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THE PSELAPHINAE (COLEOPTERA, STAPHYLINIDAE)
OF DALMATIA IN THE COLLECTION OF DR. EDUARD
KARAMAN OF THE NATURAL HISTORY MUSEUM, SPLIT
(CROATIA)

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Authors describe the contents of Eduard Karaman's (1849 - 1923) collection, kept in the Natural History Museum in Split. In the collection of subfamily Pselaphinae, 43 species (241 specimens) of 129 present species are from Dalmatia and mostly collected by E. Karaman himself. All Pselaphinae from Dalmatia revised are by Zora Karaman. Endemic species of Dalmatia and neighbouring areas are *Trimium cavicolle*, *T. hopffgarteni*, *T. karamani*, *Tychobythinus cavifrons*, *Pygoxyon lathridiiforme* and *Pselaphus salonitanus*. Endemic species of the Balkans are: *Bryaxis dalmatinus* and *Tychus cordiger*. One new species found by E. Karaman was named after him *Trimium karamani*.

Coleoptera, Staphylinidae, Pselaphinae, faunistic lists, collections, Eduard Karaman, Dalmatia, Croatia.

NONVEILLER, G.*, KOKAN, B.**. Pselafine Dalmacije u zbirci dr. Eduarda Karamana u Prirodoslovnom muzeju u Splitu, Hrvatska (Coleoptera, Staphylinidae), *Hrvatski prirodoslovni muzej Zagreb, Demetrova 1, HR-10000 Zagreb, Hrvatska, **Prirodoslovni muzej Split, Kolombatovićevo šetalište 2, HR-21000 Split, Hrvatska, - Entomol. Croat., 2001, Vol. 5. Num. 1 - 2: 5 – 18.

Autori su opisali sadržaj zbirke Eduarda Karamana (1849 - 1923) koja se čuva u Prirodoslovnom muzeju u Splitu. U zbirci potporodice Pselaphinae od 129 vrsta ima 43 vrste (241 primjerak) iz Dalmacije koje je većinom sabrao E. Karaman. Sve Pselaphinae iz Dalmacije revidirala je Zora Karaman. Za Dalmaciju ili susjedna područja endemske su vrste *Trimium cavicolle*, *T. hopffgarteni*, *T. karamani*, *Tychobythinus cavifrons*, *Pygoxyon lathridiiforme* i *Pselaphus salonitanus*, a za Balkan su endemi: *Bryaxis dalmatinus* i *Tychus cordiger*. Jednu je novu vrstu pronašao E. Karaman i ona je prozvana njegovim imenom *Trimium karamani*.

Coleoptera, Staphylinidae, Pselaphinae, faunistički popisi, zbirke, Eduard Karaman, Dalmacija, Hrvatska.

Introduction

Dr. med. Eduard Karaman (1849 - 1923), native from Split (Dalmatia), was one of the first entomologists to exhaustively study the Coleoptera of Central Dalmatia. He studied medicine in Prag, Graz and Vienna, and after he graduated, he worked as a physician for a few years in Split, and was then appointed a physician in that city, but he

retired very early, in order to devote all his time to collecting beetles. He was an amateur collector in the classical sense. He collected Coleoptera around the area of his native town, prepared them carefully, trying to identify them by himself using available identification keys and to arrange them in his collection, which within time became very important. The insect fauna of Central Dalmatia, including Coleoptera, was at that period poorly explored. Thus, he was faced with difficulties to classify many of the collected specimens and sent them for identification to the most famous European specialists of his time, such as Reitter, Ganglbauer, Apfelbeck, Müller, Weise, Stierlin. As a result of this useful cooperation, a great number of publications on the Coleoptera of Split and the surrounding areas, collected by E. Karaman, appeared in entomological journals of that period. They deal with lists of collected species, many of which had formerly not been recorded from that area. There also were a number of new species, and nearly twenty of them bear E. Karaman's name (NONVEILLER, 1999, p. 43). Dr. E. Karaman himself published a unique contribution on the results of his entomological activities. In 1912 he issued, together with his younger colleague Petar Novak (1879 - 1968) - an entomologist, employed at that time as agricultural officer in Sućurac, near Split - a list of interesting Coleoptera collected during the preceding period in the surroundings of Split (KARAMAN E. & NOVAK, P., 1912). Dr. E. Karaman tried to enrich his collection also with species from foreign countries, and for that purpose he maintained an extensive exchange of insects with coleopterologists from many countries.

Soon after Dr. E. Karaman's death, his very rich and precious insect collection of Coleoptera, which includes more than 8600 species and 30,000 specimens, was transferred to the newly established Natural History Museum of Split and is still there.

Although this collection contains a relatively "old" material, collected mainly at the end of the 19th century and in the first decade of the 20th century, and was identified at that period, the species in Dr. E. Karaman's collection may be of interest for some entomological research now in progress.

At the request of Dr. Zora Karaman (Skopje, Macedonia, wife of the zoologist Dr. Stanko Karaman, nephew of Dr. Eduard Karaman), interested in the study of Pselaphinae, the totality of the representatives of this group of insects in Dr. E. Karaman's collection was sent to her in 1939. She revised them and returned them to the Museum in Split. As a result, many data from this collection appeared in Dr. Zora KARAMAN's successive contributions on Palaearctic Pselaphinae (1940, 1948, 1951, 1954, 1955, 1957, 1959, 1960, 1962, 1972). Nevertheless, as it results from the following list, many interesting data from this collection have still remained unknown to entomologists. A reason for the authors to published the following list.

List of the Pselaphinae in the collection of Dr. Eduard KARAMAN

The number of specimens for each species is given with all label data. Locality names on labels are in several languages, so that in our list all toponyms are in Croatian (Fig.1).



Fig. 1. Labels in E. Karaman's collection
a) Eduard Karaman, b) Zora Karaman

I Tribe Faronini Raffray, 1880

1. *Faronus* Aubé, 1844
- 1 *F. parallelus* Besuchet, 1958
(*Faronus sahlbergi* Besuchet, 1960)
Split, 2-specimens (Karaman); Kaštela, I-1913, 1 specimen; II-1913, 2 specimens (Novak).

An Eastern Mediterranean species, distributed in Israel, Lebanon, Turkey, Cyprus, Rhodes, Greece and Dalmatia. Found on xenothermic biotopes. REITTER (1881, 1882), NOVAK (1952), as well as BESUCHET (1960) recorded the species from Dalmatia. BESUCHET (l.c.) considered that it is an eastern vicariant of the Western European *lafertei* Aubé, 1844.

BESUCHET (1960) described as *Faronus sahlbergi* a male collected by SAHLBERG in Lebanon during his famous entomological trip through the Balkans and the Middle East at the beginning of the last century (1903 - 1904), when he also visited Dalmatia, but BESUCHET (1999) synonymized this species recently with *parallelus*.

II Tribe Euplectini Streubel, 1839

2. *Biblioplectus* Reitter, 1881
2. *B. ambiguus* (Reichenbach, 1816)
Kaštel Stari, 1 specimen (Karaman). Sinj, 1 specimen (Klimesch).
The species occurs nearly in whole Europe. It is not included in NOVAK's book on the Coleoptera of the Adriatic Coast (1952), but was known from Bosnia and Slovenia. For the first time recorded in Dalmatia.
3. *B. minutissimus* (Aubé, 1833)
Solin, 3 specimens (Karaman).

Western and Central Europe, sporadically in Southern Europe. In Dalmatia recorded by REITTER (1881), GANGLBAUER (1904) and NOVAK (1952) in Zadar, Knin, Metković and the Island Mljet.

4. *B. obtusus* Guillebeau, 1888

Knin, 2 specimens; Solin, 2 specimens; Stobreč, 1 specimen; Split, 1 specimen (Karaman). Sinj, 1 specimen (Klimesch).

A Central and Southern Eastern European species. Described from Dalmatia by Guillebeau, this species was so far recorded only from different parts of the former Yugoslavia (continental Croatia, Istria, Herzegovina, Montenegro, Serbia), as well as from different European countries.

5. *B. pusillus* (Denny, 1825)

Solin 2 specimens; Stobreč, 1 specimen (Karaman).

Northern, Central and Southern Europe, known up to the shores of the Caspian Sea. Known from neighbouring areas, such as continental Croatia and Bosnia, for the first time recorded in Dalmatia.

6. *B. tenebrosus* (Reitter, 1881)

Solin, 1 specimen; Kaštel Stari, 1 specimen (Karaman). Kaštela, X-1912, 2 specimens, XII-1912, 1 specimen, I-1913, 1 specimen (Novak).

This species was described by Reitter from Dalmatia (Knin), and was found later in continental Croatia (Plitvice). Only a few specimens are currently known of this species, which is widespread in Europe.

3. *Euplectus* Leach, 18177. *E. bonvouloiri narentinus* Reitter, 1882

Split, 1 specimen (Karaman).

Described from Dalmatia (Metković), this subspecies was collected later in different Balkan countries and is now also known from Southern and Central Europe.

8. *E. karsteni* (Reichenbach, 1816)

Split, 2 specimens; Solin, 2 specimens (Karaman). Kaštela, IV-1913, 1 specimen, V-1913, 1 specimen; Island Iž, 1905, 1 specimen (Novak).

A common and very variable species occurs on the territory of the whole Europe. Known from all neighbouring areas (continental Croatia, Herzegovina, Bosnia, Montenegro). In the literature mentioned in Dalmatia by NOVAK (1952) and Z. KARAMAN (1962).

9. *E. signatus* (Reichenbach, 1816)

Knin, V-1913, 1 specimen; Knin 3 specimens; Split, 1 specimen (Karaman). Kaštela, V-1913, 2 specimens (Novak). Metković, 1879, 2 specimens (Reitter).

Spread nearly all over Europe and the Caucasus. Recorded in Dalmatia by REITTER (1881), NOVAK (1952) and Z. KARAMAN (1962).

4. *Pseudoplectus* Reitter, 1881

[10.] *P. perplexus* (J. Duval, 1834)

In the collection of Dr. E. Karaman there are now no specimens belonging to this species, but in Petar NOVAK's book on the Coleoptera of the Adriatic coast (1952: 102) it is said that E. Karaman collected this species in Kaštel Stari.

The species occurs in the Mediterranean, and in Central Europe, sporadically in Denmark.

5. *Trimium* Aubé, 183311. *T. cavicolle* Reitter, 1881

Split, 2 specimens (Karaman).

This species was found by Reitter in the course of his first visit to Dalmatia and was described by him from Metković and the Island Hvar. A species endemic to the coastal area of Dalmatia and Herzegovina, and to its immediate hinterland (Mt. Promina, Mostar).

12. *T. hopffgarteni* Reitter, 1881

Sinj, 3 specimens; Sinj environments, 1 specimen (Karaman).

This species was also collected by Reitter during the mentioned visit and described in the report that he published on this travel. The species was dedicated to one of his companions on this voyage. A species endemic to the Adriatic coastal area, from island Rab to Herzeg Novi, but found also in Bosnia (Hrasno).

13. *T. karamani* Reitter, 1913

(*wernerii* Reitter, 1913: 650)

Split, 4♂, 2♀ (Karaman). Kaštela, II-1913, 1♂, 1♀, 1 specimen (Novak).

This species, endemic to Dalmatia and the coastal area of Montenegro, was described the same year twice, by the same author, on the same page.

III Tribe *Batrisini* Reitter, 18826. *Batrisodes* Reitter, 188214. *B. adnexus* (Hampe, 1862)

Solin, 1♂ (Karaman).

Spread in Central and Eastern Europe. So far not recorded in Dalmatia. As concerns the neighbouring areas, the species was known from the Island of Cres (MÜLLER, 1923), and from Herzegovina (Mostarsko blato) (Z. KARAMAN, 1959: 277).

15. *B. oculatus* (Aubé, 1833)

Knin, 1 specimen; Solin, 1♂, 3 specimens (Karaman).

This species is found in the southern part of Central Europe, as well as in Eastern Europe, and is spread up to Anatolia. It was recorded in Dalmatia by NOVAK (1952:103) and is currently known from continental Croatia and other neighbouring areas.

IV Tribe *Brachyglutini* Raffray, 1890

7. *Rybaxis* Saulcy, 1874

16. *R. longicornis* (Leach, 1817)

(*Bryaxis sanguinea* auct.)

Solin, 1 specimen; Sinj, 3 specimens (Karaman). Sinj, 3 specimens (Klimesch).

The above-mentioned specimens were identified by Z. Karaman as *Bryaxis sanguinea*.

A common Palaearctic species, spread mainly in swamp environments and along river-banks. REITTER (1882), JEANNEL (1950) and Z. KARAMAN (1962) recorded the species in Dalmatia, but not NOVAK (1952).

8. *Brachygluta* Thomson, 1859

17. *B. fossulata* (Reichenbach, 1816)

Solin, 3 specimens; Knin, 1 specimen; Stobreč, 1 specimen (Karaman). Sinj, 1 specimen (Klimesch).

A widespread and common species, found nearly all over Europe, as well as in Anatolia and the Caucasus, mainly in decayed plants. Recorded in several localities in Dalmatia by REITTER (1881), NOVAK (1952) and Z. KARAMAN (1961:130).

18. *B. foveola* (Motschulsky, 1840)

(*schuppelii* Aubé, 1844)

Trogir, 1♂; Solin, 1♀; Split, 2♂, 2 specimens (Karaman).

A South European and Balkan species, also spread in Asia Minor and recorded in Tunisia. Found in salty soils. Recorded in several localities in Dalmatia by GANGLBAUER (1904), NOVAK (1952) and Z. KARAMAN (1961: 163).

19. *B. globulicollis* (Mulsant & Rey, 1861)

Knin, 1♂, 1 specimen (Karaman).

Western Mediterranean, including NW Africa. Found on salty soils along the Atlantic and Mediterranean coasts. There are no other findings of this species outside the mentioned area.

20. *B. lefebvrei lefebvrei* (Aubé, 1833)

(*fagniezi* Jeannel, 1950)

Sinj, 2 specimens (Klimesch). Knin, 1879, 1 specimen (Reitter).

Central and South Eastern Europe, SW Africa. In Dalmatia recorded by REITTER (1881), NOVAK (1952) and Z. KARAMAN (1961).

21. *B. perforata* (Aubé, 1833)

Sinj, 4 specimens (Klimesch).

Widespread, from Northern Spain to the Balkan Peninsula. Found in the vicinity of water currents. From Dalmatia recorded by REITTER (1881) and NOVAK (1952) from a few localities (Knin, Vrlika, Sinj, Metković).

22. *B. tibialis* (Aubé, 1844)

(*martae* Reitter, 1880)

Solin, 11 specimens (Karaman).

Bryaxis martae was described by Reitter from the locality of Budva (Montenegro), but was later by the same author synonymized with *Bryaxis tibialis* Aubé, 1844. Z. KARAMAN (1961: 152) considered that *tibialis tibialis* is a western subspecies (distributed in SE France, Corsica and Sardinia), while *tibialis marthae* represents an eastern subspecies, occurring from Italy up to Greece. In Dalmatia recorded by REITTER (1881), NOVAK (1952) and Z. KARAMAN (1961). *Brachygluta martae* is now considered as a synonyme of *tibialis* (POGGI, 1977).

23. *B. transversalis* (Schaum, 1895)

Konjsko, 1♂, 3♀; Solin, 1♂ (Karaman).

Belong to the fauna of the East Mediterranean (Syria, Corfu, Greece, Albania, Dalmatia, Italy). REITTER (1881), NOVAK (1952) and Z. KARAMAN (1961) recorded the species from a few localities in Dalmatia.

24. *B. trigonoprocta* (Ganglbauer, 1895)

Knin, 1 specimen; Split, 2♂; Solin, 1♂ (Karaman).

Found in swamps of Southern, southern Central and Eastern Europe. NOVAK (1952) also found the species in Knin. No other records from Dalmatia.

25. *B. xanthoptera* (Reichenbach, 1816)

Solin, 2 specimens (Karaman).

Distributed in Southern and Central Europe, also recorded from Anatolia and Algeria. Found under stones on riverbanks. There is only one record of the species from Dalmatia (Solin) in Z. KARAMAN's paper of 1961, probably based on specimens from the collection of Dr. Eduard Karaman.

9. *Reichenbachia* Leach, 1826

26. *R. nigriventris* (Schaum, 1859)

Solin, 8 specimens (Karaman).

A Mediterranean species, in Zadar recorded by Z. KARAMAN (1962). One of the first pselaphid beetles recorded in Dalmatia and its neighbouring areas. It was described by Schaum in 1859 after specimens collected in Dalmatia 15 years ago by Kahr, a German entomologist - trader (NONVEILLER, 1999: 196).

27. *R. chevrieri* (Aubé, 1844)

Kaštel Stari, 2 specimens (Karaman).

A southern European-Anatolian element, widespread on the territory of the former Yugoslavia, but recorded only from a few localities.

10. *Trissemus* Jeannel, 1950

28. *T. antennatus serricornis* (Schmidt-Goebel, 1833)

(*antennatus balcanicus* Z. Karaman, 1962)

Solin, 2♂; 9 specimens; Split, 1 specimen (Karaman).

A species widespread in Central and Eastern Europe, Turkey, W Caucasus. By Zora KARAMAN (1962) recorded from Metković. Found in swamps and in the vicinity of water currents.

11. *Fagnezia* Jeannel, 1950

29. *F. impressa* (Panzer, 1805)

Metković, 6 specimens; 1879, 1 specimen (Reitter).

Also a widespread European species, found mainly in swamp environments. REITTER (1881) and Z. KARAMAN (1960) recorded it in Dalmatia (Zadar, Metković), but not NOVAK (1952).

V Tribe *Bythinini* Raffray, 1890

12. *Tychobythinus* Ganglbauer, 1896

30. *T. cavifrons* (Reitter, 1881)

Knin, 1 specimen; Solin, 2 specimens (Karaman).

A species described from Knin, in Dalmatia recorded later by NOVAK (1952) and Z. KARAMAN (1954); endemic to Dalmatia, Herzegovina and Greece.

31. *T. glabratus* (Rye, 1870)

(*bulati* Reitter, 1917)

Kaštel Stari, 4 specimens; Split, 4 specimens (Karaman). Kaštela, VI-1912, 1 specimen; X-1912, 2 specimens; I-1913, 1 specimen; II-1913, 1 specimen (Novak).

Bryaxis bulati was described after specimens found by Dr. E. Karaman in the vicinity of Split and named after Dr. Gajetan Bulat, the mayor of Split at the period, maybe to compensate for the facilities given by him to Reitter's entomological excursion in the region or to immortalize him for his achievements in Dr. E. Karaman's

native city. *Bryaxis glabratus* is spread mainly in Western Europe, but also occurs in Italy. In Dalmatia recorded by MÜLLER (1912). NOVAK (1952) mentioned this species sub *Bryaxis bulati* Reitter, recently synonymized by BESUCHET (1999).

13. *Bythinus* Leach, 1817

32. *B. acutangulus acutangulus* Reitter, 1878

(*acutangulus kninensis* Reitter, 1881)

Sinj, 1♂; 1 specimen; Solin, 3♂, 1♀; 6 specimens; Split, 3♂, 1♀, 14 specimens; (Karaman). Kaštela, I-1912, 1 specimen; II-1913, 1 specimen (Novak).

The species is spread mainly over the Balkan Peninsula, and also found further to the north (Romania, Hungary, Slovakia). There are a number of records of the species from Dalmatia, in REITTER (1881, 1882, 1913), GANGLBAUER (1895), Z. KARAMAN (1948, 1957) and NOVAK (1952).

Some of the specimens from Split and Solin were identified by J. Müller as ssp. *kninensis*, identification confirmed by Z. Karaman.

14. *Bryaxis* Kugelann, 1791

33. *B. bulbifer* (Reichenbach, 1816)

Solin, 4 specimens, 2♂, 1♀; 1♂ (det. Holdhaus). Knin, 1 specimen (Karaman). Knin, 1879, 1♂ (Reitter).

The species is found nearly in whole Europe and is spread up to Anatolia and the Caucasus. REITTER (1881) and Z. KARAMAN (1957) recorded it in a number of localities in Dalmatia (Zadar, Knin, Split, Omiš, Metković). NOVAK (1952), curiously, did not mention any specimen of the species collected by him, only data from the references.

34. *B. dalmatinus* Reitter, 1881

Dubrovnik, 1♂, 1♀ (Reitter). Dubrovnik, 1 specimen (Holdhaus).

Also one of the many new species collected by Reitter during his first visit to Dalmatia, Herzegovina and Montenegro, and described in the report that he published on this travel. Later, the species was also found in Bosnia, Macedonia and Serbia and is considered as endemic to this part of the Balkan Peninsula.

35. *B. solidus* Reitter, 1881

Environments of Sinj, 1 specimen (Karaman). Sinj, 1 specimen (Klimesch).

Described from the Montenegrin coast (Herzegovina and Kotor), this species is distributed from Slovenia to Montenegro and was found also in Bosnia and Herzegovina. Z. KARAMAN (1957) recorded the species in different localities in Dalmatia.

VI Tribe *Pygoxyini* Reitter, 190915. *Pygoxyon* Reitter, 188036. *P. lathridiiforme* Reitter, 1881

Kaštela, I-1912, 1 specimen; IV-1913, 1 specimen (Novak).

An endemic species of Dalmatia, Herzegovina and Montenegro, and a not excessively rare Pselaphid, but in the literature formerly recorded only once in Dalmatia, by REITTER (1881) who found the species near Dubrovnik.

VII Tribe *Tychini* Raffray, 190416. *Tychus* Leach, 181737. *T. cordiger* Besuchet, 1969

Kaštel Stari, 1♂ (Karaman). Kaštela, XI-1912, 1♀ (Novak).

Distributed in Greece, from where the species was described, in Macedonia, Herzegovina and in Dalmatia. Z. KARAMAN (1972) recorded the species from Kaštela, Solin and Divulje near Trogir.

38. *T. dalmatinus* Reitter, 1881

Solin, 3 specimens; Metković, 1 specimen; Knin; 1 specimen, Stobreč, 1♂ (Karaman). Kaštela, III-1913, 1♂, 1 specimen (Novak). Knin, 1879, 1 specimen (Reitter).

Described by Reitter from "Süd-Dalmatien" (= the coastal area of Montenegro), this species, widespread in Europe, was recorded in Dalmatia in a large number of localities by NOVAK (1952) and by Z. KARAMAN (1955).

39. *T. rufus rufus* Motschoulsky, 1845(ab. *morio* Reitter, 1881)

Solin, 1♂ (label: Type), 1 specimen (label: Type); envir. Sinj, 1 specimen (Karaman). Kaštela, II-1913, 1♂, 2 specimens; IV-1913, 1 specimen (Novak).

This species, distributed in the Balkan Peninsula, Hungary, Romania and Anatolia, was described in Trieste. In 1881 REITTER described the ab. *morio* from Herzegovina and Kotor (now a synonym of *rufus*). It is not very clear what does the label "type" on two specimens mean.

VIII Tribe *Ctenistini* Blanchard, 184517. *Centrotoma* Heyden, 184940. *C. lucifuga* Heyden, 1849

Solin, 1 specimen (Karaman).

This species is spread mainly in Central Europe, is found in Northern Italy and in NE France. It is considered to be a rare species, found mainly in nests of ants. Formerly not recorded in Dalmatia.

18. *Ctenistes* Reichenbach, 181641. *C. palpalis* Reichenbach, 1816

Knin, 2 specimens; Solin, 1♂, 2♀ (Karaman).

Distributed from Central Europe through Central Asia; found in xerophilous biotopes. NOVAK (1952) recorded this species in several localities in Dalmatia.

IX Tribe *Pselaphini* Latreille 180219. *Pselaphaulax* Reitter, 190942. *P. dresdensis dresdensis* (Herbst, 1792)

Sinj, 1 specimen (Klimesch).

A species widespread in Northern and Central Europe, also recorded from Siberia. Several subspecies are described of *dresdensis*. They are found mainly in swamps, under grass and in moos. By several of the formerly mentioned authors, recorded in Dalmatia.

20. *Pselaphus* Herbst, 179243. *P. salonitanus* Z. Karaman, 1940

Solin, 2♂, 2♀, 3 specimens (Karaman).

Described from Dalmatia, so far known there only from a few localities, also recorded from Herzegovina (Mostar). One of the specimens in the collection, a female, is labeled "Type". But the holotype, designed by Z. KARAMAN (1940), was a male (!).

Discussion

In the collection of Dr. E. Karaman there are about 129 species of Pselaphinae, represented by more than 600 specimens. The majority of them are from different European countries, some even from the Caucasus. This is a relatively important number of species and a proof that Dr. E. Karaman, as a genuine insect collector, was anxious, engaging much of his time, and maybe also of his money, to establish a Coleoptera collection as large as possible, not only collecting insects by himself, but also trying to enrich it through exchanges and purchases (NONVEILLER, 1999: 41 - 47).

Even 42 [43] Pselaphid species in his collection were collected in Dalmatia. They belong to 20 genera and 9 tribes. The majority of the specimens were collected by Dr. E. Karaman himself, a few ones were found by other entomologists (6 species). The first group proceeds from a few localities only. Dr. E. Karaman collected Pselaphinae mainly in Split and in its immediate neighbourhood, such as around the little towns of Solin, Kaštela, Stobreč and Trogir that he could reach on foot or by horse-coach. To some localities, Konjsko, Knin and Sinj, he went most probably by train, and to Metković by ship. To these specimens in the collection are added a few others, not found by himself, but collected by two of his friends, the coleopterologists Petar Novak

(who was then staying in Kaštel Sućurac, near Split (1 species) and the Czech Josef Klimesch, appointed as a forest officer in Sinj (3 species).

Two of the Pselaphinae from Dalmatia in the collection were collected by Reitter and Holdhaus and were sent to Karaman by them in exchange. Dr. Eduard Karaman received from these two famous coleopterologists, his contemporaries, a number of other Pselaphinae too. In his collection there are Pselaphinae collected in various countries also by a large number of other well-known entomologists of that time. They were from Ljubljana (Gspan, Stussiner), Maribor (Dr. Krauss), Sarajevo (Apfelbeck, Winneguth), Vienna (Ganglbauer, Holdhaus, Winkler, Paganetti-Hummeler, Moczarski, Bachofen), Prague and other Czech cities (Formanek, Heyrowski, Roubal, Rambousek, Obenberger), Italy (Dodero), etc. Almost all of these entomologists, and many others, visited Dalmatia at that period, some even several times, and thus had the opportunity meet Dr. E. Karaman in Split and undertake with him some entomological excursions to the surroundings of Split. These relations were useful not only for the study of Dalmatian Pselaphinae, but of Coleoptera in general.

Concerning the species from Dalmatia in Dr. E. Karaman's collection, for the purpose of comparison, it can be mentioned that NOVAK (1952), the only author dealing extensively with the Coleoptera of that region, recorded about 65 species of Pselaphinae known at that period from Dalmatia. The number of Pselaphinae listed in his book is more important, but he also included in his book the Coleoptera of coastal areas of northern and southern Dalmatia. Out of this number, 22 species were collected by Novak himself, the data on the remaining species proceeding from literature references only. It is interesting to underline that the number of Pselaphinae collected by Novak does not exceed that of Dr. E. Karaman, in spite of the fact that Petar Novak traveled around the whole Dalmatia and visited numberless localities on the coast, in the hinterland of Dalmatia and on the islands.

The list of Pselaphinae in Dr. E. Karaman's collections comprises 6 species endemic to Dalmatia or its immediate neighbouring areas (continental Croatia, Herzegovina, Montenegro); 2 species are endemic to the Balkan Peninsula. There are also 2 Eastern Mediterranean, 2 Western Mediterranean, 1 Mediterranean species and the remaining 30 are common, more or less widespread species. The species *Trimum karamani* was discovered by Dr. E. Karaman and named after him. Five of the species in the above published list (Nr. 2, 5, 13, 40, 43) are for the first time recorded from Dalmatia. It may be of some interest to underline that 11 of the species in Dr. E. Karaman's collection were described after specimens collected in Dalmatia, mainly by Reitter in his account on his trip to Dalmatia (1881). In the collection, there are also type labels on specimens of two species, but these data are not reliable (see No. 39 and 43).

It may also be added that the species in Dr. E. Karaman's collection, as concerns Pselaphinae and as is shown in the above published list, are represented only by 241 specimens. One can suppose that Karaman probably collected more specimens of some species, but they were sent in exchange for species from foreign countries.

In conclusion, as shown in this discussion, it is of some interest to record in this contribution the Pselaphinae of Dalmatia in Karaman's collection and to expose some details that result from their examination.

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Sažetak

U radu je objavljen popis kornjaša iz potporodice Pselaphinae iz zbirke dr.-a Eduarda Karamana (1849 - 1923), liječnika iz Splita. Zbirka se nalazi u Prirodoslovnom muzeju u Splitu. Od 129 vrsta potporodice Pselaphinae u zbirci dr.-a KARAMANA, 43 su vrste sabrane u Dalmaciji, većinom od dr.-a E. Karamana. Ostale su sabrali dvojica njegovih kolega i prijatelja, Petar Novak, entomolog iz Sućurca, kraj Splita (1 vrsta) i J. Klimesch, entomolog iz Sinja (3 vrste). Dvije su vrste dobijene razmjenom; u Dalmaciji su ih našli bečki entomolozi E. Reitter i K. Holdhaus. Popis obuhvaća 6 endemskih vrsta za Dalmaciju ili područja u njenom neposrednom susjedstvu (kontinentalna Hrvatska, Hercegovina, Crna Gora): *Trimum cavicolle*, *T. hopffgarteni*, *T. karamani*, *Tychobythinus cavifrons*, *Pygoxyon lathridiiforme* i *Pselaphus salonitanus*. Dvije su vrste endemi Balkana (*Bryaxis dalmatinus* i *Tychus cordiger*). Popis sadrži 1 mediteransku, 2 istočno mediteranske i 2 zapadno mediteranske vrste. Ostatak, tj. 30 vrsta, ima širi areal rasprostranjenja i većinom su dosta česte. Jedanaest vrsta iz Dalmacije opisao je REITTER (1881, 1882, 1913), većinom prema primjercima koje je sam sabrao na putovanjima po ovim krajevima. Jednu od tih vrsta pronašao je dr. E. Karaman i po njemu je dobila ime *Trimum karamani*. Jednu vrstu s popisa opisala je iz Dalmacije dr. Zora KARAMAN (1940). Pet vrsta iz ovog popisa nisu ranije bile zabilježene s područja Dalmacije. Sve Pselaphidae iz zbirke Dr.-a E. Karamana revidirala je dr. Zora Karaman, iz Skoplja, u razdoblju od 1939 do 1968. godine. Na primjercima dvije vrste (br. 39. i 43.) nalaze se etikete s oznakom "typus", ali taj podatak nije pouzdan jer nema drugih dokumenata.

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A QUALITATIVE STUDY OF FOOD CONSUMPTION, GROWTH AND FECUNDITY OF A REDUVIID PREDATOR IN RELATION TO PREY DENSITY

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Nymphal instars and adults of a reduviid, *Neohaematorrhophus therasii* Ambrose and Livingstone were fed with caterpillars of *Corcyra cephalonica* Stainton in four prey densities (one, two, four and eight caterpillars/day/predator). Developmental period, predatory rate, percentage of survival and adult longevity of predators were negatively affected by prey scarcity. Low prey densities increased the preoviposition period. Fecundity and hatchability were increased as a function of prey density. The total prey consumption rate of both the nymphal instars and adults were minimum and maximum in one and eight prey densities respectively.

Heteroptera, Reduviidae, reduviids, predators, natural enemies, *Corcyra* larvae, biology, bionomics, predatory rate.

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Stadiji nimfe i odrasli grabežljive stjenice *Neohaematorrhophus therasii* Ambrose and Livingstone hranjene su s gusjenicama *Corcyra cephalonica* Stainton u četiri stupnja raspoložive hrane (jedna, dvije, četiri i osam gusjenica po danu i predatoru). Smanjenje broja gusjenica negativno utječe na trajanje razvoja, brojnost, postotak preživljavanja i dužinu života imaga predatora. Niska gustoća raspoložive hrane produljuje trajanje sazrijevanja jaja. Plodnost i izlijeganje bili su u porastu s gustoćom raspoložive hrane. Ukupna ishrana nimfi i imaga bila je najmanja kod jedne gusjenice, odnosno najveća kod gustoće osam gusjenica.

Heteroptera, Reduviidae, grabežljive stjenice, predatori, prirodni neprijatelji, gusjenice *Corcyra*, biologija, bionomija, gustoća populacije.

Introduction

Reduviids constitute a prominent group of predators due to their amenability to mass production (SAHAYARAJ, 1998) and potential for use in pest management (SAHAYARAJ, 1999).