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New records of Orthoptera from Molise (Southern Italy) with an updated provisional checklist

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Abstract
New chorological data on some species of Orthoptera from the Italian region Molise are given, and 11 species are recorded as new for this area. Moreover, an updated checklist of the Orthoptera thus far recorded from Molise is provided.

Key words: Orthoptera, Molise, faunistics, new records, checklist.

Introduction

Molise, with a surface of 4460.6 km² (ISTAT 2013), is a small region of South Italy. It is divided into two provinces: Campobasso and Isernia, and it includes part of the National Park of Abruzzo, Lazio and Molise, in addition to other minor protected areas. Its area is predominantly mountainous (55%), while the rest is mostly hilly (Mipaaf 2010); it has also 35 kilometes of sandy coastline to the northeast, lying on the Adriatic Sea (Ielardi 2002).

Despite its key position in the Italian peninsula, one of Earth's biodiversity hotspots in the Mediterranean (see Myers et al. 2000; Minelli et al. 2002; Blasi et al. 2005), and its ecosystems variety, this region has been little investigated from an entomological point of view (see Ruffo & Stoch 2005, 2007). Despite the great tradition of Italian orthopterologists, even the Orthoptera have been little studied in this area and the relatively few data available were summarized by Fontana et al. (2005) and Massa et al. (2012). The most specific work dealing also the Orthoptera from Molise is that of Fontana et al. (2004) on the aforementioned National Park, but most of the data comes from the Abruzzo region.

The present work provides new records for this group of insects, increasing the number of known species in the region, and summarizes the knowledge with an update checklist.

Material and methods

The examined material come from collected specimens or photos from the web. For each site, the following information is provided: locality, date, collector or photographer, number of specimens (specifying sex when possible), repository or source. For each record, name places are maintained in Italian. Geographical coordinates are in decimal degrees (datum WGS84). The uncertainty of data (in metres) is indicated according to the point-radius method (Wieczorek et al. 2004). Moreover, information about biology and distribution, with focus on Italy, is also given. All photographic records were confirmed by the authors. The collected material was identified in part by the authors and in part by Bruno Massa (University of Palermo); in the latter case the identifier is specified in the text. Nomenclature and taxonomy follow Cigliano et al. (2019) except for the species *Acrida ungarica* (Herbst, 1786), for which Skejo et al. (2018) is followed.

In the references of the checklist, the quotations from Fontana et al. (2007) are not reported, since this work is simply the translation in English of Fontana et al. (2005).

Abbreviations used in the examined material are the following:

CFCC F. Ceccolini collection, Rassina (Arezzo), Italy
CFCF F. Cianferoni collection, Florence, Italy
CLP L. Pizzocaro collection, Vezza d'Oglio (Brescia), Italy

EI www.entomologiitaliani.net
IN www.inaturalist.org
loc. locality
un uncertainty

Listed species

Gryllidae

Gryllus* (*Gryllus*) *bimaculatus De Geer, 1773

Material examined. **Isernia**: Bagnoli del Trigno, Fonte del Putto, 25.X.2018, 1 adult (♂), photo by Franco Rossi (EI).

General distribution and biology. This species has a distribution range spanning from Africa, Asia and Mediterranean Europe (Massa et al. 2012). *Gryllus bimaculatus* lives in grassland, usually with low grass, without digging shelters, but it can be also synanthropic (Massa et al. 2012). Adults are usually active in summer (Bellmann & Luquet 1995), but males were observed singing throughout most of the autumn in Central Italy (e.g. in several places in the center of Firenze until the first days of November, pers. obs., 2015 and Fig. 1). The oviposition sites need warmth and moisture (Ferreira & Ferguson 2009). It is an eruptive insect with short-lived local peaks in numbers and much lower densities in between (Ferreira & Ferguson 2009) and many individuals can fly for kilometers and they are able to colonize new territories (Ragge 1972; Massa et al. 2012).

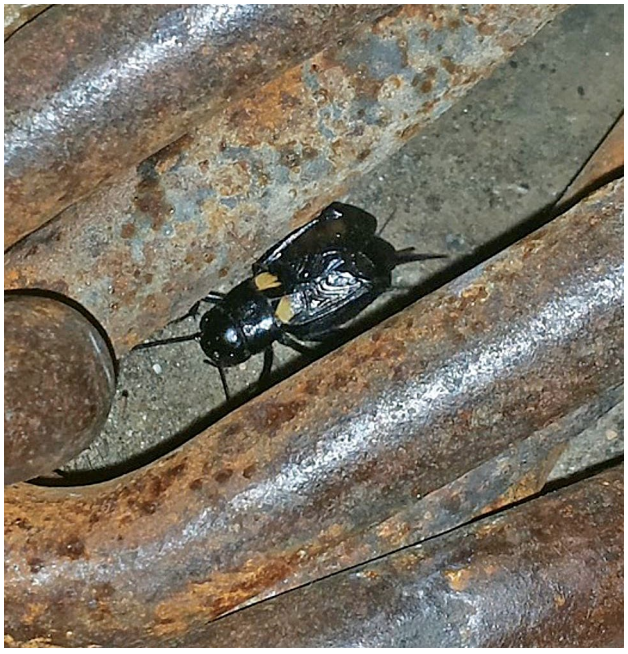

Fig. 1 – Singing male of *Gryllus bimaculatus* on 4th November 2015 in Piazza Pitti, Firenze (photo by Annalisa Paglianti).

Regional distribution in Italy. Piemonte, Veneto, Friuli-Venezia Giulia, Liguria, Emilia-Romagna, Toscana, Lazio, Abruzzo, Campania, Puglia, Basilicata, Calabria, Sicilia, Sardegna (Massa et al. 2012).

Remarks. First record for Molise.

Gryllus* (*Gryllus*) *campestris Linnaeus, 1758

Material examined. **Isernia**: Capracotta, 41.835186° N 14.271392° E, 12.VII.2019, 1 adult (♂), photo by Stefania Dal Pra (IN).

General distribution and biology. This cricket is widespread in Western Palaearctic (Massa et al. 2012), even if during recent decades its population shows serious decline in many parts of its geographical distribution (Gawałek et al. 2014). It typically lives in burrows, preferring dry, sunny locations with short vegetation from plain to mountain (Massa et al. 2012) and a specimen was found at 2470 m a.s.l. (Galvagni 2001). Adults are usually active in spring and summer, but males can sing throughout most of the autumn (Fabbri 2015). While males are territorial and defend their burrows fiercely, females are vagrant and attracted by singing males. They lay eggs in bare ground either close to a burrow or into the burrow (Hochkirch et al. 2007). Nymphs hatch in mid-July and overwinter during their tenth or eleventh instar (Köhler & Reinhardt 1992).

Regional distribution in Italy. Valle d'Aosta, Piemonte, Lombardia, Trentino-Alto Adige, Veneto, Friuli-Venezia Giulia, Liguria, Emilia-Romagna, Toscana, Umbria, Marche, Lazio, Abruzzo, Molise, Campania, Puglia, Calabria, Sicilia, Sardegna (Massa et al. 2012).

Remarks. In addition to the present record, in Molise the species was found in lake of Castel San Vincenzo, Valle Fiorita, Vastogirardi, Monti del Matese, Campitello Matese (see La Greca & Messina 1982; Fontana et al. 2004, 2005; Massa et al. 2012).

Trigonidiidae

Stenonemobius* (*Stenonemobius*) *gracilis
(Jakovleff, 1871)

Material examined. **Isernia**: Venafro, 41.476169° N 14.035894° E (un = 2 m), about 170 m s.l.m., 1 adult, photo by Daniele Ritella (IN).

General distribution and biology. It is known from Central Asia to the Iberian Peninsula and North Africa until Sudan, but there are a lot of territories in this range in which the species is unrecorded (see Chopard 1943; Harz 1969; Iorgu et al. 2008; Klaus-Gerhard 2013). Its biology is poorly known, but it seems to be attracted by lights and,

in North Africa, it is observed to be quite common in wadi systems (Massa et al. 2012).

Regional distribution in Italy. Veneto, Emilia-Romagna, Toscana, Umbria, Abruzzo, Campania, Puglia, Sicilia, Sardegna (Massa et al. 2012), Piemonte (Sindaco et al. 2012), Lombardia (Ghezzi 2017), Lazio (Iorio et al. 2018).

Remarks. First record for Molise. The information about the distribution of this species is still inadequate to make an assessment and it is considered as Data Deficient (DD) according to the European Red List of orthopterans (Hochkirch et al. 2016).

Trigonidium* (*Trigonidium*) *cicindeloides Rambur, 1839

Material examined. **Campobasso**: Petacciato, lake (artificial), at the springs of Fosso Mérgola, about 50 m a.s.l., 42.00584° N 14.81235° E, 31.VII.2014, F. Cianferoni, L. Pizzocaro, F. Ceccolini & E. Paggetti leg., 1 adult (♂), CFCF.

General distribution and biology. The species shows a large range, spanning from Southern Asia, Southern Europe to Africa, but the knowledge about its detailed distribution is scarce, lacking records from many countries inside this range (see Radhakrishnan & Dharma Rajan 2019). Thermophilic, it inhabits wetlands, especially coastal ones (Fontana & Kleukers 2002), but it was found also in the inland (Paggetti & Ceccolini 2014).

Regional distribution in Italy. Toscana, Marche, Lazio, Abruzzo, Campania, Puglia, Basilicata, Calabria, Sicilia, Sardegna (Massa et al. 2012).

Remarks. First record for Molise.

Gryllotalpidae
***Gryllotalpa* sp.**

Material examined. **Campobasso**: Petacciato, lake (artificial), at the springs of Fosso Mérgola, about 50 m a.s.l., 42.00584° N 14.81235° E, 31.VII.2014, F. Cianferoni, L. Pizzocaro, F. Ceccolini & E. Paggetti leg., 2 specimens (nymphs), CFCF; *idem*, 1 specimen (nymph), CFCC; *idem*, 1 specimen (nymph), CLP. **Isernia**: Montenero Val Cocchiara, Pantano della Zittola, loc. Bocca Pantano, 824 m a.s.l., SIC "Pantano Zittola–Feudo Valcocchiara" (IT7212126), 41.70137° N 14.08456° E, 29.VII.2014, F. Cianferoni, L. Pizzocaro, F. Ceccolini & E. Paggetti leg., 1 specimen (nymph), CLP.

Remarks. The genus *Gryllotalpa* Latreille, 1802 includes about 70 species (Cigliano et al. 2019) widespread in Europe, Africa, Asia, Australia, and North America (Hill et al. 2002), adapted to live underground, with reduced ovipositor, fore legs vastly modified for digging and hind legs fully losing their jumping capability during the ontogenesis (Gorochov 1995). Eight species occur in Italy (Massa et al. 2012), but it is hard to identify them as many species have been described mainly on the basis of the number of chromosomes (Baccetti & Capra 1978; Baccetti 1991). In adult specimens is possibile to separate two groups on the basis of wings morphology: two species have hind wings reaching beyond the tip of abdomen and six species have hind wings shorter, not reaching beyond the tip of abdomen (Massa et al. 2012). Unfortunately, nymphs are not easily separable.

In Molise only one record of mole cricket occurs and it is ascribed to *Gryllotalpa gryllotalpa* (Linnaeus, 1758) (Fontana et al. 2004). However, most species can reasonably be excluded, since *G. cossyrensis* Baccetti & Capra, 1978 occurs in Italy only on Pantelleria island, *G. octodecim* Baccetti & Capra, 1978 and *G. sedecim* Baccetti & Capra, 1978 are known from North Italy and Sardegna, *G. septemdecimchromosomica* Ortiz, 1958 is a West European species recorded in Italy only in Liguria, Toscana, and Umbria, *G. viginti* Baccetti & Capra, 1978 is known from Liguria, and *G. vigintiunum* Baccetti, 1991 is recorded only for some islands of northern Sardegna (Massa et al. 2012). Two species seem to be the most compatible to occur in Molise: *G. gryllotalpa* which is known from many localities from northern and central Italian mainland, and *G. quindecim* Baccetti & Capra, 1978 which is known from Sicilia and southern mainland of the Italian peninsula (Massa et al. 2012). The position of Molise is compatible with the occurrence of both the latter species, also since in three adjacent regions (Lazio, Campania, and Puglia) records of both exist (Massa et al. 2012). Thus, on the basis of wings morphology, the identification of adults would be easy, since *G. gryllotalpa* is macropterous and *G. quindecim* is brachypterous, but, having unfortunately only nymphs, we prefer to limit the identification to genus level. However, the first record of *Gryllotalpa* sp. for the Campobasso province is provided.

Mogoplistidae
Arachnocephalus vestitus A. Costa, 1855

Material examined. **Isernia**: Bagnoli del Trigno, Fonte del Putto, 11.X.2013, 1 adult (♀), photo by Franco Rossi (EI).

General distribution and biology. This species has a Mediterranean range with extension to Caucasus (Massa et al. 2012). It inhabits tree canopies and bushes and hardly ever moves on grasses and on the ground, but it has been collected several times on building walls (Alexiou et al. 2017).

Regional distribution in Italy. Piemonte, Lombardia, Veneto, Friuli-Venezia Giulia, Liguria, Emilia-Romagna, Toscana, Umbria, Marche, Lazio, Abruzzo, Campa-

nia, Puglia, Basilicata, Calabria, Sicilia, Sardegna (Massa et al. 2012).

Remarks. First record for Molise.

Rhaphidophoridae

Dolichopoda* (*Dolichopoda*) *geniculata geniculata
(O.G. Costa, 1836)

Material examined. **Isernia**: Colli a Volturno, near "Hotel Volturno", 41.6078° N 14.0993° E, 345 m s.l.m., 29.VII. 2014, F. Cianferoni, L. Pizzocaro, F. Ceccolini & E. Paggetti leg., 1 adult (♀), CFCF; *idem*, 1 adult (♀), CLP.

General distribution and biology. Considered an Italian endemism, being widespread on the central and southern Apennines (Massa et al. 2012), recently an unexpected record was found in a cave of Canton of Ticino, Switzerland (Meier et al. 2013). The most probable hypothesis to explain the presence of this greyish cave cricket on this site appears to be the anthropic origin, also in consideration of the great genetic affinity with populations of northern Lazio, from which it was probably imported (Meier et al. 2013). However, this is not the only case for populations of *Dolichopoda*, since also the isolated northern population of *D. laetitiae laetitiae* Minozzi, 1920 in the Grotta della Poscola, a cave in Veneto, was probably introduced by man (Bernardini et al. 1997). *Dolichopoda geniculata* includes two subspecies, of which the nominate one occupies the whole range except the archipelago of Isole Ponziane (Lazio), where *D. geniculata pontiana* Capra, 1967 occurs (Capra 1967; Massa et al. 2012). It is an eutroglophile species (Massa et al. 2012) and records of specimens collected with fall traps in epigean environment are reported (Di Russo & Rampini, 2004).

Regional distribution in Italy. Lazio, Abruzzo, Molise, Campania, Puglia, Basilicata, Calabria (Massa et al. 2012). Two specimens of *Dolichopoda* from Puglia (Baccetti & Capra 1970; Massa et al. 2012) were collected in two nearby caves, in discontinuity with the rest of the range of the species; the unavailability of males leaves however some doubts on the identification of these specimens (Massa et al. 2012).

Remarks. The specimens cited above are the fourth record from Molise of *D. geniculata*, after ones in Di Russo & Rampini (2004), Fontana et al. (2005), and Ceccolini (2015), all in Isernia province.

Tettigoniidae

Conocephalus* (*Anisoptera*) *fuscus fuscus
(Fabricius, 1793)

Material examined. **Isernia**: Rocchetta a Volturno, springs of Volturno river, 41.63818° N 14.07703° E, about 550 m a.s.l., 28.VII.2014, F. Ceccolini, F. Cianferoni, L. Pizzocaro & E. Paggetti leg., 1 nymph (♀), CFCC.

General distribution and biology. It is widespread from Europe and North Africa to Asia until China and Korea (see Cigliano et al. 2019, and Zhou et al. 2010 under the name *Conocephalus (Anisoptera) discolor* (Thunberg, 1815)). The species includes two subspecies, one of which confined in Cyprus island (Cigliano et al. 2019). It lives in all kind of grasslands and synanthropic habitats with high dense, fresh vegetation, mostly in the vicinity of water (Massa et al. 2012).

Regional distribution in Italy. Valle d'Aosta, Piemonte, Lombardia, Trentino-Alto Adige, Veneto, Friuli-Venezia Giulia, Liguria, Emilia-Romagna, Toscana, Marche, Lazio, Abruzzo, Campania, Puglia, Basilicata, Calabria, Sicilia, Sardegna (Massa et al. 2012), Molise (Fontana et al. 2004).

Remarks. This is the second record from Molise after that from Lake of Castel San Vincenzo (Fontana et al. 2004).

Meconema thalassinum (De Geer, 1773)

Material examined. **Isernia**: Colli a Volturno, near "Hotel Volturno", 41.6078° N 14.0993° E, 345 m s.l.m., 29.VII. 2014, F. Cianferoni, L. Pizzocaro, F. Ceccolini & E. Paggetti leg., B. Massa det., 1 adult (♂), CFCC.

General distribution and biology. It is widespread in almost all of Europe (Massa et al. 2012) and introduced in several localities of North America (see Johnstone 1970; Sismondo 1980; Marshall et al. 2004; Cannings et al. 2007). This green bush-cricket lives in deciduous trees in light forests and forest margins (Massa et al. 2012).

Regional distribution in Italy. Piemonte, Lombardia, Trentino-Alto Adige**,** Veneto, Friuli-Venezia Giulia, Emilia-Romagna, Toscana, Abruzzo, Puglia (Massa et al. 2012), Liguria (Baroni et al. 2013), Valle d'Aosta (Iorio et al. 2019).

Remarks. First record for Molise. So far only three localities from Southern Apennines were reported for this species: two in Abruzzo (Laurenzi & Osella 1994) and one in Puglia (La Greca 1959; Schmidt 1997).

Metaplastes pulchripennis (A. Costa, 1863)

Material examined. **Isernia**: Colli a Volturno, near "Hotel Volturno", 41.6078° N 14.0993° E, 345 m s.l.m., 29.VII. 2014, F. Cianferoni, L. Pizzocaro, F. Ceccolini & E. Paggetti leg., B. Massa det., 1 adult (♀), CFCC.

General distribution and biology. West Mediterranean

species, it lives in forest margins and flower-rich grasslands; in the Italian mainland adults can be encountered especially on *Rubus* (Massa et al. 2012).

Regional distribution in Italy. Piemonte, Ligura, Emilia-Romagna, Toscana, Umbria, Lazio, Campania, Basilicata, Calabria, Sicilia, Sardegna (Massa et al. 2012).

Remarks. First record for Molise.

Tylopsis lilifolia (Fabricius, 1793)

Material examined. **Campobasso**: Toro, IX.2010, 1 adult (♀), photo by Carlo Fracasso (EI); Spinete, Piana, 41.553908° N 14.494261° E (un = 8 m), about 665 m a.s.l., 14.VII.2017, 1 adult, photo by "sara_91" (IN).

General distribution and biology. This species has Mediterranean distribution with extension to Middle East and it lives on shrubs and tall herbs of grasslands and anthropogenic habitats (Massa et al. 2012).

Regional distribution in Italy. Piemonte, Lombardia, Trentino-Alto Adige, Veneto, Friuli-Venezia Giulia, Liguria, Emilia-Romagna, Toscana, Umbria, Marche, Lazio, Abruzzo, Campania, Puglia, Basilicata, Calabria, Sicilia, Sardegna (Massa et al. 2012).

Remarks. First record for Molise.

Saga pedo (Pallas, 1771)

Material examined. **Campobasso**: Guglionesi, 2.VII.2010, 1 adult (♀), photo by Carlo Fracasso (EI). **Isernia**: Bagnoli del Trigno, Calice Rosso, 41.70274° N 14.46480° E (un = 500 m), about 590 m a.s.l., 1.VIII.2013, 1 adult (♀), photo by Franco Rossi (EI).

General distribution and biology. This impressive green bush-cricket (it is the largest orthopterous in Europe) is widely distributed from Europe to Siberia and west China (Massa et al. 2012). A few decades ago it was accidentally introduced in Michigan (United States) where six specimens were found between 1970 and 1972 (Cantrall 1972), but as no more specimens have been found it is probable that it is now extinct in North America (Willems 1996). It is a strict carnivorous species, which feeds mainly on other orthopterans hunting them with attacks on the head (Massa et al. 2012). It lives in xeric environments, including also those of agricultural origin (Anselmo 2019). The species is parthenogenetic and for a long time the male remained unknown, until Baur et al. (2006) described one specimen from Switzerland, although according to Lemonnier-Darcemont et al. (2016) it is a case of gynandromorphism. Another male from Croatia is mentioned by Villani & Pezzi (2016).

Regional distribution in Italy. Valle d'Aosta, Piemonte, Lombardia, Veneto, Friuli-Venezia Giulia, Liguria, Umbria, Lazio, Abruzzo, Molise, Campania, Puglia, Basilicata, Calabria, Sicilia, Sardegna (Massa et al. 2012), Trentino-Alto Adige (Galvagni & Prosser 2004), Emilia-Romagna (Fabbri & Ambrogio 2014; Villani & Pezzi 2016; Fabbri & Montebelli 2017), Marche (Carotti 2006), Toscana (Vergari et al. 2017). There is a record also for the little country of the Repubblica di San Marino (Targioni Tozzetti 1898).

Remarks. In Molise *S. pedo* is generically recorded by Fontana et al. (2002) and the only precise locality is Monte Caruso (Isernia province), reported by Fontana et al. (2005) and Massa et al. (2012). The specimen from Guglionesi is the first one for the Campobasso province. Although this orthopterous is known for all Italian regions, precise distribution and abundance of this species is still poorly known and it is important to collect new records to fill the faunistic knowledge gap, also because the species is included in the Appendix II of the Bern Convention and in the Annex IV of the "Habitats Directive" 92/43/EEC, and it is listed as VU (Vulnerable) in the Global IUCN Red List of Threatened Species (Orthopteroid Specialist Group 1996), although more recently it has been downgraded to LC (Least Concern) in the European Red List of Threatened Species (Hochkirch et al. 2016).

Decticus albifrons (Fabricius, 1775)

Material examined. **Isernia**: Pesche, 41.61127° N 14.28241° E (un = 50 m), about 760 m a.s.l., 11.VIII.2010, 1 adult (♀), observation by F. Ceccolini & E. Paggetti, photo by E. Paggetti.

General distribution and biology. The species is widespread in Macaronesian islands, southern Europe, North Africa, and South-West Asia (Massa et al. 2012). It lives in open warm habitats with high vegetation, mostly at sea-level, but can occur up to 1700 m (Massa et al. 2012).

Regional distribution in Italy. Piemonte, Lombardia, Veneto, Friuli-Venezia Giulia, Liguria, Emilia-Romagna, Toscana, Lazio, Abruzzo, Molise, Campania, Puglia, Basilicata, Calabria, Sicilia, Sardegna (Massa et al. 2012), Trentino-Alto Adige (Iorio et al. 2019).

Remarks. This is the second record from Molise after one from Isernia (Fontana et al. 2005; Massa et al. 2012).

Tettigonia viridissima (Linnaeus, 1758)

Material examined. **Campobasso**: Colle d'Anchise/Baranello, Biferno river, 41.5125° N 14.5307° E, about 450 m a.s.l., 30.VII.2014, F. Cianferoni, L. Pizzocaro, F. Ceccolini & E. Paggetti leg., B. Massa det., 1 adult (♂), CLP.

General distribution and biology. *Tettigonia viridissima* is a large insect widespread in the Western Palaearctic and Central Asia (Rhee 2013). It lives in tall herbs and dense vegetation, feeding mainly on other insects, including toxic Zygaenidae (Fontana et al. 2002).

Regional distribution in Italy. Valle d'Aosta, Piemonte, Lombardia, Trentino-Alto Adige, Veneto, Friuli-Venezia Giulia, Liguria, Emilia-Romagna, Toscana, Umbria, Marche, Lazio, Abruzzo, Molise, Campania, Puglia, Basilicata, Calabria, Sicilia, Sardegna (Massa et al. 2012).

Remarks. This is the fourth record from Molise: the previous ones are from Isernia, Vastogirardi (Isernia province), and Campitello Matese (Campobasso province) (Fontana et al. 2005; Massa et al. 2012).

ACRIDIDAE

Acrida ungarica (Herbst, 1786)

MATERIAL EXAMINED. **Campobasso**: Petacciato, VII.2007, 1 adult, photo by Franco Rossi (EI). **Isernia**: Rocchetta a Volturno, municipality road of San Vincenzo, 41.649096° N 14.084117° E (un = 104 m), about 550 m a.s.l., 26.IX.2017, 1 adult, photo by "mak" (IN); Sesto Campano, near Vallecupa, 41.443731° N 14.020422° E (un = 8 m), about 255 m a.s.l., 6.IX.2017, 1 adult (Fig. 2), photo by Daniele Ritella (IN).

General distribution and biology. Mediterranean species, it lives in dry habitats, such as grasslands, dunes, and wasteland (Massa et al. 2012).

Regional distribution in Italy. Piemonte, Lombardia, Trentino-Alto Adige, Veneto, Friuli-Venezia Giulia, Liguria, Emilia-Romagna, Toscana, Marche, Lazio, Abruzzo, Campania, Puglia, Calabria, Sicilia, Sardegna (Massa et al. 2012), Basilicata (Dirsh 1949).

Remarks. First record for Molise.

The nomenclature of this taxon has a complex history and recently it has undergone a new change. Dirsh (1949) described *Acrida mediterranea* as a new species, splitted from *A. turrita* Linnaeus, 1758 and divided it in tree subspecies: *A. mediterranea mediterranea*, *A. mediterranea bosphorica*, and *A. mediterranea lombardica*. The first two, as well as *A. caucasica* Dirsh, 1949, were synonimized with *A. anatolica* Dirsh, 1949 by Bey-Bienko & Mishtshenko (1951); however Dirsh & Uvarov (1953) synonimized all subspecies of *A. mediterranea* previously described by Dirsh (1949) with *A. bicolor* (Thunberg, 1815). Subsequently, Harz (1975) recovered the taxon "*mediterranea*", considering it a subspecies of *A. ungarica* (Herbst, 1786): since in literature *A. ungarica* has been considered divided in the two subspecies *A. ungarica ungarica* (Herbst, 1786), present in Eastern Europe, and *A. ungarica mediterranea* Dirsh, 1949, occurring in Western Europe, including Italy. However, since the boundaries of the two subspecies were not clear, Massa et al. (2012) hypothesized a possible synonymy of *A. ungarica mediterranea* with *A. ungarica*. Indeed recently, comparing Pannonian and Mediterranean specimens, Skejo et al. (2018) have not found significant morphological differences and they regarded *A. ungarica mediterranea* a synonym of *A. ungarica*; in this context they have also formalized the synonymy of *A. mediterranea lombardica* with *A. ungarica*.

Fig. 2 – Specimen of *Acrida ungarica* from Sesto Campano, Isernia (photo by Daniele Ritella).

Calliptamus siciliae Ramme, 1927

MATERIAL EXAMINED. **Campobasso**: Colle d'Anchise, surroundings Mulino Spina, SIC IT7222247, 41.523° N 14.525° E, about 445 m a.s.l., 30.VII.2014, F. Ceccolini, F. Cianferoni, L. Pizzocaro & E. Paggetti leg., B. Massa det., 2 adults (1 ♂, 1 ♀), CFCF.

General distribution and biology. South European species widespread from Pyrenees through Italy (Hellrigl 2006), this species inhabits dry meadows, shrubland and arid environments (Massa et al. 2012).

Regional distribution in Italy. Valle d'Aosta, Piemonte, Lombardia, Trentino-Alto Adige, Veneto, Liguria, Emilia-Romagna, Toscana, Umbria, Marche, Lazio, Abruzzo, Campania, Puglia, Basilicata, Calabria, Sicilia, Sardegna (Massa et al. 2012).

Remarks. First record for Molise.

Anacridium aegyptium (Linnaeus, 1764)

MATERIAL EXAMINED. **Isernia**: Venafro, near Oasi Le Mortine, 41.47114° N 14.09124° E (un = 8 m), about 180 m

a.s.l., 5.VI.2018, 1 adult, photo by Daniele Ritella (IN); Venafro, surroundings, 41.488715° N 14.025275° E (un = 8 m), about 490 m a.s.l., 26.IV.2018, 1 adult, photo by Daniele Ritella (IN); Venafro, surroundings, 41.488419° N 14.0354° E (un = 2 m), about 445 m a.s.l., 25.III.2017, at least 1 adult (Fig. 3), photo by Daniele Ritella (IN); Venafro, 41.476642° 14.034242° E (un = 8 m), about 175 m a.s.l., 13.III.2017, 1 adult, photo by Daniele Ritella (IN); Venafro, 41.476637° 14.034773° E (un = 4 m), about 175 m a.s.l., 9.III.2017, at least 1 adult, photo by Daniele Ritella (IN).

General distribution and biology. It is widespread in Southern Europe, South-Western Asia, and Northern Africa (Massa et al. 2012). It is a phytophagous species that lives in tree and shrubs, not harmful to crops (Samejo & Sultana 2016) and it can be found in many different habitats with vegetation, also in towns, where adults can overwinter inside holes in building walls (Massa et al. 2012). *Anacridium aegyptium* is a solitary species, but sometimes may occur in large numbers (Norris & Richards 1965) and nymphs were reported to exhibit color change in response to crowding (Song & Wenzel 2007); quite important invasions have been recorded in Egypt in 1890 and in 1927-28, whilst in 1929 it was found associated in proportion of a quarter of a swarm of *Schistocerca gregaria* (Forskål, 1775) (El-Zoheiry 1937; Colombo 1950).

Regional distribution in Italy. Piemonte, Lombardia, Trentino-Alto Adige, Veneto, Friuli-Venezia Giulia, Liguria, Emilia-Romagna, Toscana, Umbria, Marche, Lazio, Abruzzo, Campania, Puglia, Basilicata, Calabria, Sicilia, Sardegna (Massa et al. 2012).

Remarks. First record for Molise.

Dociostaurus* (*Kazakia*) *genei genei (Ocskay, 1832)

Material examined. **Campobasso**: Petacciato, Marina di Petacciato, at springs of Tecchio torrent, 42.0381° N 14.8496° E, about 1 m a.s.l., 31.VII.2014, F. Ceccolini, F. Cianferoni, L. Pizzocaro & E. Paggetti leg., B. Massa det., 1 adult (♂), CFCC; *idem*, 1 adult (♂), CFCF; *idem*, 1 adult (1 ♀), CLP.

General distribution and biology. The species is divided in two subspecies, one of which present in Italy (Cigliano et al. 2019), and is widespread in Southern Europe and Middle Est (Massa et al. 2012). It lives in arid areas, especially in open scrub and grass dry land pastures (García et al. 2005).

Regional distribution in Italy. Piemonte, Lombardia, Veneto, Emilia-Romagna, Toscana, Marche, Lazio, Abruzzo, Campania, Puglia, Basilicata, Calabria (Massa et al. 2012).

Remarks. First record for Molise.

Fig. 3 – Specimen of *Anacridium aegyptium* from Venafro, Isernia (photo by Daniele Ritella).

Euchorthippus declivus (Brisout de Barneville, 1848)

Material examined. **Campobasso**: Colle d'Anchise/Baranello, Biferno river, 41.5125° N 14.5307° E, about 450 m a.s.l., 30.VII.2014, F. Cianferoni, L. Pizzocaro, F. Ceccolini & E. Paggetti leg., B. Massa det., 1 adult (♀), CFCC. **Isernia**: Rocchetta a Volturno, at springs of Volturno river, 41.63818° N 14.07703° E, about 550 m a.s.l., 28.VII.2014, F. Ceccolini, F. Cianferoni, L. Pizzocaro & E. Paggetti leg., B. Massa det., 2 adults (1 ♂, 1 ♀), CFCC; *idem*, 2 adults (1 ♂, 1 ♀), CFCF; *idem*, 1 adult (♀), 2 nymphs (♂♂), CLP.

General distribution and biology. The species is widespread in Southern Europe and it lives in all kinds of grassy habitats, like grassland, roadside verges, forest margins, and clearings (Massa et al. 2012).

Regional distribution in Italy. Piemonte, Lombardia, Trentino-Alto Adige, Veneto, Friuli-Venezia Giulia, Ligu-

ria, Emilia-Romagna, Toscana, Umbria, Marche, Lazio, Abruzzo, Molise, Campania, Puglia, Basilicata, Calabria, Sardegna (Massa et al. 2012), Valle d'Aosta (Iorio et al. 2019).

Remarks. In Molise *E. declivus* was recorded so far from the following localities: Lago Castel S. Vincenzo, Le Forme (Fontana et al. 2004), Vastogirardi, Monte del Matese, Lago del Matese (Fontana et al. 2005; Massa et al. 2012). The specimen reported in the present work is the first record for the province of Campobasso.

Omocestus* (*Omocestus*) *rufipes (Zetterstedt, 1821)

Material examined. **Campobasso**: Colle d'Anchise/Baranello, Biferno river, 41.5125° N 14.5307° E, about 450 m a.s.l., 30.VII.2014, F. Cianferoni, L. Pizzocaro, F. Ceccolini & E. Paggetti leg., 1 adult (♀), CFCF.

General distribution and biology. The species has a wide distribution from North Africa and Europe to Central Asia and South Siberia (Cigliano et al. 2019). It lives from sea level to 2300 m a.s.l. in the mountains, in grasslands, wasteland, forest clearings, urban and agricultural habitats (Massa et al. 2012).

Regional distribution in Italy. Valle d'Aosta, Piemonte, Lombardia, Trentino-Alto Adige, Veneto, Friuli-Venezia Giulia, Liguria, Emilia-Romagna, Toscana, Umbria, Marche, Lazio, Abruzzo, Molise, Campania, Puglia, Basilicata, Calabria, Sicilia, Sardegna (Massa et al. 2012).

Remarks. In addition to record of present work, in Molise *O. rufipes* is reported from two localities of Monti del Matese (Fontana et al. 2015; Massa et al. 2012).

Acrotylus patruelis (Herrich-Schäffer, 1838)

Material examined. **Campobasso**: Petacciato, Marina di Petacciato, at springs of Tecchio torrent, 42.0381° N 14.8496° E, about 1 m a.s.l., 31.VII.2014, F. Ceccolini, F. Cianferoni, L. Pizzocaro & E. Paggetti leg., B. Massa det., 1 adult (♀), CLP.

General distribution and biology. The species is distributed in Africa, southern Europe and southwestern Asia and it occurs in many dry open habitats with bare or sandy ground (Massa et al. 2012).

Regional distribution in Italy. Piemonte, Lombardia, Trentino-Alto Adige, Veneto, Friuli-Venezia Giulia, Liguria, Emilia-Romagna, Toscana, Lazio, Abruzzo, Campania, Puglia, Basilicata, Calabria, Sicilia, Sardegna (Massa et al. 2012).

Remarks. First record for Molise.

Oedipoda germanica germanica (Latreille, 1804)

Material examined. **Isernia**: Colli a Volturno, near "Hotel Volturno", 41.6078° N 14.0993° E, 345 m s.l.m., 29.VII.2014, F. Cianferoni, L. Pizzocaro, F. Ceccolini & E. Paggetti leg., B. Massa det., 1 adult (♀), CLP.

General distribution and biology. The species occurs in Europe and Near East (Massa et al. 2012) with three subspecies, one of which, the nominate one, is present in Italy (Cigliano et al. 2019). It is typical of stony or rocky habitat (Massa et al. 2012).

Regional distribution in Italy. Valle d'Aosta, Piemonte, Lombardia, Trentino-Alto Adige, Veneto, Friuli-Venezia Giulia, Liguria, Emilia-Romagna, Toscana, Umbria, Marche, Lazio, Abruzzo, Molise, Campania, Puglia, Basilicata, Calabria (Massa et al. 2012), Sicilia (Iorio et al. 2018).

Remarks. In addition to the record of present work, there are other two localities reported for Molise: Vastogirardi and Monti del Matese (see La Greca 1959; Fontana et al. 2005; Massa et al. 2012).

Sphingonotus* (*Sphingonotus*) *caerulans caerulans (Linnaeus, 1767)

Material examined. **Campobasso**: Petacciato, Marina di Petacciato, at springs of Tecchio torrent, 42.0381° N 14.8496° E, about 1 m a.s.l., 31.VII.2014, F. Ceccolini, F. Cianferoni, L. Pizzocaro & E. Paggetti leg., B. Massa det., 2 adults (♀♀), CFCC; *idem*, 2 adults (1 ♂, 1 ♀), CFCF; *idem*, 2 adults (1 ♂, 1 ♀), CLP.

General distribution and biology. *Sphingonotus caerulans* is a politipic species widespread in Western Palaearctic and Central Asia and divided in five subspecies (Cigliano et al. 2019). In Italy only the nominate one is present (Massa et al. 2012). It is a xerothermic species of low-vegetation, rocky or sandy habitats (Massa et al. 2012).

Regional distribution in Italy. Valle d'Aosta, Piemonte, Lombardia, Trentino-Alto Adige, Veneto, Friuli-Venezia Giulia, Liguria, Emilia-Romagna, Toscana, Umbria, Marche, Lazio, Abruzzo, Campania, Puglia, Basilicata, Calabria, Sicilia (Massa et al. 2012).

Remarks. First record for Molise.

Until few years ago, in Italy three subspecies were considered valid: in addition to nominate one, *S. caerulans corsicus* Chopard, 1923, from Sardegna, and *S. caerulans exornatus* Nedelkov, 1907, from southern mainland and Sicilia (Fontana et al. 2005). *Sphingonotus corsicus* is now considered a valid species, according to Defaut (2003), whilst *S. caerulans exornatus* is considered a synonym of

the nominate subspecies (see Massa et al. 2012; Cigliano et al. 2019).

Tetrigidae

Paratettix meridionalis (Rambur, 1838)

Material examined. **Campobasso**: Petacciato, lake (artificial), at the springs of Fosso Mérgola, about 50 m a.s.l., 42.00584° N 14.81235° E, 31.VII.2014, F. Cianferoni, L. Pizzocaro, F. Ceccolini & E. Paggetti leg., 2 adults (1 ♂, 1 ♀), CFCC; *idem*, 2 adults (1 ♂, 1 ♀), CFCF; *idem*, 4 adults (2 ♂♂, 2 ♀♀), CLP.

General distribution and biology. It is a common Western Palaearctic species, present also in Macaronesia, occurring in humid, vegetation-rich sandy, rocky or muddy places, usually not very far from the coast (Matos Andrade & Franquinho Aguiar 2018). It is recorded also from Mexico (Cigliano et al. 2019), evidently as allochthonous.

Regional distribution in Italy. Piemonte, Veneto, Liguria, Emilia-Romagna, Toscana, Marche, Lazio, Abruzzo, Campania, Puglia, Basilicata, Calabria, Sicilia, Sardegna (Massa et al. 2012), Molise (Fontana et al. 2002, 2004).

Remarks. In Molise *P. meridionalis* is reported from the lake of Castel S. Vincenzo (Fontana et al. 2002, 2004). Specimens from Petacciato are the first record for the province of Campobasso.

Tetrix ceperoi ceperoi (Bolivar, 1887)

Material examined. **Campobasso**: Petacciato, lake (artificial), at the springs of Fosso Mérgola, about 50 m a.s.l., 42.00584° N 14.81235° E, 31.VII.2014, F. Cianferoni, L. Pizzocaro, F. Ceccolini & E. Paggetti leg., 1 adult (♂), CFCC; *idem*, 1 adult (♂), CFCF.

General distribution and biology. The species is present in Western Palaearctic, especially in North Africa and Western Europe with the nominate subspecies and in South East Asia with another subspecies (Cigliano et al. 2019). It is typical of wet areas, especially near coasts, but sometimes present until 1000 m a.s.l. (Massa et al. 2012).

Regional distribution in Italy. Piemonte, Lombardia, Veneto, Friuli-Venezia Giulia, Liguria, Emilia-Romagna, Toscana, Umbria, Marche, Lazio, Abruzzo, Molise, Campania, Puglia, Basilicata, Calabria, Sicilia, Sardegna (Massa et al. 2012).

Remarks. So far the only record for Molise of *T. ceperoi ceperoi* was from Lago del Matese (Fontana et al. 2005; Massa et al. 2012). Specimens reported above are the first ones known for Campobasso province.

Provisional Checklist of the Orthoptera from Molise

Taxa reported for the first time for Molise through present work are marked with an asterisk. For each species the IUCN Red List Category at European level is indicated according to Hochkirch et al. (2016), in which the status of all the species was assessed using the IUCN Red List Categories and Criteria (IUCN 2012). Abbreviations of the categories are the following: EN = Endangered; NT = Near Threatened; LC = Least Concern; DD = Data Deficient; N/E = not evaluated. In Hochkirch et al. (2016) subspecies are not considered, thus all the taxa at subspecific level are reported as N/E in the checklist; in these cases the status of the species is indicate in parentheses.

Taxon	References	Red List status
Gryllidae		
Eumodicogryllus bordigalensis bordigalensis (Latreille, 1804)	Fontana et al. 2002, 2004, 2005; Massa et al. 2012; Iorio et al. 2019	N/E (LC)
Gryllus (*Gryllus*) *bimaculatus* De Geer, 1773 *	present work	LC
Gryllus (*Gryllus*) *campestris* Linnaeus, 1758	La Greca & Messina 1982; Fontana et al. 2004, 2005; Massa et al. 2012; Iorio et al. 2019; present work	LC
Trigonidiidae		
Pteronemobius (*Pteronemobius*) *heydenii heydenii* (Fischer, 1853)	Fontana et al. 2002; Fontana et al. 2004	N/E (LC)
Stenonemobius (*Stenonemobius*) *gracilis* (Jakovleff, 1871) *	present work	LC
Trigonidium (*Trigonidium*) *cicindeloides* Rambur, 1839 *	present work	LC
Gryllotalpidae		
Gryllotalpa gryllotalpa (Linnaeus, 1758)	Fontana et al. 2004	LC

continued

Taxon	References	Red List status
Mogoplistidae		
Arachnocephalus vestitus A. Costa, 1855 *	present work	LC
Mogoplistes brunneus Serville, 1839	Fontana et al. 2005; Massa et al. 2012; Iorio et al. 2019	LC
Rhaphidophoridae		
Dolichopoda (*Dolichopoda*) *geniculata geniculata* (O.G. Costa, 1836)	Fontana et al. 2005; Massa et al. 2012; Di Russo & Rampini 2014; Ceccolini 2015; Iorio et al. 2019; present work	N/E (LC)
Tettigoniidae		
Ephippiger cavannai Targioni Tozzetti, 1881	La Greca 1949; Baccetti 1959; Fontana et al. 2005; Massa et al. 2012; Iorio et al. 2019	LC
Conocephalus (*Anisoptera*) *fuscus fuscus* (Fabricius, 1793)	Fontana et al. 2004; present work	N/E (LC)
Meconema meridionale A. Costa, 1860	Fontana et al. 2004	LC
Meconema thalassinum (De Geer, 1773) *	present work	LC
Acrometopa macropoda (Burmeister, 1838)	Iorio et al. 2019	N/E [1]
Metaplastes pulchripennis (A. Costa, 1863) *	present work	LC
Poecilimon (*Poecilimon*) *jonicus superbus* (Fischer, 1853)	Baccetti 1952; Fontana et al. 2004, 2005; Massa et al. 2012; Iorio et al. 2019	N/E (LC)
Tylopsis lilifolia (Fabricius, 1793)	Fontana et al. 2004; present work	LC
Saga pedo (Pallas, 1771)	Fontana et al. 2002, 2005; Massa et al. 2012; Iorio et al. 2019; present work	LC
Decticus albifrons (Fabricius, 1775)	Fontana et al. 2005; Massa et al. 2012; Iorio et al. 2019; present work	LC
Decticus aprutianus Capra, 1936	Baccetti 1963; Fontana et al. 2005; Massa et al. 2012; Iorio et al. 2019	LC
Eupholidoptera chabrieri chabrieri (Charpentier, 1825)	Fontana et al. 2004	N/E (LC)
Pholidoptera fallax (Fischer, 1853)	Fontana et al. 2004	LC
Pholidoptera femorata (Fieber, 1853)	Fontana et al. 2005; Massa et al. 2012; Iorio et al. 2019	LC
Rhacocleis neglecta (A. Costa, 1863)	Fontana et al. 2005; Massa et al. 2012; Iorio et al. 2019	LC
Sepiana sepium (Yersin, 1854)	Fontana et al. 2004	LC
Tessellana tessellata tessellata (Charpentier, 1825)	La Greca 1949; Baccetti 1963; Fontana et al. 2004, 2005; Massa et al. 2012; Iorio et al. 2019	N/E (LC)
Tettigonia cantans (Fuessly, 1775)	Fontana et al. 2005; Massa et al. 2012; Iorio et al. 2019	LC
Tettigonia viridissima (Linnaeus, 1758)	Fontana et al. 2005; Massa et al. 2012; Iorio et al. 2019; present work	LC
Acrididae		
Acrida ungarica (Herbst, 1786) *	present work	LC
Calliptamus italicus italicus (Linnaeus, 1758)	Fontana et al. 2004, 2005; Massa et al. 2012; Iorio et al. 2019	N/E (LC)
Calliptamus siciliae Ramme, 1927 *	present work	LC
Anacridium aegyptium (Linnaeus, 1764) *	present work	LC
Pezotettix giornae (Rossi, 1794)	Fontana et al. 2004, 2005; Massa et al. 2012; Iorio et al. 2019	LC

continued

Taxon	References	Red List status
Gomphocerus sibiricus sibiricus (Linnaeus, 1767)	Fontana et al. 2005; Massa et al. 2012; Iorio et al. 2019	N/E (LC)
Chorthippus (*Chorthippus*) *karelini bruttius* Fontana & La Greca, 1999	Baccetti 1955; Fontana et al. 2005; Massa et al. 2012; Iorio et al. 2019	N/E (LC)
Chorthippus (*Chorthippus*) *dichrous* (Eversmann, 1859)	Harz 1975; Fontana et al. 2005; Massa et al. 2012; Iorio et al. 2019	LC
Chorthippus (*Chorthippus*) *dorsatus dorsatus* (Zetterstedt, 1821)	Fontana et al. 2004	N/E (LC)
Chorthippus (*Chorthippus*) *dorsatus garganicus* Jannone, 1937	Fontana et al. 2005; Massa et al. 2012; Iorio et al. 2019	N/E (LC)
Chorthippus (*Glyptobothrus*) *brunneus brunneus* (Thunberg, 1815)	Fontana et al. 2005; Massa et al. 2012;Iorio et al. 2019	N/E (LC)
Chorthippus (*Glyptobothrus*) *rubratibialis* Schmidt, 1978	Fontana et al. 2004, 2005; Massa et al. 2012; Iorio et al. 2019	LC
Pseudochorthippus parallelus parallelus (Zetterstedt, 1821)	Fontana et al. 2004, 2005; Massa et al. 2012; Iorio et al. 2019	N/E (LC)
Dociostaurus (*Kazakia*) *genei genei* (Ocskay, 1832) *	present work	N/E (LC)
Euchorthippus declivus (Brisout de Barneville, 1848)	Fontana et al. 2004, 2005; Massa et al. 2012; Iorio et al. 2019; present work	LC
Gomphocerippus rufus (Linnaeus, 1758)	Galvagni 1959; Fontana et al. 2005; Massa et al. 2012; Iorio et al. 2019	LC
Italohippus albicornis (La Greca, 1948)	Baccetti 1959; Fontana et al. 2005; Massa et al. 2012; Iorio et al. 2019	EN
Omocestus (*Omocestus*) *rufipes* (Zetterstedt, 1821)	Fontana et al. 2005; Massa et al. 2012; Iorio et al. 2019; present work	LC
Omocestus (*Omocestus*) *haemorrhoidalis haemorrhoidalis* (Charpentier, 1825)	Baccetti 1958; Fontana et al. 2004, 2005; Massa et al. 2012; Iorio et al. 2019	N/E (LC)
Omocestus (*Omocestus*) *petraeus* (Brisout, 1855)	Baccetti 1958; Fontana et al. 2005; Massa et al. 2012; Iorio et al. 2019	LC
Stenobothrus apenninus Ebner, 1915	Galvagni 1959; Fontana et al. 2005; Massa et al. 2012; Iorio et al. 2019	LC
Stenobothrus lineatus lineatus (Panzer, 1796)	Fontana et al. 2005; Massa et al. 2012; Iorio et al. 2019	N/E (LC)
Italopodisma samnitica (La Greca, 1954)	Baccetti 1959; Galvagni 1973; La Greca & Messina 1982; Fontana et al. 2005; Massa et al. 2012; Iorio et al. 2019	EN
Italopodisma trapezoidalis trapezoidalis (La Greca, 1969)	Fontana et al. 2004, 2005; Massa et al. 2012; Iorio et al. 2019	N/E (LC)
Acrotylus patruelis (Herrich-Schäffer, 1838) *	present work	LC
Aiolopus strepens strepens (Latreille, 1804)	Fontana et al. 2004, 2005; Massa et al. 2012; Iorio et al. 2019	N/E (LC)
Locusta migratoria migratoria (Linnaeus, 1758)	Fontana et al. 2005; Massa et al. 2012; Iorio et al. 2019	N/E (LC)
Oedipoda caerulescens caerulescens (Linnaeus, 1758)	Fontana et al. 2005; Massa et al. 2012; Iorio et al. 2019	N/E (LC)
Oedipoda germanica germanica (Latreille, 1804)	Galvagni 1959; Fontana et al. 2005; Massa et al. 2012; Iorio et al. 2019; present work	N/E (LC)
Paracinema tricolor bisignatum (Charpentier, 1825)	Fontana et al. 2004, 2005; Massa et al. 2012; Iorio et al. 2019	N/E (LC)
Sphingonotus (*Sphingonotus*) *caerulans caerulans* (Linnaeus, 1767) *	present work	N/E (LC)

continued

Taxon	References	Red List status
Tetrigidae		
Paratettix meridionalis (Rambur, 1838)	Fontana et al. 2002, 2004; present work	LC
Tetrix depressa (Brisout de Barneville, 1848)	Galvagni 1959; Fontana et al. 2002, 2004, 2005; Massa et al. 2012; Iorio et al. 2019	LC
Tetrix ceperoi ceperoi (Bolivar, 1887)	Fontana et al. 2005; Massa et al. 2012; Iorio et al. 2019; present work	N/E (LC)
Tetrix subulata (Linnaeus, 1758)	Galvagni 1959; Fontana et al. 2005; Massa et al. 2012; Iorio et al. 2019	LC
Tetrix kraussi Saulcy, 1888	Fontana et al. 2002, 2005; Massa et al. 2012; Iorio et al. 2019	N/E [2]

[1] *Acrometopa macropoda* is not listed by Hochkirch et al. (2016), evidently because it is considered a subspecies of *A. servillea* (Brullé, 1832) as well as recently by some other authors (e.g. Skejo et al. 2018). Therefore it is not possible to deduce information about the status of *A. macropoda*.
[2] *Tetrix kraussi* is not listed by Hochkirch et al. (2016), evidently because it is considered a subspecies of *Tetrix bipunctata kraussi* Saulcy, 1888 as well as recently by some other authors (e.g. Massa et al. 2012 and Lemos et al. 2016). Therefore it is not possible to obtain information of the status of *T. kraussi*.

Discussion

New records of 24 species (besides a record for *Gryllotalpa* sp.) from Molise are provided, adding 12 species new for the region and other four new for the province of Campobasso.

After the present work the total number of Orthoptera known for the region has risen to 64 (one of which recorded with two different subspecies); comparing to the 351 species reported for Italy (see Massa et al. 2012; Baroni et al. 2018), 18.2% of the species occurring in the country is known for Molise. The percentage of endemism is relatively high, since, according to Massa et al. (2012), among these 65 taxa, eight species (*Dolichopoda geniculata*, *Ephippiger cavannai*, *Decticus aprutianus*, *Chorthippus rubratibialis*, *Italohippus albicornis*, *Stenobothrus apenninus*, *Italopodisma samnitica*, *Italopodisma trapezoidalis*) and three subspecies (*Poecilimon jonicus superbus*, *Chorthippus karelini bruttius*, *Chorthippus dorsatus garganicus*) are endemic to Italy.

In Iorio et al. (2019) the maps of *Stauroderus scalaris scalaris* (Fischer von Waldheim, 1846) and *Italohippus monticola* (Ebner, 1915) include distribution ranges that slightly overflow in Molise; however they are schematized distribution ranges, whose elliptical form includes a very small part of the Molise region merely due to the shape of the figure. Actually no published records exist for these species in Molise, thus we do not include them in the checklist of the region, although their occurrence seem probable.

Although through this paper an increase of 20.7% of the known species in the region occurred, Molise should be more investigated to reach an appropriate faunistic knowledge. Indeed the number of taxa known for the region is very low if compared to Italy; even if some Italian species show a distribution incompatible with their presence in Molise (since they are limited to the Alps or the major islands), the taxa recorded for Molise appear still too few if compared to the 115 known for the adjacent region Abruzzo (see Fontana et al. 2004, 2005 and Massa et al. 2012). Improving the faunistic knowledge of this group in Molise would be very interesting since this territory has a key position within a country so endemism-rich like Italy. In particular, the Apennines host 40 taxa of endemic Orthoptera and represent a very important area for biodiversity conservation (Massa et al. 2012). An emblematic case is that of the genus *Italopodisma* Harz, 1973, which includes species living exclusively on the central Apennines; each massif of the mountain range usually hosts only one taxon and only four taxa are present in more than one mountainous relief (Massa et al. 2012). Currently, two taxa of this genus (*Italopodisma samnitica* and *I. trapezoidalis trapezoidalis*) are known to occur in Molise, but further research could detect new taxa. *Italopodisma samnitica* and *I. trapezoidalis* are also considered as Endangered (EN) according to the European Red List of orthopterans, as well as *Italohippus albicornis*; in the same list *Paracinema tricolor* is classified as Near Threatened (NT) (Hochkirch et al. 2016).

To date, in Molise 25 taxa have been treated at subspecific level. Unfortunately, adequate information about their populations is not currently available and the IUCN category referred to the species level as reported in Hochkirch et al. (2016) does not allow to assess which status deserves to be assigned to the subspecies. For a correct conservation of the orthopteran biodiversity at this regional (but also national) level, an assessment of also the subspecific taxa, maybe through a dedicated Italian Red List, should be made soon.

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