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NEW RECORDS OF *ONTHOPHAGUS FURCATUS* (FABRICIUS, 1781) (COLEOPTERA: SCARABAEIDAE) IN SLOVENIA AND THE OVERVIEW OF ITS DISTRIBUTION AND OCCURRENCE IN THE NORTH-WESTERN BALKANS

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ABSTRACT

From 16 species of the genus Onthophagus Latreille, 1802 occurring in Slovenia, 5 have not been recorded for at least 60 years. In this paper three new records of one of such species, Onthophagus furcatus (Fabricius, 1781), recorded at three new localities in the southern part of Slovenia (Slovenian Istria) are presented. These records expand the known range of occurrence of this species in Slovenia, as well as confirm that it is still present in the country. An overview of the distribution of this species in the north-western Balkans (Slovenia, Croatia and Bosnia and Herzegovina), altitudinal range and times of occurrence are also given. In the area of the NW Balkans, O. furcatus is active from April to October, mostly at altitudes below 400 m. Most records originate from the Mediterranean part of the NW Balkans, adjacent to the Adriatic Sea, while the northern records are rare and scattered.

Key words: dung beetles, Slovenian Istria, chorological occurrence, altitudinal occurrence

NUOVE SEGNALAZIONI DI *ONTHOPHAGUS FURCATUS* (FABRICIUS, 1781) (COLEOPTERA: SCARABAEIDAE) IN SLOVENIA E REVISIONE DELLA SUA DISTRIBUZIONE E PRESENZA NEI BALCANI NORD-OCCIDENTALI

SINTESI

Delle 16 specie del genere Onthophagus Latreille, 1802 che vivono in Slovenia, 5 non sono state rinvenute per almeno 60 anni. In questo lavoro vengono trattati tre nuovi ritrovamenti di una di queste specie, Onthophagus furcatus (Fabricius, 1781), segnalata per tre nuove località nella parte meridionale della Slovenia (Istria slovena). Questi dati vanno ad ampliare l'area di distribuzione della specie in Slovenia, così come confermano la sua presenza attuale nel paese. L'articolo offre una revisione della distribuzione di tale specie nei Balcani nord-occidentali (Slovenia, Croazia e Bosnia ed Erzegovina), completa di dati sull'ampiezza altitudinale e del periodo di ritrovamento. Nella zona dei Balcani nord-occidentali O. furcatus è attivo da aprile ad ottobre, per lo più a quote inferiori ai 400 m. La maggior parte dei ritrovamenti risale alla zona mediterranea dell'area studiata, quella adiacente al mare Adriatico, mentre i ritrovamenti settentrionali sono rari e dispersi.

Parole chiave: scarabei stercorari, Istria slovena, presenza corologica, ampiezza altitudinale

INTRODUCTION

The dung beetle fauna of the north-western Balkans (Slovenia, Croatia and Bosnia and Herzegovina) has been surveyed by many different entomologists (e.g. Müller, 1902; Depoli, 1924; Novak, 1952) during the last 200 years. However, the works of Rene Mikšić, especially his monographs and identification keys for the dung beetles (Mikšić, 1958, 1962, 1965) and the catalogues of the Lamellicornia of Yugoslavia (Mikšić, 1970) were and still remain the best source of information for most countries. For example, only several recent records of dung beetles were published (e.g. Koren et al., 2010, 2011) in Croatia after the works of Mikšić (1958, 1962, 1965, 1970, 1984), without any newer overview or checklist. In Bosnia and Herzegovina the situation is almost the same, with the exception of the recent checklist of the superfamily Scarabaeoidea (Lelo & Kašić-Lelo, 2010). However, this checklist only represents a modern update to the works of Mikšić (1970, 1984), and does not provide any new data about the dung beetle fauna of Bosnia and Herzegovina. The best situation is probably in Slovenia, where a recent overview of the superfamily Scarabaeoidea in Slovenia was published (Brelj et al., 2010) containing all the known literature data and data from private and museum collections, as well as distribution maps, ecology and checklists. In that overview, 16 species belonging to the genus *Onthophagus* Latreille, 1802 were listed (Brelj et al., 2010). It is interesting to note that five of the 16 species were not recorded in Slovenia after the year 1950, and one species was recorded only once (Brelj et al., 2010). This indicates that the knowledge about the presence and distribution of this genus in Slovenia is still rather poor, and the recent occurrence of several species needs to be confirmed.

The genus *Onthophagus* Latreille, 1802 consists of about 2000 species worldwide (Tarasov & Kabakov, 2010), around 40 of which can be found in Europe (Mikšić, 1958). Members of this genus are small to middle sized coprophagous beetles, mostly inhabiting dry and sunny, open and more or less steppe or half-steppe biotopes. They can be found in a range of different kind of animal excrements, along with the other most numerous dung beetle family Aphodidae.

Onthophagus furcatus (Fabricius, 1781) is a Turanic-European-Mediterranean species, distributed in central and southern Europe, Asia Minor, Transcaucasia, the Arabian Peninsula, Iraq, Turkmenistan and Morocco (Brelj et al., 2010). It is a stenotop, colline species inhabiting xerothermophilous habitats (Brelj et al., 2010). It can be recorded on sunward oriented slopes and dry pastures, frequenting horse, cattle, human and other excrements, at times even carrion. Adults occur in dung from mid-April to the end of August, particularly in June and July.

In Slovenia, *O. furcatus* is considered to be a rare species, with no recent records, and very few older literature records (Brelj et al., 2010). The first mention for Slovenia originates from Siegel (1866) who cites it for the Carniola region, but without any exact localities. Mikšić (1958, 1970) mentions its occurrence in western Slovenia, possibly referring to the record of Siegel (1866). It was only several years ago when the first date – locality data were published for this species in Slovenia; for Ajdovščina (without any date), Kreplje, collected on July 1924 and Krim, 1949 (Brelj et al., 2010). After that, no records for this species in Slovenia were published.

The aim of this paper is to present the distribution, altitudinal and chorological occurrence of this species in the area of the north-western Balkan (Slovenia, Croatia and Bosnia and Herzegovina).

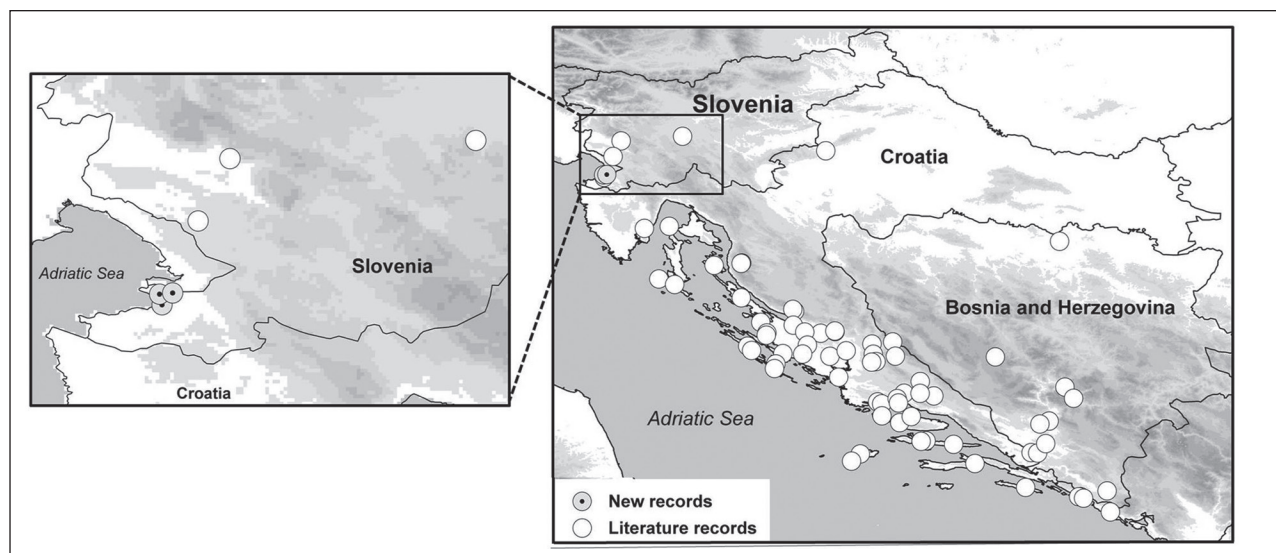


Fig. 1: Distribution of *Onthophagus furcatus* in the NW Balkan.
Sl. 1: Razširjenost vrste *Onthophagus furcatus* na SZ Balkanu

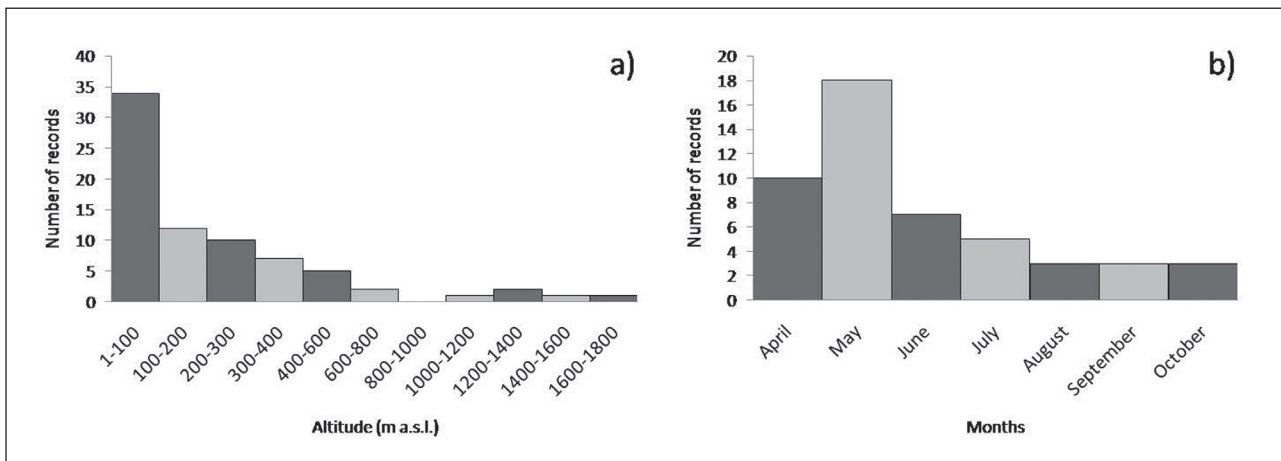


Fig. 2: Altitudinal and chorological occurrence of *O. furcatus* in the NW Balkans. a) Records in different altitudinal zones, and b) records in different months.

Sl. 2: Višinsko in časovno pojavljanje *O. furcatus* na SZ Balkanu: a) najdbe v različnih višinskih conah in b) najdbe v različnih mesecih

MATERIALS AND METHODS

The material mentioned here was collected by the second author during the last few decades in the territory of Slovenia. Dung beetles were collected by examination of animal excrements, and stored in the author's private collection (M. Gjerkeš collection).

Insects were sampled on the following locations:

Bonifika, between Koper and Ankaran, pasture, 1.8.1991, 45° 33' 20.03" N, 13° 45' 24.13" E, 5 m a.s.l., cow excrement, 1F;

Monte Moro, Ankaran, overgrown pasture, 19.4.2013 and 29.4.2013, 45° 34' 46.33" N, 13° 45' 00.55" E, 115 m a.s.l., goat excrement, 1M; 1M & 1F;

Elerji village, Kaštelir hill, 1.7.2013 and 28.8.2013, pasture, 45° 34' 55.50" N, 13° 46' 52.23" E, 244 m a.s.l., horse excrement, 1M; 3M & 6F.

All the material was prepared using standard methods, and identified using modern identification key (Ballerio *et al.*, 2010). To create the distribution maps, all available known literature was consulted, and a database containing all the records, dates and the altitudes of occurrence for this species was created. For Slovenia, all the records were already contained in the work of Brelih *et al.* (2010), while for Bosnia and Herzegovina data were available from the overview of Lelo & Kašić-Lelo (2010). Most data from Croatia were found in the works of Novak (1952), Novak & Etoni (1964–1965), Mikšić (1958) and Koren *et al.* (2010, 2011).

RESULTS AND DISCUSSION

Occurrence in NW Balkans

In total we were able to gather 72 records of *O. furcatus* in the north-western Balkan, and create a first dis-

tribution map for the species (Fig. 1).

In Croatia, *O. furcatus* is mostly limited to the Mediterranean region, adjacent to the Adriatic Sea, but some records for the northern part of the country also exist. Only several records exist from Bosnia and Herzegovina, which is probably due to the lack of historical and recent surveys in the country. However, it seems that it is not as common and widespread as in Croatia (T. Koren, personal communication).

In Slovenia this species is present only in the south-western part of the country, adjacent to the Croatian and Italian borders. Although all three recent records are located in close proximity to each other, they represent an extension of the known distribution range of this species in Slovenia towards the south-western part of the country, namely Slovenian Istria.

Regarding the altitudinal distribution, this species is present from sea level to high altitudes, reaching almost 1800 m a.s.l. (Fig. 2). Most records are however located on the lower altitudes, showing a strong affinity of this species for lower areas which confirms the literature data (Ballerio *et al.*, 2010). Regarding the month of occurrence, *O. furcatus* is active from April to October in the north-western Balkans. Most records of this species originated in the spring time, with the highest number of records in May (N = 18) and April (N = 10).

New records from Slovenia

Historically this species was recorded on three more northerly localities and the presence of the species there needs to be confirmed in the future. Our new records of *O. furcatus* show that this species is still present in Slovenia.

Each of our new records originates from a different type of animal excrement, namely cow, horse and goat.

This means that in Slovenia this species consume different types of excrement, as it was already known from the literature (Ballerio et al., 2010). With that fact in mind, it is interesting that this species had been recorded only three times in the country. The reasons for such a low number of historical records could probably be found in the small number of entomologists who studied this group of dung beetles in Slovenia in the past and the present. It is possible that this species can be easily confused with similar small black *Onthophagus* species such as *Onthophagus ovatus* (Linnaeus, 1767), *Onthophagus joannae* (Goljan, 1953), *Onthophagus grossepunctatus* (Reitter, 1905) or *Onthophagus ruficapillus* (Brullé, 1832). But even for amateurs, the situation becomes fairly easy when the beetles are examined under a stereo microscope. The main difference between *O. furcatus* and the others are the outwardly curved front angles of the pronotum present in *O. furcatus*, and not present in any other similar species occurring in the area (Ballerio et al., 2010). It is even easier with males of this species, which have two small horns on the head, not present on the heads of any other similar species' males in the region (Fig. 3).

While the decrease of some dung beetle species is prone to occur in the future due to climate change and

succession of pastures, it seems that will not be the case with *O. furcatus*, at least in western Europe. Dortel et al. (2013) showed that due to climate change, *O. furcatus* may be one of several species which could prosper, and become more widespread in Portugal, Spain and France. As this species is relatively common in neighbouring countries (Mikšič, 1958; Ballerio et al., 2010), new records are to be expected in the southern parts of Slovenia. In nearby Italy, this species is widespread and common (Ballerio et al., 2010) and the same is in most parts of Croatia (Mikšič, 1958). Other than *O. furcatus*, there are several other species from the same genus, as well as other dung beetle species which were not recorded in Slovenia for at least 50 years, and some are even considered extinct (Brelj et al., 2010). This shows that the dung beetle fauna of Slovenia is still far from well known, and further systematic surveys need to be done in the future.

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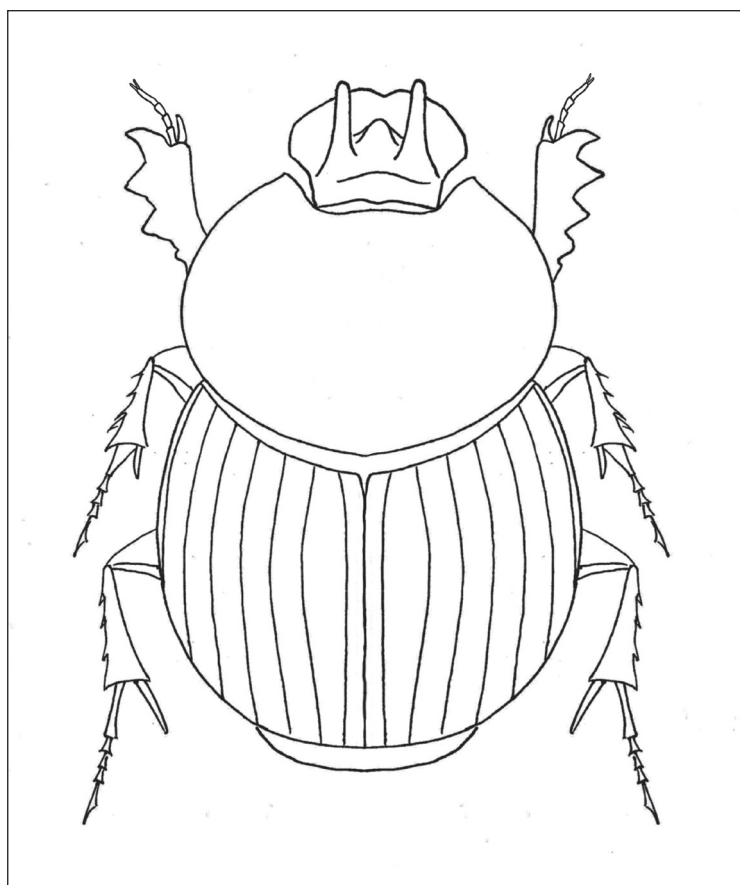


Fig. 3: Male specimen of *O. furcatus* from Slovenia (author: Gaja Pavliha).
Sl. 3: Samec vrste *O. furcatus* iz Slovenije (avtorica: Gaja Pavliha)

NOVE NAJDBE VRSTE *ONTHOPHAGUS FURCATUS* (FABRICIUS, 1781) (COLEOPTERA: SCARABAEIDAE) V SLOVENIJI TER PREGLED NJENE RAZŠIRJENOSTI IN POJAVLJANJA NA SEVEROZAHODNEM BALKANU

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POVZETEK

Rod *Onthophagus* obsega 2000 vrst, od tega se jih 40 nahaja v Evropi. V Sloveniji se pojavlja 16 vrst, vendar pet vrst v zadnjih šestdesetih letih ni bilo zabeleženih. Ena od teh je tudi vrsta *Onthophagus furcatus*, ki je razširjena v srednji in južni Evropi, Mali Aziji, Zakavkazju, Arabskem polotoku, Iraku, Turkmenistanu in v Maroku. Najdemo jo na prisojnih pobočjih in suhih pašnikih, kjer se nahaja v konjskih, govejih, človeških in drugih iztrebkih, lahko se zadržuje tudi na mrhovini. V prispevku predstavljamo nove najdbe vrste *O. furcatus* v Sloveniji in s tem potrjujemo njeno prisotnost v južnem delu države, v slovenski Istri. Dodatno predstavljamo prvi pregled pojavljanja te vrste na področju severnega Balkana, ki zavzema Slovenijo, Hrvaško ter Bosno in Hercegovino, vključujoč razširjenost, nadmorsko višino in čas pojavljanja. Na območju severozahodnega Balkana je *O. furcatus* aktiven od aprila do oktobra, predvsem na nadmorskih višinah, nižjih od 400 metrov. Večina najdb izvira iz mediteranskega dela severozahodnega Balkana, medtem ko so podatki s severnega dela redkejši in bolj razpršeni.

Ključne besede: koprofagni plojkaši, slovenska Istra, višinska razširjenost, časovno pojavljanje

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