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Myrmilla calva, samica s Korena nad Horjulom
Myrmilla calva *female from Koreno above Horjul*

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Ose mravljarice Slovenije (Hymenoptera: Mutillidae)

Velvet Ants of Slovenia (Hymenoptera: Mutillidae)

Andrej GOGALA[1]

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Izvleček

Ose mravljarice (Mutillidae) so kozmopolitska družina želatih os, za katere je značilen skrajni spolni dimorfizem. Ličinke so zunanji parazitoidi ličink ali bub drugih žuželk v njihovih gnezdih ali skrivališčih. Seznam os mravljaric Slovenije temelji na podatkih iz literature, rokopisnem seznamu vrst iz zbirke Evgena Jaegra, ki ga je napisal pokojni Guido Nonveiller, in primerkih iz zbirke Prirodoslovnega muzeja Slovenije v Ljubljani (PMSL). Za Slovenijo je zabeleženih 16 vrst os mravljaric. Prvič so objavljeni podatki za naslednje štiri vrste: *Physetopoda cingulata, Physetopoda daghestanica, Smicromyrme sicanus* in *Cystomutilla ruficeps*. Posebej je navedenih še 6 vrst, ki so v zbirki PMSL zastopane le s primerki iz drugih držav, predvsem z Balkana.

Ključne besede: Hymenoptera, Mutillidae, favna, Slovenija

Abstract

Velvet ants (Mutillidae) are a cosmopolitan family of aculeate wasps, characterized by extreme sexual dimorphism. Larvae are external parasitoids of larvae or pupae of other insects in their nests or hiding places. The list of velvet ants of Slovenia is based on data from the literature, the late Guido Nonveiller's handwritten list of species in the collection of Evgen Jaeger and specimens from the collection of the Slovenian Museum of Natural History in Ljubljana (PMSL). Sixteen species of velvet ants have been recorded for Slovenia. Data for the following four species are published for the first time: *Physetopoda cingulata, Physetopoda daghestanica, Smicromyrme sicanus* and *Cystomutilla ruficeps*. Additional 6 species represented in the PMSL collection only by specimens from other countries (mostly from the Balkans) are listed separately.

Key words: Hymenoptera, Mutillidae, fauna, Slovenia

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Uvod

Ose mravljarice (Mutillidae) so kozmopolitska družina želatih os z največjo raznovrstnostjo v tropskih predelih. Družino sestavlja približno 4200 opisanih vrst iz sedmih poddružin (Lelej & Brothers 2008). Za večino vrst je značilen skrajni spolni dimorfizem. Samice so brez kril, gosto odlakane, z zelo debelim in trdim zunanjim skeletom. Obarvane so rdečerjavo in črno, pogosto imajo lise in proge iz svetlih dlačic. To je svarilna obarvanost, saj se lahko branijo z učinkovitim želom. Skleriti njihovega oprsja so na zgornji strani večinoma zrasli, navadno brez vidnih šivov, z izjemo poddružin Myrmosinae (s šivom le med pro- in mezonotumom) in Pseudophotopsidinae (z nekoliko manj izrazitimi šivi med pro-, meso- in metanotumom). Samci so večinoma krilati in njihovo oprsje je predeljeno na sklerite, kot pri drugih osah. Pri mnogih vrstah samci prenašajo nekrilate samice pred parjenjem ali se celo parijo v zraku. Pri nekaterih vrstah in več manjših rodovih (predvsem zunaj evropske favne) pa so tudi samci brez kril. Ličinke os mravljaric so zunanji parazitoidi ličink ali bub drugih žuželk v njihovih gnezdih ali skrivališčih. Gostitelji so predvsem druge želate ose in čebele (Aculeata), a tudi muhe (Diptera), metulji (Lepidoptera), hrošči (Coleoptera) in ščurki (Blattodea). Zabubijo se v celici, zapredku ali ooteki gostitelja. Zaradi spolnega dimorfizma mnoge vrste poznamo le po enem spolu in le v primeru najdbe parov med parjenjem ali vzgoje obeh spolov iz istega gostitelja je mogoče zanesljivo ugotoviti pripadnost obeh spolov isti vrsti. Večina vrst je dejavna podnevi, le pripadnice poddružine Pseudophotopsidinae in puščavske vrste so nočne ali somračne (povzeto v glavnem po Brothers & Finnamore 1993).

Introduction

Velvet ants (Mutillidae) are a cosmopolitan family of aculeate wasps with the greatest diversity in the tropics. The family contains about 4,200 described species in seven subfamilies (Lelej & Brothers 2008). Most species are characterized by extreme sexual dimorphism. Females are wingless, usually densely pubescent, with very thick and hard external skeleton. Their colours are reddish-brown and black, often with spots and stripes of bright hairs. This is a warning colouration, as they can defend themselves with effective sting. Their thorax sclerites are often fused, usually without visible suture on dorsal side, except in the subfamilies Myrmosinae (only between pro- and mesonotum), and Pseudophotopsidinae (between pro-, meso- and metanotum, but somewhat less distinguishable). Males are generally winged and their thorax is subdivided into sclerites likewise in other wasps. In many species the males carry wingless females prior to mating or they even mate in the air. In some species and several smaller genera (mostly outside European fauna), males are also wingless.

Larvae of velvet ants are external parasitoids of larvae or pupae of other insects in their nests or hiding places. The hosts are mainly other aculeate wasps and bees (Aculeata), but also flies (Diptera), butterflies (Lepidoptera), beetles (Coleoptera) and cockroaches (Blattodea). Pupation occurs in the cell, cocoon or ootheca of the host. Due to sexual dimorphism many species are known only by one sex, and only finds of couples during mating or breeding of both sexes from the same host can reliably determine the affiliation of both sexes to the same species. Most species are active during the day, only members of the subfamily Pseudophotopsidinae and desert species are nocturnal or crepuscular (summarised mostly after Brothers & Finnamore 1993).

Material in metode

Seznam os mravljaric (Mutillidae) Slovenije temelji na podatkih iz literature, Nonveillerjevem rokopisnem seznamu vrst, ki si jih je izposodil iz zbirke Evgena Jaegra, in primerkih iz zbirke Prirodoslovnega muzeja Slovenije v Ljubljani, ki jih je v glavnem zbral avtor. V tej zbirki je tudi nekaj primerkov iz nekaterih sosednjih in drugih držav Balkana, ki so navedeni posebej. Vrste, ki živijo v Sloveniji, je večinoma mogoče določevati s ključi za srednjo Evropo (Lelej in Schmid-Egger 2005, Bogusch 2006, Muskovits in György 2011). Ključe za italijanske in nekatere dodatne vrste je objavil Invrea (1964), a so že zastareli zaradi mnogih taksonomskih sprememb (npr. Lelej 1985, Petersen 1988); za posamezne rodove so uporabni tudi ključi, ki jih navajata Lelej (1995) in Pagliano (2009). Klasifikacija in nomenklatura sledita delu Lelej in Yildirim (2009).

O favni os mravljaric v Sloveniji ni veliko podatkov. Scopoli (1763) je eno opisano vrsto uvrstil v rod *Mutilla*, vendar je njena identiteta vprašljiva. Nonveiller (1976) navaja devet vrst in oblik, živečih v Sloveniji. Po danes veljavni nomenklaturi jih uvrščamo v osem vrst, saj je *Myrmilla distincta* (Lepeletier, 1845), navedena kot *Myrmilla calva* f. *distincta,* sinonim vrste *M. calva* (Villers, 1789). Veljavni status taksona *Smicromyrme rufipes* f. *scutellaris* (Latreille, 1792) je vrsta *Physetopoda scutellaris*, ki jo je za Kranjsko navedel Bischoff (1909). Podatki za preostale vrste, ki jih navaja Nonveiller za Slovenijo, z izjemo vrste *Nemka viduata*, temeljijo na primerkih iz zbirke Evgena Jaegra. Shranjeni so bili v Ljubljani (Prirodoslovni muzej Slovenije – PMSL), vendar si jih je Nonveiller izposodil in so še vedno v njegovi zbirki. Ta je sedaj shranjena v Linzu, vendar ni dostopna, dokler se vse izposojeno gradivo ne vrne lastnikom (Ćetković, osebna korespondenca). Natančnih podatkov o najdiščih in datumih najdb zato ni bilo mogoče pridobiti. Obstaja le Nonveillerjev zapis seznama vrst iz Jaegrove zbirke, v kateri navaja najdišča in skupno število primerkov obeh spolov.

Materials and methods

The list of velvet ants (Mutillidae) of Slovenia is based on data from the literature, on Nonveiller's handwritten evidence of specimens borrowed from the Evgen Jaeger's collection (Nonveiller, pers. corr. and Ćetković, pers. corr.), and on specimens from the collection of the Slovenian Museum of Natural History in Ljubljana, mostly collected by the author. In this collection there are also specimens from some neighbouring and other countries in the Balkans, which are listed separately. Species living in Slovenia can mainly be identified with the keys for Central Europe (Lelej & Schmid-Egger 2005, Bogusch 2006, Muskovits & György 2011). Keys for Italian and some additional species were published by Invrea (1964), but treatment of many taxa has become obsolete due to numerous taxonomic changes (e.g. Lelej 1985, Petersen 1988); for individual genera also keys by Lelej (1995) and Pagliano (2009) are useful. Classification and nomenclature follow Lelej & Yildirim (2009).

The records on the fauna of velvet ants in Slovenia are sparse. Scopoli (1763) placed one of the described species in the genus *Mutilla*, but its identity is questionable. Nonveiller (1976) listed nine species and infraspecific forms present in Slovenia. According to current nomenclature they are classified into eight species, since *Myrmilla distincta* (Lepeletier, 1845), listed as *Myrmilla calva* f. *distincta,* is a synonym of *M. calva* (Villers, 1789). The valid status of *Smicromyrme rufipes* f. *scutellaris* (Latreille, 1792) is the species *Physetopoda scutellaris*, recorded for Carniola by Bischoff (1909). Data of other species mentioned by Nonveiller for Slovenia, with the exception of *Nemka viduata*, are based on specimens from the collection of Evgen Jaeger, the property of the Slovenian Museum of Natural History in Ljubljana (PMSL), but the late Prof. G. Nonveiller borrowed them and are still in his collection, temporarily kept in Biologiezentrum in Linz and inaccessible until all borrowed material is sorted to be returned to the owners (Ćetković, personal correspondence). Exact data on the sites and dates of the finds,

Lelej (2002) in drugi avtorji pojavljanje vrst v Sloveniji povzemajo po Nonveillerju (1976). Podatke o posameznih mravljaricah v Sloveniji so objavili Graeffe (1911), Vogrin (1955) in Gogala (1991). Najnovejši dostopni vir je Nonveiller in Ćetković (2013), ki pojavljanje mravljaric navaja le po državah. V tem delu dodajam nekaj podatkov o gradivu, zbranem v novejšem času.

Biologija

Biologija je poznana le pri redkih vrstah os mravljaric. Gostitelji so znani le za približno 2 – 3 % opisanih vrst mravljaric. Večina zajeda pri samotarskih gostiteljih, predvsem pri osah in čebelah (Brothers et al. 2000).

Brothers (1972, 1978) je opisal vedenje in razvoj dveh ameriških vrst, ki zajedata družbene vitke čebele (Halictidae). Njuna biologija si je podobna, čeprav pripadata različnim poddružinam (Myrmosinae in Sphaeropthalminae). Čebele se pred mravljaricami branijo z zaporo vhoda v rov s svojim telesom ali z napadom na mravljarico. Ko jim uspe priti v gnezdo, se mravljarice hranijo z ličinkami gostitelja. Jajčece odložijo le na povsem doraslo ličinko ali bubo. Večinoma je pred tem ne ohromijo, le bube so bile verjetno ohromljene z želom. Po odlaganju jajčeca celico ponovno zaprejo. Ko se njihova ličinka ne hrani več, se zaprede v kokon. Svilo izloča na spodnji ustni (labiumu). Parjenje se začne takoj, ko mlada samica zapusti rov.

Tudi evropske mravljarice iz rodu *Myrmilla* zajedajo gnezda vitkih čebel (Halictidae). Oprašene samice prezimijo v podzemnem skrivališču in se spomladi odpravijo na iskanje gostitelja (Knerer 1973). V tem času prezimljene samice vitkih čebel že končajo s prinašanjem hrane v gnezdo, v katerem se razvija zarod njihovih ličink. Vhod v gnezdo

therefore, could not be obtained. There is only Nonveiller's handwritten list of the species from Jaeger's collection with localities and the total number of specimens of both sexes.

Lelej (2002) and other authors follow Nonveiller (1976) when indicating the presence of species in Slovenia. Specimen-level data on velvet ants in Slovenia were published by Graeffe (1911), Vogrin (1955) and Gogala (1991). The most recent available source is Nonveiller & Ćetković (2013), dealing only with country-level records. In this article, I am adding some data on the material collected in recent times.

Biology

Biology of only a few velvet ant species is known. Hosts are known of only about 2-3% of the described velvet ant species. Most are parasites of solitary hosts, predominantly wasps and bees (Brothers et al. 2000).

Brothers (1972, 1978) described the behaviour and development of two American species parasitizing social sweat bees (Halictidae). Biology of both species is similar, even though they belong to different subfamilies (Myrmosinae and Sphaeropthalminae). Bees are defending their nests by blocking the entrance of the burrow with their body or by attacking the velvet ant. When they get into the nest, velvet ants feed on some of the host's larvae. Eggs are laid only on fully grown larvae or pupae. Mostly they are not paralyzed, only pupae were probably paralyzed with the sting. After laying an egg, the velvet ant closes the cell again. When larvae finish feeding, they spin a cocoon. Silk is secreted from the labium. Mating occurs as soon as the young female leaves the tunnel.

European velvet ants of the genus *Myrmilla* also parasitise nests of sweat bees (Halictidae). Fertilized females overwinter underground and search for a host in the spring (Knerer 1973). At this time the overwintered sweat bee females stop bringing food to the nest where their progeny develops. The entrance to the nest is closed with excavated soil, so the velvet ant must find

zaprejo z izkopano zemljo, zato ga mora mravljarica najti predvsem po vonju in odkopati. Sledi spopad z lastnico gnezda, ki ga skuša ubraniti pred vsiljivko. Vendar je mravljarica močnejša in zaščitena s trdo hitinjačo. Če čebela z glavo in oprsjem zapre vhod, mravljarica skoplje nov rov s strani. V boju ne uporablja žela, ki ga uporablja predvsem za obrambo. Čebelo, ki jo v boju umori, navadno vrže iz gnezda, ki ga sedaj straži pri vhodu, da vanj ne zaidejo drugi zajedavci. Po nekaj dneh vhod zapre s koščki zemlje. Njeni jajčniki morajo še dozoreti in beljakovine za njihov razvoj si verjetno zagotovi z ostanki gostiteljskih čebel in njihovimi ličinkami. Naslednjih tri do pet tednov ostaja blizu zarodnih celic, kjer gostiteljske ličinke dokončujejo rast. Svoja jajčeca odloži na dorasle ličinke ali bube. Izležejo se ličinke, ki se začno hraniti z gostiteljsko ličinko. Po končanem razvoju spredejo zapredke in tedaj samica mravljarice gnezdo zapusti. Junija se izleže prva generacija os mravljaric. Samci in samice se sparijo in samice poiščejo gostiteljsko gnezdo, ki ima v tem obdobju že veliko delavk. Čebele se branijo tako, da z zemljo zatrpajo rove in mravljarica mora kopati, da pride do zarodnih celic. Velikost osebkov nove generacije mravljaric je odvisna od velikosti gostiteljskih ličink. Ličinke samcev in delavk so manjše od ličink matic.

Tudi mravljarice vrste *Mutilla europaea*, ki zajedajo v gnezdih čmrljev, imajo verjetno dve generaciji v letu. Samica odpre celico, v kateri je dorasla ličinka ali buba čmrlja. S pikom z želom jo omrtviči in nanjo odloži jajčece. V zajedanem gnezdu čmrljev je lahko večina ličink parazitiranih. Drewsen (1847) je poročal, da se je iz gnezda čmrljev, prinesenega domov, izleglo 76 mravljaric, od tega 24 samcev, in le dve delavki čmrljev (Invrea 1964). Potem ko mravljaricam uspe priti v gnezdo, se med njimi in čmrlji skoraj nikoli ne vnamejo spopadi (Brothers 1972, Brothers et al. 2000).

Ose mravljarice se večinoma oglašajo z drgnjenjem zadnjega roba 2. zadkovega tergita ob rebrasto strukturo na sredini 3. tergita (Tschuch in Brothers 2000). Stridulatorni

it mainly by smell and dig it out. A confrontation with the owner of the nest follows, as the bee is trying to defend herself against the intruder. However, velvet ant is stronger and protected with hard integument. If a bee closes the entrance with the head and thorax, she digs a new tunnel from the side. She does not use the sting in fight, as it serves mainly for defense. Dead bee is usually thrown out of the nest, which she guards now at the entrance, so that other parasites do not get in. After a few days the entrance is closed with pieces of soil. Her ovaries have yet to mature and she provides proteins for their development probably by the remains of host bees and their larvae. The next three to five weeks she stays close to the brood cells, where the host larvae are finishing their growth. She lays her eggs on fully grown larvae or pupae. Larvae hatch and begin to eat the host larva. Upon completion of the development they spin cocoons and then the female velvet ant leaves the nest. In June, the first generation of velvet ants hatch. Males and females mate and females search for a host nest, which has many workers in this period. Bees defend themselves by filling the tunnels with soil and velvet ant must dig to get to the brood cells. The size of velvet ants of the new generation depends on the size of host larvae. Larvae of males and workers are smaller than the larvae of queens.

Velvet ants of the species *Mutilla europaea*, which parasitize the nests of bumblebees, probably have two generations in a year as well. A female opens a cell which contains a fully grown bumblebee larva or pupa, paralyzes it with a sting and lays an egg. In a parasitized nest of bumblebees most larvae may be parasitized. Drewsen (1847) had reported that from the nest of bumblebees being transported home, 76 velvet ants hatched, of which 24 were males, and only two bumblebee workers (Invrea 1964). After velvet ants manage to get into the nest, fighting between them and bumblebees almost never happens (Brothers 1972, Brothers et al. 2000).

Most velvet ants stridulate by rubbing the rear edge of the second abdominal tergum against the rippled structure in the middle of the third tergum (Tschuch & Brothers 2000).

organ imata večinoma oba spola. Samci neke nočne vrste stridulirajo med letom, verjetno kot pozivni napev. Samice se lahko oglašajo med zavračanjem parjenja. Oglašanje je najverjetneje svarilo plenilcem pred nevarnostjo obrambe z želom. Vibracije ob oglašanju lahko pomagajo tudi pri odkopavanju zemlje. Invrea (1964) je opazoval samico vrste *Mutilla quinquemaculata*, ki je ob odpiranju celice v gnezdu iz ilovice na skali glasno stridulirala. Poleg tega, da se oglašajo, mravljarice v nevarnosti izločajo tudi kemične snovi iz mandibularnih žlez (Tschuch in Brothers 2001).

Gogala (1991) je opazoval mravljarico vrste *Myrmilla mutica*, katere gostitelji niso bili znani, pri preučevanju gnezdenja družbenih vitkih čebel vrste *Halictus scabiosae*. Čeprav ni bilo neposrednega dokaza za parazitski odnos, je ta zelo verjeten, saj tudi druge vrste rodu *Myrmilla* zajedajo pri vitkih čebelah in *Halictus scabiosae* je po velikosti edina izmed pojavljajočih se v okolici ustrezala velikosti mravljarice.

Both sexes generally have stridulatory organs. Males of a certain nocturnal species stridulate during flight, probably as a calling signal. Females may stridulate to reject mating. Sound production is likely a warning to the predators of a danger of defense with the sting. Vibrations produced by stridulation may also help during soil excavation. Invrea (1964) observed a female of the species *Mutilla quinquemaculata*, which stridulated loud when opening a cell in the clay nest on a rock. Besides sound production, velvet ants in danger secrete chemical substances from the mandibular glands (Tschuch & Brothers 2001).

Gogala (1991) observed *Myrmilla mutica*, for which no hosts were known, while studying the nesting of social sweat bee *Halictus scabiosae*. Although no direct evidence of parasitic relationship was established, this is highly probable case, since several *Myrmilla* species are documented parasitoids of sweat bees, and *H. scabiosae* was the only species of appropriate size nesting in the area.

Slika 1: *Myrmosa atra,* samica iz Lukovice

Fig. 1: *Myrmosa atra* female from Lukovica

Slika 2: *Oxybelus uniglumis* s plenom; gostitelj vrst *Myrmosa atra* in *Smicromyrme rufipes*

Fig. 2: *Oxybelus uniglumis* with its prey; a host of *Myrmosa atra* and *Smicromyrme rufipes*

Slika 3: *Myrmilla calva,* samica s Korena nad Horjulom

Fig. 3: *Myrmilla calva* female from Koreno above Horjul

Slika 4: Delavka vrste *Halictus scabiosae* pri vhodu v gnezdo; verjetni gostitelj vrste *Myrmilla mutica*

Fig. 4: *Halictus scabiosae* worker at the nest entrance; a probable host of *Myrmilla mutica*

Slika 5: *Myrmilla mutica,* samica iz Brij

Fig. 5: *Myrmilla mutica* female from Brje

Kaj je *Mutilla saltatrix* Scopoli, 1763

Ioannes Antonius Scopoli je leta 1763 v knjigi *Entomologia Carniolica* opisal novo vrsto iz rodu *Mutilla*, ki ga je leta 1758 uvedel Carl Linnaeus. Kasneje se ime *M. saltatrix* ni uporabljalo za nobeno od os mravljaric. Lelej (2002) ime navaja kot *incertae sedis*, z nejasnim položajem. Za tipsko lokaliteto zmotno navaja Karnijo, Italija. V resnici je Scopolijevo delo favna avstrijske dežele Kranjske, katere ozemlje je danes pretežno v Sloveniji. Najdišča Scopoli sicer ne navaja. Njegov opis je sledeč:

838. Mutilla *Saltatrix*.
— long.— —
Huc refero animal 21. Martii cum floribus *Farfarae* lectum, pediculo triplo minus, fuscum glabrum ; maxillis pedibusque ferrugineis ; antennis motatoriis , infractis , thorace longioribus: articulo oblongo, acuto , fusco clavatis ; stipite albido ; abdomine ovato, subtus jugo seu plica compressa instructo. Haec currit velociter, leviter tacta saltat, antennas assiduo agitat.

[Tu poročam o živali, najdeni 21. marca na lapuhovem cvetju, trikrat manjši od uši, rjavi in gladki. Čeljusti in noge rjaste; tipalke trepetajoče, prelomljene, daljše od oprsja: to je ovalno, priostreno, s temno zadebelitvijo; pecelj je belkast; zadek jajčast, se spodvije. Hitro teče, ob rahlem dotiku skoči, neprestano miga s tipalkami.]

Več opisanih značilnosti se ne ujema z značilnostmi os mravljaric. Te niso gladke, temveč kosmate in grobo punktirane. Nimajo tako dolgih tipalk in ne skačejo. Opis se veliko bolje ujema z značilnostmi mravljelikih pajkov skakačev (Araneae: Salticidae), ki en par nog uporabljajo kot tipalke. V Sloveniji živijo štiri mravljelike vrste pajkov, po dve iz rodov *Myrmarachne* in *Synageles* (Kostanjšek

What is *Mutilla saltatrix* Scopoli, 1763

In his book *Entomologia Carniolica* (1763), Ioannes Antonius Scopoli described a new species of the genus *Mutilla*, which was introduced in 1758 by Carl Linnaeus. However, the name *M. saltatrix* was later not used for any of the velvet ants. Lelej (2002) lists it among the names *incertae sedis*, with an undetermined position. For the type locality he erroneously states Carnia, Italy. In fact, Scopoli's work is the fauna of the Austrian province of Carniola, the territory of which is today located largely within Slovenia. Scopoli, however, did not state the finding site. His description reads as follows:

838. Mutilla *Saltatrix*.
— long.— —
Huc refero animal 21. Martii cum floribus *Farfarae* lectum, pediculo triplo minus, fuscum glabrum ; maxillis pedibusque ferrugineis ; antennis motatoriis , infractis , thorace longioribus: articulo oblongo, acuto , fusco clavatis ; stipite albido ; abdomine ovato, subtus jugo seu plica compressa instructo. Haec currit velociter, leviter tacta saltat, antennas assiduo agitat.

[Here I report on an animal found on 21 March in Coltsfoot flowers, three times smaller than a louse, brown and smooth. Jaws and legs are rusty; antennae trembling, broken, longer than chest: this is oval, acute, with dark thickening; stalk is whitish; Abdomen ovoid, it bends. Runs fast, jumps at slight touch, constantly shakes its antennae.]

Several of the described characteristics are not consistent with the characteristics of the velvet ants. They are not smooth, but hairy and roughly punctured. They do not have such long antennae and do not jump. The description is better suited to the features of ant-like jumping spiders (Araneae: Salticidae), which use a pair of legs as feelers. In Slovenia, four ant-like spider species exist, two of the genera *Myrmarachne*

in Kuntner 2015). Ker tipski primerek ni ohranjen, ni mogoče ugotoviti, kateri vrsti pripada Scopolijev opis. Najpogostejša izmed njih je verjetno *Myrmarachne formicaria* (De Geer, 1778), vendar naj bi bil Scopoli to vrsto po sedanjem razumevanju opisal že pod imenom *Aranea joblotii* (Kostanjšek in Kuntner 2015). Glede na navedeno majhno velikost bi šlo lahko za juvenilni primerek.

and *Synageles* (Kostanjšek & Kuntner 2015). As the type specimen has not been preserved, it is not possible to determine which species corresponds to Scopoli's description. The commonest of these is probably *Myrmarachne formicaria* (De Geer, 1778), but according to present interpretation Scopoli described this species already under the name *Aranea joblotii* (Kostanjšek & Kuntner 2015). According to the small given size, it might be a juvenile specimen.

Seznam os mravljaric (Mutillidae) Slovenije / Check list of velvet ants (Mutillidae) of Slovenia

Myrmosinae Fox, 1894

Myrmosa Latreille, 1796

Myrmosa atra Panzer, 1801

M. melanocephala (Fabricius, 1793)

Nonveiller 1976, Nonveiller & Ćetković 2013: Slovenija
Podčetrtek, Maribor, 8♀ 6♂, coll. E. Jaeger (Nonveiller *in litteris,* 1984)
Log, Lukovica, VL59, 1. 7. 1984, 1♀, A. Gogala leg., PMSL
Stomaž, Sela, Dolina Raše, VL16, 13. 9. 2009, 1♀, A. Gogala leg., PMSL

Gostitelji: *Oxybelus uniglumis, Crabro peltarius, Crossocerus palmipes, C. wesmaeli, Diodontus tristis, Lindenius panzeri, L. albilabris* (Crabronidae) (Invrea 1964, Bogusch 2006). Primerek iz Lukovice je bil najden na gnezdišču vrste *Oxybelus uniglumis.*

Zahodnopalearktična vrsta. Najdena v subpanonskem, predalpskem in submediteranskem območju Slovenije. Sorodno, a redko vrsto *M. moesica* Suarez, 1981, opisano iz vzhodne Srbije, je mogoče razločiti od *M. atra* le po genitalijah samca. Možno je, da je razširjena širše, kot nam je znano doslej (Srbija, Črna gora) (Ćetković, osebna korespondenca).

Hosts: *Oxybelus uniglumis, Crabro peltarius, Crossocerus palmipes, C. wesmaeli, Diodontus tristis, Lindenius panzeri, L. albilabris* (Crabronidae) (Invrea 1964, Bogusch 2006). Specimen from Lukovica was found at the nests of *Oxybelus uniglumis.*

West Palaearctic species. Collected in the sub-Pannonian, pre-Alpine and sub-Mediterranean regions of Slovenia. A related but rare species *M. moesica* Suarez, 1981, described from eastern Serbia, can be distinguished from *M. atra* only by male genitalia. It is possible that it is spread wider than known so far (Serbia, Montenegro) (Ćetković, pers. comm.).

Paramyrmosa Saussure, 1880

Paramyrmosa brunnipes (Lepeletier, 1845)

Nonveiller 1976, Nonveiller & Ćetković 2013: Slovenija
Podčetrtek, coll. E. Jaeger (Nonveiller *in litteris,* 1984)
Log, Lukovica, VL59, 10. 6. 1992, 1♀, A. Gogala leg., 12. 7. 1990, 1♂, A. Gogala leg., PMSL

Gostitelji: *Lasioglossum majus, L. pauxillum, L. morio, L. malachurum* (Halictidae), *Crabro peltarius, Cerceris rybyensis* (Crabronidae) (Invrea 1964, Knerer 1973, Bogusch 2006).
Zahodno palearktična vrsta. Najdena v subpanonskem in predalpskem območju Slovenije.

Hosts: *Lasioglossum majus, L. pauxillum, L. morio, L. malachurum* (Halictidae), *Crabro peltarius, Cerceris rybyensis* (Crabronidae) (Invrea 1964, Knerer 1973, Bogusch 2006).
West Palaearctic species. Collected in the sub-Pannonian and pre-Alpine regions of Slovenia.

Myrmillinae Bischoff, 1920

Myrmilla Wesmael, 1852

Myrmilla calva (Villers, 1789)

M. distincta (Lepeletier, 1845)

Vogrin 1955: Gorica, coll. Hensch
Nonveiller 1976, Nonveiller & Ćetković 2013: Slovenija
Podčetrtek, coll. E. Jaeger, including 1 gynandromorphic specimen, with the following label data: „STYR. Podčetrtek, 28.5.30. Dr. Jaeger“ (Nonveiller *in litteris,* 1984, Ćetković, pers. corr.)
Brje pri Komnu, VL07, 16. 6. 1990, 1♀, A. Gogala leg., 23. 8. 1992, 1♀, A. Gogala leg., PMSL
Bezovica, VL14, 3. 10. 1990, 1♀, A. Gogala leg., PMSL
Sečovlje, Fontanigge, UL93, 24. 8. 1991, 1♀, A. Gogala leg., PMSL
Gorjansko, UL97, 7. 6. 1992, 1♀, A. Gogala leg., 26. 6. 1993, 1♂, A. Gogala leg., PMSL
Ljubljana, Črnuče, Jarški prod, VM60, 3. 9. 1998, 1♀, A. Gogala leg., PMSL
Štanjel, Lukovec, VL07, 3. 5. 2008, 1♀, A. Gogala leg., PMSL
Horjul, Koreno, VL49, 26. 4. 2014, 1♀, photo A. Gogala

Gostitelji: *Lasioglossum morio, L. calceatum, L. marginatum, L. malachurum* in druge družbene čebele iz družine Halictidae (Knerer 1973, Bogusch 2006).
Palearktična vrsta. Najdena v submediteranskem, predalpskem in subpanonskem območju Slovenije.

Hosts: *Lasioglossum morio, L. calceatum, L. marginatum, L. malachurum* and other social bees of the family Halictidae (Knerer 1973, Bogusch 2006).
Palaearctic species. Collected in the sub-Mediterranean, pre-Alpine and sub-Pannonian regions of Slovenia.

Myrmilla mutica (André, 1903)

Nonveiller & Ćetković 2013: Slovenija
Gogala 1991: Komen, near the nests of *Halictus scabiosae*
Brje pri Komnu, VL07, 21. 5. 1989, 1♀, A. Gogala leg., PMSL

Gostitelji: verjetno *Halictus scabiosae* (Halictidae), saj je bila samica najdena na gnezdišču teh družbenih čebel (Gogala 1991).

Vzhodnomediteranska vrsta, razširjena od okolice Trsta (Italija) na zahodu do Krima na vzhodu in od Avstrije, Češke in Slovaške na severu do Krete na jugu (Ljubomirov 2011). V seznamu Fauna Europaea je za Slovenijo navedena zaradi splošne razširjenosti, ki jo podaja Ljubomirov (2011), posebno zaradi bližine potrjenega pojavljanja v okolici Trsta (Ćetković, oseb. kor.). V Sloveniji najdena na Krasu (submediteransko območje).

Hosts: probably *Halictus scabiosae* (Halictidae), since a female was found on the nesting ground of this social bee (Gogala 1991).

East Mediterranean species, distributed from the surroundings of Trieste in Italy in the west to Crimea in the east and from Austria, Czech Republic and Slovakia in the north to Crete in the south (Ljubomirov 2011). Listed for Slovenia in Fauna Europaea database following specific suggestions and general distribution elaborated in Ljubomirov (2011), particularly owing to the proximity of the confirmed presence in the Trieste area (Ćetković, pers. comm.). In Slovenia, it was found in the Kras (Karst), sub-Mediterranean region.

Myrmilla erythrocephala (Latreille, 1792)

Nonveiller & Ćetković 2013: Slovenija

V seznamu Fauna Europaea je za Slovenijo navedena zaradi splošne razširjenosti, ki jo podaja Ljubomirov (2011), posebno zaradi bližine potrjenega pojavljanja v okolici Trsta (Ćetković, oseb. kor.).

Listed for Slovenia in Fauna Europaea database following specific suggestions and general distribution elaborated in Ljubomirov (2011), particularly due to the proximity of the confirmed presence in the Trieste area (Ćetković, pers. comm.).

Mutillinae Latreille, 1802

Mutillini Latreille, 1802

Mutilla Linnaeus, 1758

Mutilla europaea Linnaeus, 1758

M. notomelas André, 1902

Nonveiller 1976, Nonveiller & Ćetković 2013: Slovenija
Styria (Štajerska), 13♀ 6♂, coll. E. Jaeger (Nonveiller *in litteris,* 1984); label data available for 1♂: „STYR. Podčetrtek, 17. 6. 31, Dr. Jaeger" (Ćetković, pers. corr.)
Kranjska Gora, Krnica, VM04, 3. 7. 1976, 1♀, V. Furlan leg., PMSL
Vršič, VM04, 29. 7. 1976, 1♀, V. Furlan leg., PMSL
Komna – Vratca, VM02, 26. 8. 1990, 1♀, A. Gogala leg., PMSL
Mrzlica, 1100 m, WM01, 23. 7. 1991, 2♂, V. Furlan leg., PMSL
Čaven, VL08, 22. 8. 1992, 1♂, A. Gogala leg., PMSL
Begunjščica, VM44, 3. 8. 1994, 1♂, A. Gogala leg., PMSL
Smrekovec, Komen, 1650 m, VM84, 8. 8. 1998, 1♂, A. Gogala leg., PMSL

Gostitelji: čmrlji, *Bombus* spp. (Apidae) (Invrea 1964, Bogusch 2006).
Palearktična vrsta. V Sloveniji prebivalka gorskih predelov, najdena v alpskem, predalpskem in submediteranskem območju. Samci imajo lahko mezonotum in skutelum na oprsju rjavo obarvan, lahko pa so povsem črni. V tem primeru se od podobne vrste *M. marginata* ločijo po veliko bolj grobi punktiranosti in ravnih dlakah.

Hosts: bumblebees, *Bombus* spp. (Apidae) (Invrea 1964, Bogusch 2006).
Palaearctic species. In Slovenia, a resident of mountainous areas, collected in the Alpine, pre-Alpine and sub-Mediterranean regions. Males may have mesonotum and scutellum on the thorax brown in colour, but may be completely black. In this case, they are distinguished from the similar species *M. marginata* by much more robust punctuation and straight hair.

Ronisia Costa, 1858

Ronisia brutia (Petagna, 1787)

Vogrin 1955: Gorica, coll. Hensch; Podpeca, 23. 7.; Kranj, 8. 8.
Nonveiller & Ćetković 2013: Slovenija
Brje pri Komnu, VL07, 29. 7. 1990, 1♀, A. Gogala leg., PMSL

Gostitelji: *Megachile albisecta, M. parietina* (Megachilidae), *Anthophora crinipes* (Apidae), morda tudi *Polistes* spp. (Vespidae) (Invrea 1964, Bogusch 2006). Opazovanje mravljaric te vrste in vrste *Tropidotilla litoralis* z glavo naprej zaritih v celice gnezda družbenih os iz rodu *Polistes* si lahko razlagamo kot hranjenje z njihovimi ličinkami. Parazitiranje mravljaric v gnezdih družbenih os ni bilo nikoli potrjeno (Brothers et al. 2000).

Mediteranska vrsta, ki naseljuje tudi tople predele srednje Evrope. Najdena na Krasu (submediteransko območje). Vogrin (1955) navaja tudi najdbe iz predalpskega in alpskega območja, in sicer kot var. *differens* Lepeletier, 1845. Ta je sinonim vrste *Ronisia ghilianii* (Spinola, 1843), vendar ni verjetno, da bi ta zahodnomediteranska vrsta živela v Sloveniji, zato te podatke pripisujem vrsti *R. brutia*.

V zbirki PMSL imamo tudi primerka iz Grčije:

Hosts: *Megachile albisecta, M. parietina* (Megachilidae), *Anthophora crinipes* (Apidae), possibly also *Polistes* spp. (Vespidae) (Invrea 1964, Bogusch 2006). Observation of this and the species *Tropidotilla litoralis* head on in cells of nests of social wasps of the genus *Polistes* can be interpreted as feeding on their larvae. Parasitization of velvet ants in the nests of social wasps has never been confirmed (Brothers et al. 2000).

Mediterranean species inhabiting warm parts of Central Europe. Collected in the Karst (sub-Mediterranean region). Vogrin (1955) lists also finds in the pre-Alpine and Alpine regions as var. *differens* Lepeletier, 1845. This is a synonym of *Ronisia ghilianii* (Spinola, 1843), but it is unlikely for this West Mediterranean species to be present in Slovenia, so I interpret this record as *R. brutia*.

In the PMSL collection, we have also specimens from Greece:

Greece: Fokida: Lidoriki, Skaloula, 12. 7. 2010, 1♀, M. Gogala & T. Trilar leg., PMSL
Greece: Andros Is.: Batsi, Agia Marina, 26. 6. 2013, 1♀, T. Trilar & M. Gogala leg., PMSL

Smicromyrmini Bischoff, 1920

Nemka Lelej, 1985

Nemka viduata (Pallas, 1773)

Nonveiller 1976, Nonveiller & Ćetković 2013: Slovenija

Gostitelji: *Bembecinus tridens*, *Gorytes* sp., *Larra anathema* (Crabronidae), *Dasypoda hirtipes* (Melittidae) (Invrea 1964, Lelej 1995, Bogusch 2006).

Palearktična vrsta, živeča tudi v toplejših delih srednje Evrope. Vezana je na peščena tla, zato jo verjetno lahko pričakujemo le v vzhodni Sloveniji. Nonveillerjeva navedba vrste za Slovenijo verjetno temelji na neobjavljenih podatkih.

V zbirki PMSL sta le primerka s Krete:

Hosts: *Bembecinus tridens*, *Gorytes* sp., *Larra anathema* (Crabronidae), *Dasypoda hirtipes* (Melittidae) (Invrea 1964, Lelej 1995, Bogusch 2006).

Palaearctic species present in the warmer parts of central Europe. Restricted to sandy soil, so it can probably be expected only in eastern Slovenia. Nonveiller's indication of the species for Slovenia was probably based on unpublished records.

In the PMSL collection, there are only specimens from Crete:

Greece: Crete: Hanya, Granvousa, Balos, 10 m, 17. 8. 2006, 2♀, T. Trilar & K. Prosenc Trilar leg., PMSL

Physetopoda Schuster, 1949

Physetopoda cingulata (Costa, 1858)

Komen, Vale, UL97, 27. 9. 1997, 1♂, A. Gogala leg., PMSL

Vrsta, večinoma znana le po samcih. Samica je bila opisana šele leta 2006 (Standfuss 2006).

Mediteransko srednjeazijska vrsta. Najdena na najtoplejšem, najnižjem delu Krasa (submediteransko območje).

Species known almost exclusively for males. Female described only in 2006 (Standfuss 2006).

Mediterranean Central Asian species. Collected in the warmest, lowest part of the Karst (sub-Mediterranean region).

Physetopoda daghestanica (Radoszkowski, 1885)

Brje pri Komnu, VL07, 11. 10. 2003, 1♂, A. Gogala leg., 22. 7. 2006, 1♂, A. Gogala leg., PMSL

Vrsta je znana le po samcih. Samice še ne znamo razločevati od drugih vrst, verjetno jih uvrščamo med primerke vrste *Physetopoda halensis* (Bogusch 2006).

Mediteransko srednjeazijska vrsta. Najdena na Krasu (submediteransko območje).

The species known only for males. Females are not yet distinguishable from other species; they are probably confused with specimens of *Physetopoda halensis* (Bogusch 2006).

Mediterranean Central Asian species. Collected in the Karst (sub-Mediterranean region).

Physetopoda halensis (Fabricius, 1787)

Smicromyrme montana (Panzer, 1805)
Graeffe 1911: Tolmein (= Tolmin), Loitsch (= Logatec)
Nonveiller 1976, Nonveiller & Ćetković 2013: Slovenija
Podčetrtek, Pokojišče, coll. E. Jaeger (Nonveiller *in litteris,* 1984)
Brezovica pri Ljubljani, VL59, 1. 5. 1984, 1♀, A. Gogala leg., PMSL
Topolovec, VL03, 9. 5. 1991, 1♀, A. Gogala leg., PMSL
Planina Vogar, VM12, 24. 5. 1996, 1♀, A. Gogala leg., PMSL

Gostitelji: ličinke hroščev *Clytra quadripunctata* in *Labidostomis humeralis* (Coleoptera: Chrysomelidae, Clytrinae) (Sergeev in Lelej 2011). Ličinke vrste *Clytra quadripunctata* se razvijajo v gnezdih mravelj iz rodu *Formica*. Ličinke mravljaric zajedajo dorasle ličinke ali bube v njihovih zapredkih (Brothers et al. 2000).
Zahodno palearktična vrsta. Široko razširjena v Sloveniji, najdena v predalpskem, alpskem, dinarskem, submediteranskem in subpanonskem območju.

Hosts: larvae of beetles *Clytra quadripunctata* and *Labidostomis humeralis* (Coleoptera: Chrysomelidae, Clytrinae) (Sergeev & Lelej 2011). The larvae of the species *Clytra quadripunctata* develop in the nests of ants of the genus *Formica*. Velvet ant larvae parasitize fully grown larvae or pupae in their cocoons (Brothers et al. 2000).
West Palaearctic species. Widespread in Slovenia, collected in the pre-Alpine, Alpine, Dinaric, sub-Mediterranean and sub-Pannonian regions.

Physetopoda scutellaris (Latreille, 1792)

Bischoff 1909: Krain (= Kranjska, Carniola), Klug leg.
Nonveiller 1976, Nonveiller & Ćetković 2013: Slovenija

Zahodno palearktična vrsta. Edini podatek za Slovenijo je objavil Bischoff, ki pa ne navaja natančnega nahajališča.

West Palaearctic species. The only record for Slovenia was published by Bischoff who, however, does not indicate the exact locality.

Smicromyrme Thomson, 1870

Smicromyrme rufipes (Fabricius, 1787)

Nonveiller 1976, Nonveiller & Ćetković 2013: Slovenija
Podčetrtek, Maribor, 7♀, coll. E. Jaeger (Nonveiller *in litteris,* 1984)

Gostitelji: *Oxybelus uniglumis, O. bipunctatus, Tachysphex* sp., *Miscophus spurius, Palarus variegatus, Hoplisoides latifrons* (Crabronidae), Pompilidae, Halictidae, Andrenidae (Invrea 1964, Bogusch 2006, Amiet 2008).
Palearktična vrsta. Najdena v subpanonskem območju Slovenije.

Hosts: *Oxybelus uniglumis, O. bipunctatus, Tachysphex* sp., *Miscophus spurius, Palarus variegatus, Hoplisoides latifrons* (Crabronidae), Pompilidae, Halictidae, Andrenidae (Invrea 1964, Bogusch 2006, Amiet 2008).
Palaearctic species. Collected in the sub-Pannonian region of Slovenia.

Smicromyrme sicanus (De Stefani, 1887)

Komen, Vale, UL97, 26. 4. 1998, 1♀, A. Gogala leg., PMSL

Mediteransko srednjeazijska vrsta. Najdena na najtoplejšem, najnižjem delu Krasa (submediteransko območje).

Mediterranean Central Asian species. Collected in the warmest, lowest part of the Karst (sub-Mediterranean region).

Dasylabrinae Invrea, 1964

Dasylabris Radoszkowski, 1885

Dasylabris maura (Linnaeus, 1758)

Nonveiller & Ćetković 2013: Slovenija

V seznamu Fauna Europaea je navedena za Slovenijo na podlagi neobjavljenih podatkov (Ćetković, oseb. kom.)

Listed for Slovenia in the Fauna Europaea database on the basis of unpublished data (Ćetković, pers. comm.).

Sphaeropthalminae Schuster, 1949

Cystomutilla André, 1896

Cystomutilla ruficeps (Smith, 1855)

Brje pri Komnu, VL07, 15. 7. 1990, 1♀, A. Gogala leg., PMSL
Divača, Škocjan, VL25, 15. 6. 1994, 1♀, A. Gogala leg., PMSL

Gostitelji: ose grebače, ki gnezdijo v suhih steblih robide: *Ectemnius rubicola, Pemphredon wesmaeli* (Crabronidae) (Invrea 1964, Bogusch 2006). Vrsta velja za zelo redko, kar pa je lahko posledica gnezdenja njenih gostiteljev v rastlinskih steblih in deblih, v nasprotju z gostitelji drugih os mravljaric, ki večinoma gnezdijo v tleh. Zato se *Cystomutilla ruficeps* ne pojavlja na tleh, kot druge mravljarice, medtem ko jo na rastlinah težje opazimo.

Zahodno palearktična vrsta. Najdena na Krasu (submediteransko območje).

Hosts: Crabronid wasps nesting in dry *Rubus* stems: *Ectemnius rubicola, Pemphredon wesmaeli* (Crabronidae) (Invrea 1964, Bogusch 2006). Species is considered very rare, but this may be due to the nesting of its hosts in plant stems and tree trunks, in contrast to the hosts of other velvet ants that nest mainly in the ground. Therefore *Cystomutilla ruficeps* does not occur on the ground, as other velvet ants do. On the other hand, it is hardly noticeable on plants.

West Palaearctic species. Collected in the Karst (sub-Mediterranean region).

Slika 6: *Myrmosa atra,* samica iz doline Raše, zbirka PMSL

Fig. 6: *Myrmosa atra* female from the Raša valley, coll. PMSL

Slika 7: *Paramyrmosa brunnipes,* samica iz Lukovice, zbirka PMSL

Fig. 7: *Paramyrmosa brunnipes* female from Lukovica, coll. PMSL

Slika 8: *Paramyrmosa brunnipes,* samec iz Lukovice, zbirka PMSL

Fig. 8: *Paramyrmosa brunnipes* male from Lukovica, coll. PMSL

Slika 9: *Myrmilla calva,* samec iz Gorjanskega, zbirka PMSL

Fig. 9: *Myrmilla calva* male from Gorjansko, coll. PMSL

Slika 10: *Myrmilla calva,* samica iz Lukovca, zbirka PMSL

Fig. 10: *Myrmilla calva* female from Lukovec, coll. PMSL

Slika 11: *Myrmilla mutica,* samica iz Brij, zbirka PMSL

Fig. 11: *Myrmilla mutica* female from Brje, coll. PMSL

Slika 12: *Mutilla europaea,* samica z Vršiča, zbirka PMSL

Fig. 12: *Mutilla europaea* female from Vršič, coll. PMSL

Slika 13: *Mutilla europaea,* samec s Čavna z rjavim oprsjem, zbirka PMSL

Fig. 13: *Mutilla europaea* male from Čaven with brown thorax, coll. PMSL

Slika 14: *Mutilla europaea,* samec z Begunjščice s črnim oprsjem, zbirka PMSL

Fig. 14: *Mutilla europaea* male from Begunjščica with black thorax, coll. PMSL

Slika 15: *Ronisia brutia,* samica iz Brij, zbirka PMSL

Fig. 15: *Ronisia brutia* female from Brje, coll. PMSL

Slika 16: *Nemka viduata,* samica s Krete, zbirka PMSL

Fig. 16: *Nemka viduata* female from Crete, coll. PMSL

Slika 17: Physetopoda cingulata, samec iz Val, zbirka PMSL

Fig. 17: Physetopoda cingulata male from Vale, coll. PMSL

Slika 18: *Physetopoda daghestanica,* samec iz Brij, zbirka PMSL

Fig. 18: *Physetopoda daghestanica* male from Brje, coll. PMSL

Slika 19: *Physetopoda halensis,* samica iz Topolovca, zbirka PMSL

Fig. 19: *Physetopoda halensis* female from Topolovec, coll. PMSL

Slika 20: *Physetopoda halensis,* samica z Vogarja, zbirka PMSL

Fig. 20: *Physetopoda halensis* female from Vogar, coll. PMSL

Slika 21: *Smicromyrme sicanus,* samica iz Val, zbirka PMSL

Fig. 21: *Smicromyrme sicanus* female from Vale, coll. PMSL

Slika 22: *Cystomutilla ruficeps,* samica iz Škocjana, zbirka PMSL

Fig. 22: *Cystomutilla ruficeps* female from Škocjan, coll. PMSL

Nekaj vrst iz sosednjih držav in Balkana / Some species from neighbouring countries and the Balkans

V zbirki Prirodoslovnega muzeja Slovenije je nekaj primerkov os mravljaric iz sosednjih in drugih držav, predvsem z Balkana, ki pripadajo vrstam, ki doslej v Sloveniji niso bile zabeležene. Najdbe nekaterih izmed teh vrst lahko pričakujemo tudi v Sloveniji.

The collection of the Slovenian Museum of Natural History includes specimens of velvet ants from neighbouring and other countries, mostly from the Balkans, representing taxa not recorded in Slovenia so far. Some of these species may be expected to be found in Slovenia.

Myrmosinae Fox, 1894

Krombeinella Pate, 1947

Krombeinella nigriceps (S.S. Saunders, 1850)

Greece: Peloponnese: Mani Peninsula: Panaghia Giatrissa, 948 m, 30. 6. 2013, 1♀, T. Trilar & M. Gogala leg., PMSL

Balkanska vrsta, na severozahod razširjena do Trogirja (Dalmacija) in Domanovićev (Hercegovina) (Nonveiller et al. 1998). Največja vrsta poddružine Myrmosinae. Primerke iz evropskega in azijskega dela Turčije ter Bolgarije obravnavata Lelej in Yildirim (2009) kot *K. gaullei* (Invrea, 1952). Vrsta brez stridulatornega organa (Tschuch in Brothers 2000).

Balkan species, spread in the northwest to Trogir (Dalmatia) and Domanovići (Herzegovina) (Nonveiller et al. 1998). The largest species in the subfamily Myrmosinae. Specimens from the European and Asian parts of Turkey and Bulgaria are dealt by Lelej and Yildirim (2009) as a distinct species, *K. gaullei* (Invrea, 1952). Species lacks stridulatory organ (Tschuch & Brothers 2000).

Pseudophotopsidinae Bischoff, 1920

Pseudophotopsis André, 1896

Pseudophotopsis obliterata (Smith, 1855)

Greece: Peloponnese: Arkadia: Ag. Andreas, Korakovouni, 390 m, N37.30517° E22.74962°, 4. 6. 2016, 1♀, M. Gogala leg., PMSL

Vrsta, znana iz Albanije, Grčije in Cipra (Lelej, L. in K. Standfuss 2003a).

Species, known from Albania, Greece and Cyprus (Lelej, L. & K. Standfuss 2003a).

Mutillinae Latreille, 1802

Mutillini Latreille, 1802

Mutilla Linnaeus, 1758

Mutilla marginata Baer, 1848

Austria: Koralpe: Weinebene-Schäferkreuz, 1700-1800 m, VM98, 10. 8. 1991, 1♂, A. Gogala leg., PMSL

Gostitelji: čmrlji, *Bombus* spp. (Apidae) (Bogusch 2006).

Palearktična vrsta. V Sloveniji še ni bila najdena, vendar jo lahko pričakujemo, saj je znana iz bližnjih pogorij Avstrije, npr. iz Koralp.

Hosts: bumblebees, *Bombus* spp. (Apidae) (Bogusch 2006).

Palaearctic species. It has not been found in Slovenia yet, but is expected as known to occur in nearby mountain ranges in Austria such as Koralpe.

Mutilla quinquemaculata Cyrillo, 1787

Greece: Andros Is.: Batsi, Agia Marina, 26. 6. 2013, 1♀, T. Trilar & M. Gogala leg., PMSL

Gostitelji: *Osmia tricornis, Megachile (Chalicodoma)* sp. (Megachilidae) (Invrea 1964).

Mediteranska vrsta. Lahko jo pričakujemo tudi v Slovenskem primorju.

Hosts: *Osmia tricornis, Megachile (Chalicodoma)* sp. (Megachilidae) (Invrea 1964).

Mediterranean species. May be expected in the Slovenian littoral.

Tropidotilla Bischoff, 1920

Tropidotilla litoralis (Petagna, 1787)

Croatia: Otok Korčula: Zavalatica, 10. 6. 1998, 1♀, T. Trilar & M. Gogala leg.
Krk, 8/11. 6. 1934, 1♂, Dr. Jaeger leg.; Krk, 17. 6. 1934, 1♂, Dr. Jaeger leg., Krk, 1♂, Mader leg. PMSL (specimens from Krk currently in Linz – Ćetković, pers. corr.)
Macedonia: Skopje, 30. 6. 1934, 1♂, PMSL (specimens currently in Linz – Ćetković, pers. corr.)
Greece: Fokida: Lidoriki, Skaloula, 683 m, 12. 6. 2012, 1♀, T. Trilar & M. Gogala leg., PMSL

Gostitelji: *Paragymnomerus spiricornis* (Eumeninae) (Amiet 2008), morda tudi družbene ose, *Polistes* spp. (Vespidae) (Invrea 1964, Bogusch 2006).

Palearktična vrsta. Živi v vseh sosednjih državah, zato bi jo lahko našli tudi v Sloveniji.

Hosts: *Paragymnomerus spiricornis* (Eumeninae) (Amiet 2008), possibly also social wasps, *Polistes* spp. (Vespidae) (Invrea 1964, Bogusch 2006).

Palaearctic species. It is present in all neighbouring countries, and could thus be found in Slovenia as well.

Smicromyrmini Bischoff, 1920
Dentilla Lelej in Lelej & Kabakov, 1980

Dentilla curtiventris (André 1901)

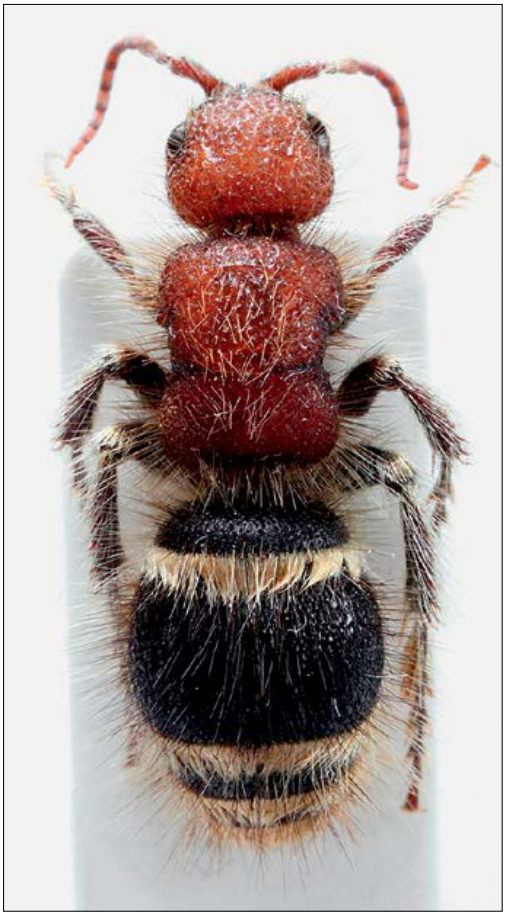
Smicromyrme errana Nonveiller, 1958
Smicromyrme erronea cretica Nonveiller, 1972
Greece: Fokida: Lidoriki, Skaloula, 668 m, 8. 7. 2007, 1♂, T. Trilar & M. Gogala leg., PMSL

Vzhodnomediteranska vrsta, razširjena od Italije do Armenije in Azerbajdžana (Lelej, L. in K. Standfuss 2003a).

East Mediterranean species. Spread from Italy to Armenia and Azerbaijan (Lelej, L. & K. Standfuss 2003a).

Slika 23: *Krombeinella nigriceps,* samica s Peloponeza, zbirka PMSL

Fig. 23: *Krombeinella nigriceps* female from the Peloponnese, coll. PMSL



Slika 24: *Pseudophotopsis obliterata,* samica s Peloponeza, zbirka PMSL

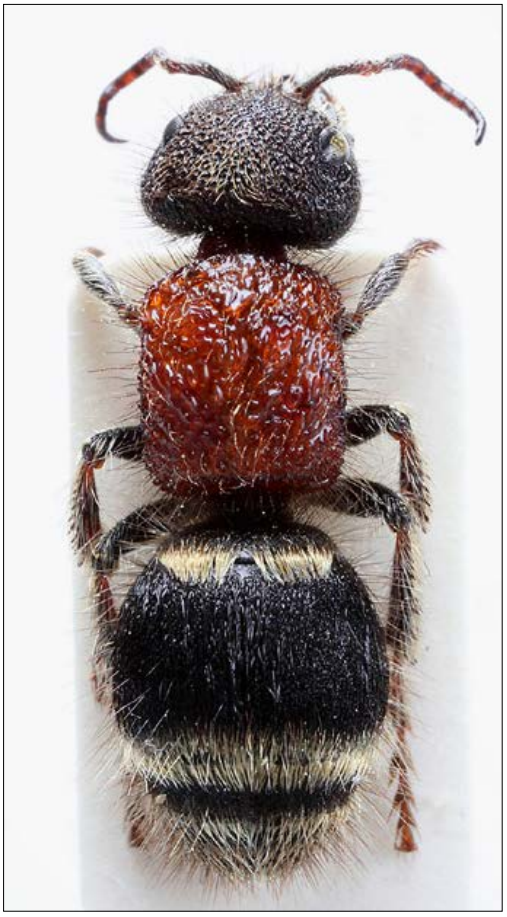
Fig. 24: *Pseudophotopsis obliterata* female from the Peloponnese, coll. PMSL

Slika 25: *Mutilla marginata,* samec s Koralp, zbirka PMSL

Fig. 25: *Mutilla marginata* male from Koralpe, coll. PMSL

Slika 26: *Mutilla quinquemaculata,* samica z otoka Andros, zbirka PMSL

Fig. 26: *Mutilla quinquemaculata* female from Andros Island, coll. PMSL



Slika 27: *Tropidotilla litoralis,* samica z otoka Korčule, zbirka PMSL

Fig. 27: *Tropidotilla litoralis* female from Korčula Island, coll. PMSL

Slika 28: *Dentilla curtiventris,* samec iz Fokide, zbirka PMSL

Fig. 28: *Dentilla curtiventris* male from Fokida, coll. PMSL

Zaključki

Za Slovenijo je bilo doslej zabeleženih 16 vrst os mravljaric. Tu so prvič objavljeni podatki za naslednje vrste: *Physetopoda cingulata, Physetopoda daghestanica, Smicromyrme sicanus* in *Cystomutilla ruficeps*. Vrsti *Myrmilla mutica* in *Ronisia brutia* v katalogu palearktičnih vrst (Lelej 2002) nista navedeni za Slovenijo, čeprav sta podatke o njunem pojavljanju že objavila Gogala (1991) in Vogrin (1955). Za štiri vrste je bil doslej objavljen le podatek za državo, brez navedbe natančne lokalitete: *Myrmilla erythrocephala*, *Nemka viduata*, *Physetopoda scutellaris* in *Dasylabris maura*. V Sloveniji lahko pričakujemo še nekaj vrst, ki so znane iz sosednjih držav. V splošnem raznovrstnost os mravljaric hitro upada od mediteranskih dežel proti severu. Tako je v Grčiji znanih 56 vrst (Lelej, L. in K. Standfuss 2003b), na Hrvaškem 31 (Nonveiller et al. 1998), na Slovaškem 19 in na Češkem 16 vrst (Bogusch 2006). Le tri vrste dosežejo sever Evrope (Bogusch 2006).

Zahvale

Pokojni Guido Nonveiller je določil moje prve primerke os mravljaric in mi izročil spisek vrst iz zbirke Evgena Jaegra. Aleksandar Ćetković je pojasnil trenutno stanje Nonveillerjeve zbirke in kot eden izmed recenzentov pomagal z dopolnitvami besedila. Matjaž Kuntner je izrazil mnenje o mravljam podobnih pajkih, ki bi lahko bili *Mutilla saltatrix*.

Conclusions

Altogether, 16 species of velvet ants have so far been recorded for Slovenia. Data for the following four species are published here for the first time: *Physetopoda cingulata, Physetopoda daghestanica, Smicromyrme sicanus* and *Cystomutilla ruficeps*. *Myrmilla mutica* and *Ronisia brutia* were not listed for Slovenia in the Catalogue of Palaearctic species (Lelej 2002), although the data on their presence had already been published by Gogala (1991) and Vogrin (1955). Four species have been published only as country-records, without exact locality data available so far: *Myrmilla erythrocephala*, *Nemka viduata*, *Physetopoda scutellaris* and *Dasylabris maura*. Indeed, we can expect a few more species that are known from our neighbouring countries. Generally, diversity of velvet ants rapidly declines from the Mediterranean countries to the north. Thus, 56 species are known in Greece (Lelej, L. & K. Standfuss 2003b), 31 species in Croatia (Nonveiller et al. 1998), 19 in Slovakia and 16 species in the Czech Republic (Bogusch 2006). Only three species are known to reach the north of Europe (Bogusch 2006).

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The late Guido Nonveiller determined my first specimens of velvet ants and handed me a list of species from the collection of Evgen Jaeger. Aleksandar Ćetković explained the current state of Nonveiller's collection and as one of the reviewers helped with additions to the text. Matjaž Kuntner has expressed his opinion on ant-like spiders, which could be *Mutilla saltatrix*.

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