/observations/236242250>); Livorno, Livorno, 43.55205°N 10.30096°E (un. = 1330 m), 5.IX.2023, 1 adult macropteris, photo by Cristina Gazza (IN) (<https://www.inaturalist.org/observations/181932514>); *idem*, Bibbona, Marina di Bibbona, 43.2451°N 10.5331°E (un. = 845 m), 1 male, photo by Mario Bassini (IN) (<https://www.inaturalist.org/observations/56564008>); *idem*, San Vincenzo, 43.0278°N 10.5400°E (un. = 11 m), 30.VII.2024, 1 adult macropteris, photo by "niek" (OB) (<https://observation.org/observation/322022784/>); *idem*, Marciana, Sant'Andrea (Elba island), 42.80602°N 10.14278°E (un. = 87 m), 11.VIII.2019, 1 male, photo by Emanuele Santarelli (IN) (<https://www.inaturalist.org/observations/30869638>); *idem*, Porto Azzurro, Mola (Elba island), 42.75869°N 10.38427°E (un. = 15 m), 1 male, photo by Roberto Barsaglini (IN) (<https://www.inaturalist.org/observations/99813993>); Siena, Siena, 43.30742°N 11.3392°E (un. = 27 m), 12.X.2024, 1 female, photo by Alessandro Bellavia (IN) (<https://www.inaturalist.org/observations/246910315>); Arezzo, Castel

Focognano, Rassina, 43.649946°N 11.834144°E (un. = 2 m), 10.XI.2024, 1 nymph, Filippo Ceccolini leg., CFCE; Arezzo, Villa Severi, 43.4666°N 11.9011°E (un. = 9 m), 30.VII.2024, 1 female, photo by “Gideon” (OB) (<https://observation.org/observation/323014479/>); *idem*, Cortona, 43.2484°N 11.8595°E (un. = 9 m), 4.VIII.2024, 1 male, photo by E. Delbart (OB) (<https://observation.org/observation/322824013/>); Grosseto, Monterotondo Marittimo, Parco Naturalistico Geotermico delle Biancane, 43.15506°N 10.85229°E (un. = 4 m), 6.IX.2024, 1 male, photo by “lucigiuniobrutto” (IN) (<https://www.inaturalist.org/observations/240143001/>); *idem*, Piombino, 42.98559°N 10.54828°E (un. not recorded), 27.VII.2024, 1 male, photo by “dariomagno” (IN) (<https://www.inaturalist.org/observations/232089496/>); *idem*, Massa Marattima, Lago dell’Accesa, 42.98828°N 10.89525°E (un. = 331 m), 8.V.2016, 1 male, photo by Bruno Parisotto (IN) (<https://www.inaturalist.org/observations/149046317/>); *idem*, Scarlino, Puntone, 42.89717°N 10.78778°E (un. = 77 m), 23.VII.2014, 1 male, photo by Bruno Parisotto (IN) (<https://www.inaturalist.org/observations/149046425/>); *idem*, Castiglione della Pescaia, Pineta Roccamare, 42.77988°N 10.81311°E (un. = 2 m), 27.IX.2024, 1 female, photo by Mike Steinmann (IN) (<https://www.inaturalist.org/observations/246683815/>); *idem*, Bruna river, 42.78759°N 10.94307°E (un. = 25 m), 1 female, photo by Bruno Parisotto (IN) (<https://www.inaturalist.org/observations/149046609/>); *idem*, Diaccia Botrona, 42.7847°N 10.94177°E (un. = 50 m), 1 male, photo by Bruno Parisotto (IN) (<https://www.inaturalist.org/observations/149046608/>); *idem*, Grosseto, near Abbazia di San Pancrazio al Fango, 42.77764°N 10.94904°E (un. = 136 m), 1 female, photo by Bruno Parisotto (IN) (<https://www.inaturalist.org/observations/149046610/>); *idem*, Barbanella, 42.77553°N 11.09382°E (un. = 557 m), 21.VII.2014, 1 male, photo by Bruno Parisotto (IN) (<https://www.inaturalist.org/observations/149046247/>); *idem*, Ombrone river, 42.74828°N 11.12256°E (un. = 31 m), 24.III.2019, 1 adult, photo by “dufusskull” (IN) (<https://www.inaturalist.org/observations/21625123/>); *idem*, Principina a Mare, 42.70531°N 11.00674°E (un. = 2 m), 20.VII.2018, 1 male, photo by Roberto Sindaco (IN) (<https://www.inaturalist.org/observations/14536712/>). **Marche:** Ancona, Agugliano, 43.54241°N 13.38990°E (un. = 8 m), 24.VII.2024, 1 male macropteris, photo by Marco Bondini (IN) (<https://www.inaturalist.org/observations/262260309/>). **Umbria:** Perugia, Magione, 43.0911°N 12.1647°E (un. = 4 m), 29.X.2024, 1 male, photo by Frank Coulier (OB) (<https://observation.org/observation/332509456/>); *idem*, Bevagna, 42.9411°N 12.6010°E (un. = 20 m), 4.X.2024, 1 female, photo by “ivetteB” (OB) (<https://observation.org/observation/329788521/>); Terni, Avigliano Umbro, near Dunarobba, 42.667030°N 12.461209°E (un. = 2 m), 1.XI.2024, 1 male, photo by Filippo Ceccolini; *idem*, 1 nymph, Filippo Ceccolini leg., CFCE. **Latium:** Viterbo, Tolfa, Rota, 42.15789°N 12.01057°E (un. = 500 m), 12.VII.2024, 1 female, photo by “babunco” (IN) (<https://www.inaturalist.org/observations/228893728/>); *idem*, 12.X.2024, 1 male, photo by “babunco” (IN) (<https://www.inaturalist.org/observations/246921046/>);

Città Metropolitana di Roma Capitale, Roma, 41.95417°N 12.425°E (un. not recorded), 29.VI.2022, 1 nymph, photo by Leonardo Ancillotto (IN) (<https://www.inaturalist.org/observations/124132148/>); *idem*, 41.95361°N 12.42694°E (un. not recorded), 1.VI.2022, 1 female, photo by Leonardo Ancillotto (IN) (<https://www.inaturalist.org/observations/119771089/>); *idem*, 41.91472°N 12.58556°E (un. not recorded), 6.VIII.2022, 1 nymph, photo by Leonardo Ancillotto (IN) (<https://www.inaturalist.org/observations/129662942/>); *idem*, 41.89809°N 12.4034°E (un. = 1 m), 13.VIII.2021, 1 male, photo by “michi100” (IN) (<https://www.inaturalist.org/observations/91049836/>); *idem*, 41.85917°N 12.52583°E (un. not recorded), 6.VIII.2022, 1 male, photo by Leonardo Ancillotto (IN) (<https://www.inaturalist.org/observations/129662770/>); *idem*, Oasi Castel di Guido, 41.8836°N 12.29565°E (un. not recorded), 17.IX.2023, 1 male, photo by “robertovi” (IN) (<https://www.inaturalist.org/observations/183648639/>); *idem*, Giardino di Roma, 41.78443°N 12.39463°E (un. not recorded), 29.VI.2021, 1 female macropteris, photo by Gianluca Di Santo (IN) (<https://www.inaturalist.org/observations/99070792/>); *idem*, Lido di Ostia, 41.74155°N 12.25004°E (un. = 40 m), 2.III.2024, 1 female, photo by Ryan Hodnett (IN) (<https://www.inaturalist.org/observations/259388309/>); *idem*, near Via di Marco Simone, 25.X.2015, 1 female, photo by Davide Brocchieri (FEI) (<http://www.entomologiitaliani.net/public/forum/phpBB3/viewtopic.php?f=120&t=65487&hilit=trigonidium>); *idem*, Anzio, 14.VII.2023, 1 female macropteris, photo by Vittorio Risoldi (FEI) (<http://www.entomologiitaliani.net/public/forum/phpBB3/viewtopic.php?f=120&t=102948&hilit=trigonidium>); *idem*, Riserva naturale regionale Tor Caldara, 41.48893°N 12.59163°E (un. = 31 m), 9.XI.2023, 1 nymph, photo by Paul Costica Oprea (IN) (<https://www.inaturalist.org/observations/192955557/>); Latina, Minturno, 41.28113°N 13.72964°E (un. = 3910 m), 10.X.2020, 1 female, photo by Matteo De Santis (IN) (<https://www.inaturalist.org/observations/62179393/>). **Abruzzo:** Teramo, Roseto degli Abruzzi, 42.65332°N 14.03282°E (un. = 5 m), 11.VII.2023, 1 female, photo by Emanuele Santarelli (IN) (<https://www.inaturalist.org/observations/174079863/>); Chieti, Torino di Sangro, 42.20719°N 14.54235°E (un. = 31 m), 26.IX.2023, 1 male, photo by Rino Iubatti (IN) (<https://www.inaturalist.org/observations/184967411/>); *idem*, 42.19623°N 14.54483°E (un. = 8 m), 1.VII.2022, 1 adult macropteris, photo by Rino Iubatti (IN) (<https://www.inaturalist.org/observations/124415411/>). **Molise:** Isernia, Venafro, 41.47505°N 14.03695°E (un. = 2 m), 19.VII.2020, 1 adult, photo by Daniele Ritella (IN) (<https://www.inaturalist.org/observations/55071050/>). **Campania:** Caserta, Capriati a Volturno, Oasi Le Mortine, 41.47177°N 14.09308°E (un. = 31 m), 29.III.2024, 1 male, photo by Ottavio Janni (IN) (<https://www.inaturalist.org/observations/204421441/>); *idem*, Piedimonte Matese, 41.33602°N 14.36623°E (un. = 122 m), 25.IX.2023, 26.IX. 2023, 1 nymph, photo by Ottavio Janni (IN) (<https://www.inaturalist.org/observations/184835317/>); *idem*, Alife, 41.31592°N 14.29673°E (un. = 31 m), 26.IX.

2023, 1 female, photo by Ottavio Janni (IN) (<https://www.inaturalist.org/observations/184985120>); *idem*, 41.30878°N 14.30555°E (un. = 122 m), 4.V.2024, 1 female, photo by Ottavio Janni (IN) (<https://www.inaturalist.org/observations/213354566>); *idem*, Alagnano, 41.27786°N 14.36482°E (un. = 40 m), 20.VIII.2022, 1 male, photo by Pasquale Buonpane (IN) (<https://www.inaturalist.org/observations/131875541>); *idem*, 41.27755°N 14.3651°E (un. = 14 m), 20.X.2023, 1 female, photo by Pasquale Buonpane (IN) (<https://www.inaturalist.org/observations/188277187>); Città metropolitana di Napoli, Napoli, Rione Cavalleggeri D'Aosta, 40.81674°N 14.18544°E (un. not recorded), 30.VII.2024, 1 female macropteris, photo by Annalisa Papa (IN) (<https://www.inaturalist.org/observations/232748144>); Salerno, Pontecagnano Faiano, CREA - Centro di ricerca Orticoltura e Florovivaismo, 40.64921°N 14.88961°E (un. not recorded), 23.XI.2022, 1 male, photo by Alessandro Mattedi (IN) (<https://www.inaturalist.org/observations/142661361>). **Apulia:** Città metropolitana di Bari, Bari, 41.11403°N 16.90471°E (un. = 53 m), 14.X.2022, 1 male, photo by Rocco Labadessa (IN) (<https://www.inaturalist.org/observations/138718162>); Gravina in Puglia, 40.81508°N 16.36129°E (un. = 2 m), 28.VII.2024, 1 male, photo by “mick_photo” (IN) (<https://www.inaturalist.org/observations/260910806>); Taranto, Mottola, 40.63407°N 17.03567°E (un. = 1950 m), 3.I.2024, 1 female, photo by “daniele24j” (IN) (<https://www.inaturalist.org/observations/195648178>); Lecce, Copertino, 40.2839°N 18.03193°E (un. = 1650 m), 1 female, photo by Francesco Tarantino (IN) (<https://www.inaturalist.org/people/tarantinofrancesco>); *idem*, Ugento, Fontanelle, 39.87057°N 18.14246°E (un. = 9 m), 24.VII.2023, 1 adult macropteris, photo by “tiz bat” (IN) (<https://www.inaturalist.org/observations/174746114>). **Calabria:** Cosenza, Santa Domenica Talao, 39.79351°N 15.82994°E (un. = 267 m), 24.V.2023, 1 male, photo by “Golfopolikayak” (IN) (<https://www.inaturalist.org/people/golfopolikayak>); Vibo Valentia, Drapia, Caria, 38.647°N 15.90445°E (un. not recorded), 11.X.2020, 1 male, photo by Domenico Aiello (IN) (<https://www.inaturalist.org/observations/62315226>); Città metropolitana di Reggio Calabria, Caulonia, near Caulonia Marittima, 38.34744°N 16.45074°E (un. = 4 m), 11.VIII.2023, 1 male, photo by Luciano Arcorace (IN) (<https://www.inaturalist.org/observations/178388633>). **Sicily:** Città metropolitana di Messina, Milazzo, Milazzo, 38.20863°N 15.25656°E (un. = 27 m), 27.IV.2024, 1 female, photo by Gianluca La Rocca (IN) (<https://www.inaturalist.org/observations/212700330>); *idem*, 38.20053°N 15.23255°E (un. = 473 m), 1.V.2023, 1 female, photo by Giancarlo Torre (IN) (<https://www.inaturalist.org/observations/159697749>); *idem*, 38.19364°N 15.24064°E (un. = 728 m), 1 male, photo by Adele Schittone (IN) (<https://www.inaturalist.org/observations/213105657>); Città metropolitana di Catania, Zafferana Etnea, 37.66619°N 15.1211°E (un. = 191 m), 1 female, photo by Simone Fontana (IN) (<https://www.inaturalist.org/observations/197615014>); *idem*, Catania, Orto Botanico, 37.51571°N 15.0836°E (un. = 2 m),

10.X.2019, 1 nymph, photo by “vlad50” (IN) (<https://www.inaturalist.org/observations/106196134>); Palermo, Termini Imerese, at Imera settentrionale mouth, XI.2009, 1 female, photo by Calogero Muscarella (FEI) (<http://www.entomologiitaliani.net/public/forum/phpBB3/viewtopic.php?f=120&t=3539&hilit=trigonidium>); Trapani, Alcamo, 37.91672°N 13.01279°E (un. = 977 m), 6.IV.2009, 1 nymph female, photo by Geir Drange (IN) (<https://www.inaturalist.org/observations/39095269>); *idem*, Mazara del Vallo, 23.IX.2019, 1 nymph, photo by Angelo Ditta (FEI) (<http://www.entomologiitaliani.net/public/forum/phpBB3/viewtopic.php?f=120&t=86764&hilit=trigonidium>); Siracusa, Pachino, Marzamemi, 36.74185°N 15.11984°E (un. = 79 m), 2.VIII.2022, 1 female macropteris, photo by “matteo1815” (IN) (<https://www.inaturalist.org/observations/129248430>). **Sardinia:** Sassari, Arzachena, Stagno di Paduli Saloni, 41.08223°N 9.44661°E (un. = 6 m), 11.IX.2024, 1 male, photo by “vieluigi” (IN) (<https://www.inaturalist.org/observations/242652838>); *idem*, Porto Torres, 40.83775°N 8.39264°E (un. = 34 m), 5.X.2024, 1 nymph, photo by “lilcar” (IN) (<https://www.inaturalist.org/observations/247126323>); *idem*, Olmedo, 19.X.2009, 1 nymph, photo by Roberto A. Pantaleoni (FEI) (<http://www.entomologiitaliani.net/public/forum/phpBB3/viewtopic.php?f=120&t=3150&hilit=trigonidium>); *idem*, Uri, 22.VII.2011, 1 female, photo by Salvatore Canu (FNM) (https://www.naturamediterraneo.com/forum/topic.asp?TOPIC_ID=149843); Oristano, Bosa, Bosa Marina, 40.28825°N 8.48329°E (un. = 9 m), 11.VIII.2024, 1 female macropteris, photo by “ema_sanna” (IN) (<https://www.inaturalist.org/observations/235201439>); *idem*, Santa Teresa Gallura, 24.VII.2019, 1 adult macropteris, photo by Luigi Lenzi (FEI) (<http://www.entomologiitaliani.net/public/forum/phpBB3/viewtopic.php?f=120&t=87971&hilit=trigonidium>); Oristano, 39.89656°N 8.54653°E (un. = 794 m), 29.VI.2024, 1 female, photo by “swsankt” (IN) (<https://www.inaturalist.org/observations/229311325>); Nuoro, Lotzorai, at Rio Pramaera mouth, 39.97151°N 9.68472°E (un. = 98 m), 20.V.2024, 1 female, photo by Roel van Klink (IN) (<https://www.inaturalist.org/observations/217088728>); *idem*, Cardedu, 24.VIII.2014, 1 female, photo by Gianni Lai (FEI) (<http://www.entomologiitaliani.net/public/forum/phpBB3/viewtopic.php?f=120&t=55953&hilit=trigonidium>); Città metropolitana di Cagliari, Elmas, Istituto Agrario Duca Degli Abruzzi, 39.26688°N 9.06635°E (un. not recorded), 16.X.2023, 1 female, photo by Gabriele Santagati (IN) (<https://www.inaturalist.org/observations/187757926>); *idem*, 39.26561°N 9.0666°E (un. not recorded), 27.IX.2023, 1 adult, photo by Gabriele Santagati (IN) (<https://www.inaturalist.org/observations/185177353>).

DISCUSSION

This review greatly improves and details the knowledge of the distribution of *T. cicindeloides* in Italy thanks to more than one hundred new records. In fact, the distribution of this insect has been previously underestimated, possibly because of gaps in research. Nevertheless, an effective

expansion of the range of this thermophilic species due to the increase in average temperatures registered in recent decades also in the Italian territory (Toreti & Desiato, 2008) cannot be ruled out.

In particular, only in recent years the species has been recorded in some regions of Northern Italy (Scarpa & Mantovan, 2024), and so far, most records were from coastal wetlands (see Fontana *et al.*, 2005; Massa, 2011; Massa *et al.*, 2012; Iorio *et al.*, 2019). Thanks to the crucial contribution of citizen science, which has provided access to information that would otherwise be impossible to gather by specialists alone, it has been possible to collect numerous new records, including those from wetlands

located far from coastal areas, such as the first records for Città Metropolitana di Firenze, and the provinces of Arezzo and Siena. In addition, new records are presented for Tuscany, specifically for Pisa and for the inland areas of the provinces of Livorno and Grosseto. The species is recorded for the first time also in the provinces of Imperia, Viterbo, Chieti, Isernia, Caserta, Cosenza, and Vibo Valentia as well as in the Città metropolitana di Bari (Fig. 1).

Nonetheless, further studies are needed to assess the potential spread of this orthopteran in Italy, particularly in the northern regions where the available records are recent and scattered (Scarpa & Mantovan, 2024).

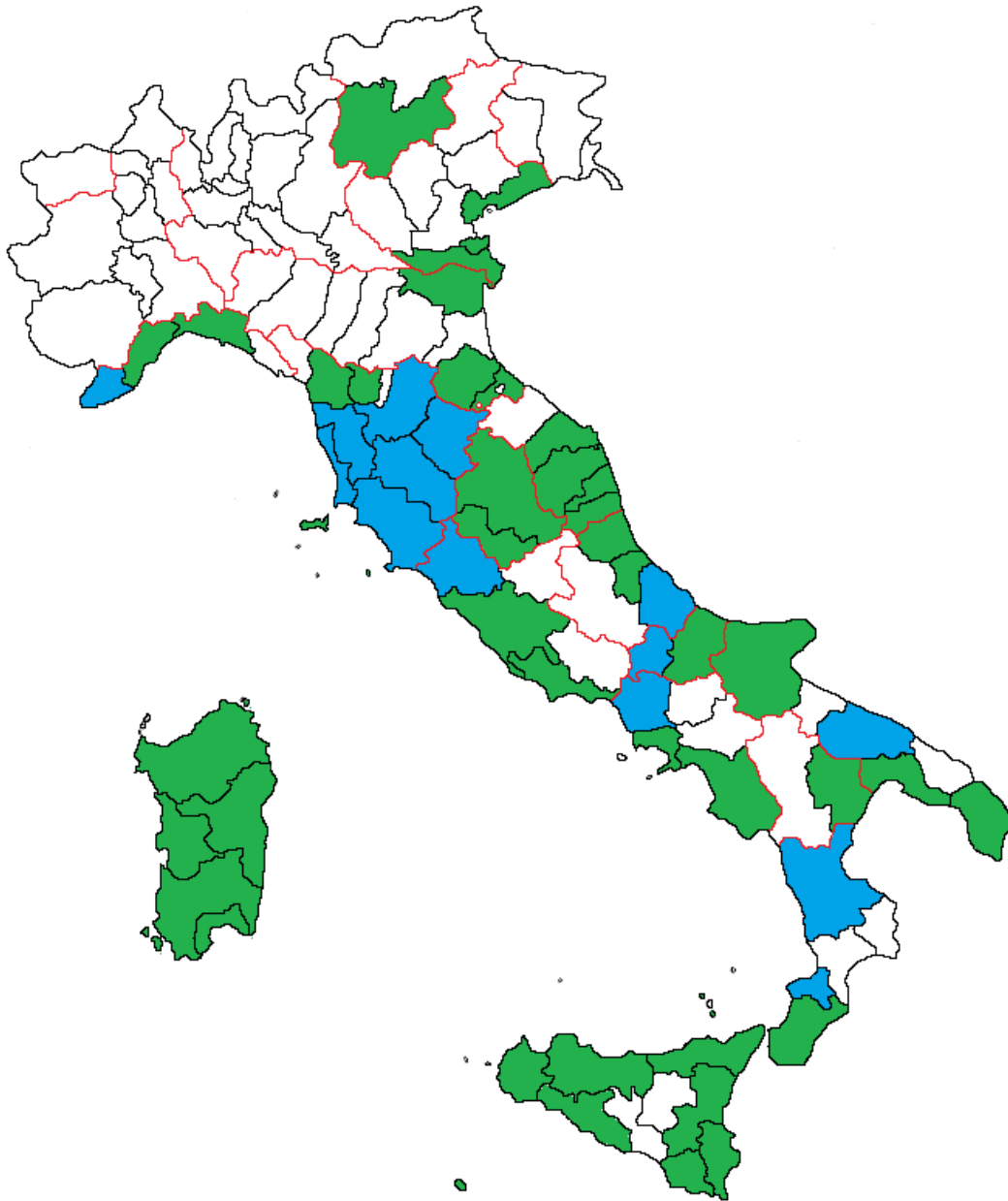


Fig. 1 - Updated distribution of *Trigonidium cicindeloides* in Italy at provincial level. Green = provinces where the species was known to occur; light blue = provinces with new records; white = provinces with no records. Islands are considered separately. Regional borders are marked by red lines. / Distribuzione aggiornata di *Trigonidium cicindeloides* in Italia a livello di province. Verde = province in cui la specie era nota; blu chiaro = province con prime segnalazioni; bianco = province senza segnalazioni. Le isole sono considerate separatamente. I confini regionali sono tracciati in rosso.

Acknowledgements

I thank all the photographers who uploaded their observations on the web. Moreover, I am grateful to Fabio Cianferoni (CNR, Firenze) who provided further material from his private collection and to the anonymous reviewers for their helpful suggestions, which improved the paper.

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