©Slovenian Entomological Society, download unter www.biologiezentrum.at

ACTA ENTOMOLOGICA SLOVENICA

LJUBLJANA, JUNIJ 2010 Vol. 18, št. 1: 19–30

ANOPHTHALMUS BOGNOLOI SP. N. IZ SLOVENIJE (COLEOPTERA: CARABIDAE: TRECHINAE)

Bojan KOFLER

Podlubnik 301, SI-4220 Škofja Loka,
e-mail: bojan.kofler@telemach.net

Izvleček – Opisana in prikazana je nova vrsta *Anophthalmus bognoloi* sp. n. iz jame Jama ob poti na Komno (Kat. št.: 1676) na obrobju Spodnje Komne v Triglavskem narodnem parku (severozahodna Slovenija). Nova vrsta je primerjana s sorodno vrsto *Anophthalmus egonis* Müller, 1923.

KLJUČNE BESEDE: Coleoptera, Carabidae, Trechinae, *Anophthalmus,* nova vrsta, Slovenija.

Abstract – *ANOPHTHALMUS BOGNOLOI* SP. N. FROM SLOVENIA (COLEOPTERA: CARABIDAE: TRECHINAE)

The new species *Anophthalmus bognoloi* sp. n. from the cave »Jama ob poti na Komno« (Cave Cadastre no. 1676) at the margin of Spodnja Komna, in the Triglav National Park (north-western Slovenia), is described and illustrated. The new species is compared with the affined species *Anophthalmus egonis* Müller, 1923.

KEY WORDS: Coleoptera, Carabidae, Trechinae*, Anophthalmus*, new species, Slovenia.

Uvod

Brezokci (*Anophthalmus* Sturm) skupine *Anophthalmus mariae* so srednje velike (5,7 - 6,2 mm) vrste. Močno sklerotizirani in rahlo pigmentirani zunanji skelet kaže na to, da živijo razmeroma blizu zemeljske površine. Imajo že popolnoma atrofirane oči, površina njihovih teles pa je pokrita s kratkimi, redko posejanimi dlakami. Ti znaki kažejo na višjo stopnjo specializacije na življenje v podzemeljskem habitatu.

Po dosedanjem vedenju zastopniki te skupine poseljujejo predvsem razpoke in jame, ki ležijo plitvo v tleh, v apnenčevem območju Južnih Alp. Severno mejo razširjenosti tvorijo Karnijske Alpe, Karavanke in Julijske Alpe. Na jugu so razširjeni do Matajurja in preko Tolmina in Trnovskega gozda do Logaških Rovt.

©Slovenian Entomological Society, download unter www.biologiezentrum.at

Po Daffnerju (1998), Bognolu (2002) in Koflerju (2006) je bilo v skupini do sedaj znanih devet vrst in ena podvrsta: *A. mariae* (Schatzmayr, 1904), *A. baratellii* Sciaky, 1985, *A. egonis* (Müller, 1923), *A. tolminensis* (Müller, 1922), *A. besnicensis* Pretner, 1949, *A. besnicensis frater* Daffner, 1998, *A. bojani* Daffner 1998, *A. kahleni* Daffner, 1998, *A. annamariae* Bognolo, 2002 in *A. miroslavae* Kofler, 2006.

Vedenje o razširjenosti te skupine (Slika 1) je še vedno pomanjkljivo, zato so odkritja novih vrst ne samo možna, ampak tudi pričakovana. Med mojimi raziskavami podzemeljske favne hroščev v Triglavskem narodnem parku sem v jami Jama ob poti na Komno na obrobju Spodnje Komne v pasti s trohnečim mesom in konzervirno tekočino uspel uloviti zanimivo serijo primerkov, ki so pripadali skupini *A. mariae*. Kljub večletnim raziskavam v drugih jamah Spodnje Komne nisem nikjer drugje uspel uloviti nobenega primerka iz te skupine.

Natančne preiskave so pokazale, da se novi primerki pomembno razlikujejo od do sedaj opisanih vrst in podvrste te skupine. Nobenega dvoma ni, da gre za novo, še neopisano vrsto. V nadaljevanju je podan njen opis in primerjava s sorodno vrsto *A. egonis*.

Meritve in okrajšave

Vse meritve so bile opravljene z mikroskopom, opremljenim z okularnim mikrometrom. Celokupna dolžina je bila merjena od konice čeljusti do konice pokrovk. Dolžina glave je bila merjena od sprednjega roba clypeusa do vratne podveze. Dolžina vratnega ščita in pokrovk je bila merjena po sredini in širina vedno na najširšem mestu posameznega dela telesa.

Biometrične meritve, ki so služile primerjavi nove vrste z njej najbolj sorodno vrsto *Anophthalmus egonis,* so bile opravljene na 6 samcih in 10 samicah nove vrste in na 10 samcih in 10 samicah vrste *A. egonis* iz tipskega nahajališča Pesjakov buden (Krnica pri Bledu).

CPMSL: Zbirka Prirodoslovnega muzeja Slovenije, Ljubljana, Slovenija
CBKS: Zbirka Bojan Kofler, Škofja Loka, Slovenija
CMBT: Zbirka Marco Bognolo, Trieste, Italija

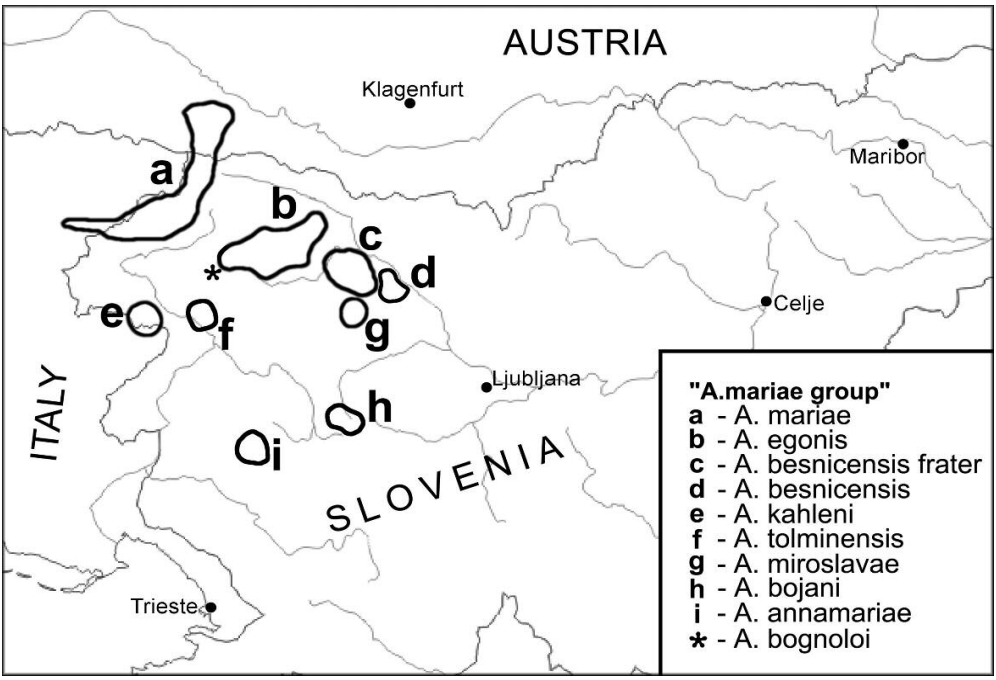
Anophthalmus bognoloi sp.n.

Holotip ♂: Slovenija, Spodnja Komna, Bohinj: Jama ob poti na Komno (Kat. št.: 1676), 1330 m, 28. 7. 2002 – 7. 6. 2003, leg. B. Kofler (CPMSL).

Paratipi: Slovenija, Spodnja Komna, Bohinj: Jama ob poti na Komno (Kat. št.: 1676), 1330 m, 28. 7. 2002 - 7. 6. 2003, 1♂ (CBKS); 7. 6. 2003 - 2. 9. 2004, 5♂, 9♀ (CMBT, CBKS, CPMSL); 2. 9. 2004 - 20. 7. 2005, 3♀ (CBKS); 23. 6. 2008 - 24. 7. 2009, 3♂, 7♀ (CBKS), vse leg. B. Kofler.

Srednje velika vrsta: 5,09 – 5,60 mm. Telo (Slika 2) krepko, glava in vratni ščit rumenordeča, pokrovke rumenorjave. Glava in vratni ščit pri samcih in samicah

©Slovenian Entomological Society, download unter www.biologiezentrum.at



Sl. 1: Razširjenost skupine *Anophthalmus mariae*.
Fig. 1: Distribution area of the *Anophthalmus mariae* group.

bleščeča, pokrovke pri samcih bleščeče in pri samicah nebleščeče. Zgornja stran poraščena s kratkimi dlakami.

Glava: kratka, porasla z redkimi kratkimi dlakami.

Vratni ščit: velik, stranski rob širok. Strani vratnega ščita se proti zadnjima vogaloma (ki sta pravokotna) zožujeta v ravni črti. Sprednja robova zaobljena. Osnovne dlake kratke in redke.

Pokrovke: podolgovate in na zgornji strani rahlo izbočene, s štirimi dolgimi dlakami na tretji progi. Strani pokrovk rahlo ovalne, najširša točka v drugi polovici pokrovk. Ramena pokrovk se v ravni črti poševno dvigujejo, ramenska vogala kratko zaobljena. Prva točka v »series umbilicata« običajno na nivoju druge točke. Konici pokrovk široko zaokroženi in proti šivu konkavno zarezani. Šivni vogal pravokoten. Pokrovke pokrite s kratkimi v vrste poravnavanimi dlakami. Razmak med dlakami približno 2-krat večji, kot je njihova dolžina.

Tipalke: krepke, poravnane ob telesu sežejo v predzadnjo petino pokrovk. Deseti člen tipalk je pri samcih 4-krat in pri samicah 3,9-krat daljši kot je širok.

Noge: dolge in krepke.

Holotip: Skupna dolžina 5,60 mm. Tipalke: dolžina 4,40 mm. Glava: dolžina – širina 0,82 proti 0,93 mm. Vratni ščit: dolžina – širina 1,06 proti 1,20 mm. Pokrovke: dolžina – širina 3,20 proti 1,89 mm.

©Slovenian Entomological Society, download unter www.biologiezentrum.at

Aedoeagus (Sliki 3 in 4): 1,70 – 1,82 mm. Pogled s strani: osnova zmerno ukrivljena, sredina močno podaljšana in lahno ukrivljena; konica ozka, zmerno ukrivljena navzgor in na koncu oblikovana v kavelj z notranjim kotom 90 stopinj. Pogled od zgoraj: osnova zmerno zaobljena, sredina močno podaljšana, konica je dolga in vitka. Ligula je velika, široka in na sprednjem robu ravna ali trikotno zarezana. Kopulacijska lamela (Sliki 5 in 6) - pogled s strani: ozka, dolga, zelo velika zoba oblikovana metuljasto in na konici obrnjena navzven. Pogled od spodaj (s trebušne strani): osnova široka, strani poševni proti vrhu, zelo velika zoba sta oblikovana metuljasto, na konici obrnjena navzven in segata daleč preko osnovne plošče.

Analiza razlik:

Samice in samci nove vrste so po svojem zunanjem videzu, samci pa tudi po obliki penisa in kopulacijske lamele, še najbližje vrsti *A. egonis* (Müller). Pa vendar se od nje jasno razlikujejo v naslednjih pomembnih znakih:

	Anophthalmus egonis	***Anophthalmus bognoloi* sp.n.**
Pokrovke (Slika 7)	- pri samicah bleščeče	- pri samicah nebleščeče
Aedoeagus (Sliki 3 in 4)	- 1,54 – 1,68 mm - razmerje dolžina/širina: 5,02	- 1,70 – 1,82 mm - razmerje dolžina/širina: 4,82
Sredina, konica (Sliki 3 in 4)	- sredina zmerno ukrivljena - konica izrazito ukrivljena navzgor in na koncu oblikovana v izrazit kavelj z notranjim kotom 75°	- sredina lahno ukrivljena - konica zmerno ukrivljena navzgor in na koncu oblikovana v kavelj z notranjim kotom 90°
Ligula (Slika 4)	- velika, srčasta	- velika, na sprednjem robu ravna ali trikotno zarezana
Kopulacijska lamela (Sliki 5 in 6)	- kratka (0,28 – 0,31 mm) - razmerje dolžina/širina: 1,49 - velika zoba, na konici obrnjena naprej in segata preko osnovne plošče	- dolga (0,37-0,41 mm) - razmerje dolžina/širina: 1,71 - zelo velika, metuljasta zoba, na konici obrnjena navzven in segata daleč preko osnovne plošče

Po morfologiji penisa in še zlasti po značilno oblikovani kopulacijski lameli, z dvema izstopajočima zelo velikima metuljasto oblikovanima zobema, se *A. bognoloi* sp.n. izrazito razlikuje od vseh drugih vrst in podvrste skupine *A. mariae*.

***Derivatio nominis*:** Nova vrsta je poimenovana po mojem dobrem prijatelju, odličnem koleopteorologu, jamarju in biospeleologu Marcu Bognolu iz Trsta.

Habitat: Sorodni brezokec *A. egonis* poseljuje velik areal in je zelo stabilna vrsta. Ob študiju številnih primerkov iz 14 jam in opuščenih rudarskih rovov nisem našel

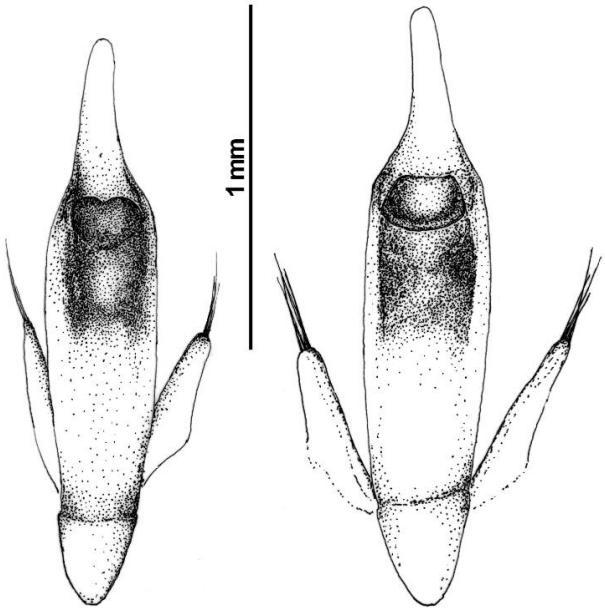
©Slovenian Entomological Society, download unter www.biologiezentrum.at

Sl. 2: *Anophthalmus bognoloi* sp.n.: habitus (♂) iz Jame ob poti na Komno, Slovenija, in obris levega dela telesa, pogled od zgoraj.
Fig. 2: *Anophthalmus bognoloi* sp.n.: habitus (♂) from Jama ob poti na Komno, Slovenia, and dorsal profile of body, left side.

nobenih pomembnih razlik (habitus samic in samcev, kopulacijska lamela, aedeagus) med njimi in primerki iz tipskega nahajališča (Pesjakov buden). *A. egonis* po znanih podatkih poseljuje Pokljuko, Rudnico in gorate predele severno od Bohinja (Pršivec in Viševnik). Daleč izven do sedaj znanega življenjskega areala te vrste sta dve novi, zaenkrat osamljeni in še nepublicirani nahajališči pri Kamni Gorici in v Kranju. Tudi tu se osebki v ničemer ne razlikujejo od osebkov s tipskega nahajališča.

Nova vrsta *A. bognoloi* pa je nasprotno do sedaj znana zgolj z obrobja Spodnje Komne, ki leži zahodno od Bohinja (Slika 1) in še to samo iz Jame ob poti na Komno, ki se nahaja na strmem južnem pobočju, na nadmorski višini 1330 m. Jama je dolga skromnih 17 m. Globoka, bolje rečeno visoka, pa 3 m. Jama se namreč od

©Slovenian Entomological Society, download unter www.biologiezentrum.at



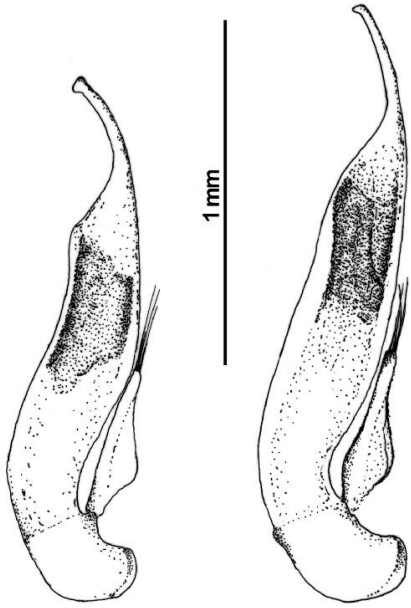
Sl. 3: Pogled na aedoeagus od zgoraj: *Anophthalmus bognoloi* sp.n. (desno) in *Anophthalmus egonis* (levo).
Fig. 3: Aedeagus, dorsal view: *Anophthalmus bognoloi* sp.n. (right) and *Anophthalmus egonis* (left).

vhoda proti koncu polagoma dviga in nima nobenih žepov, v katerih bi se v poletnem času zadrževala led in hladen zrak. Pozimi (če jama ni zasuta s snegom) najdemo v njej ledene stalagmite in stalaktite, ki pa se raztalijo že v zgodnji pomladi. V drugih, hladnejših jamah tega področja nove vrste nisem našel. Najbližje nahajališče vrste *A. egonis* je v zračni črti oddaljeno le približno 3 km. Nova vrsta ima še vedno lahno pigmentiran zunanji skelet, kar kaže tako kot pri ostalih zastopnikih te skupine na način življenja, ki je blizu zemeljske površine. Predvidevam, da poseljuje zlasti razpoke v skalnih blokih, od jam pa tiste, ki ležijo tik pod površjem, saj je bila ulovljena skupaj s tipičnimi predstavniki talne favne tega področja: *Laemostenus schreibersi* Küster, 1846, *Stomis rostratus* (Sturm, 1812), *Necrophilus subterraneus* (Dahl, 1807) in *Catops subfuscus* Kellner, 1846. Vrsta *A. egonis* ima nasprotno rajši hladnejše jame in je bila na bližnjem Pršivcu in Viševniku ulovljena skupaj s predstavniki iz takih jam, kot so: *Anophthalmus ravasinii alpestris* Daffner, 1996, *Oryotus micklitzi* Reitter, 1885 in *Aphaobius milleri* Schmidt, 1855.

Summary

The blind Trechinae belonging to the *A. mariae* group are medium-large species (5.7-6.2 mm) of the genus *Anophthalmus* Sturm. Their strongly sclerotized and

©Slovenian Entomological Society, download unter www.biologiezentrum.at



Sl. 4: Pogled na aedeagus s strani: *Anophthalmus bognoloi* sp.n. (desno) in *Anophthalmus egonis* (levo).
Fig. 4: Aedeagus, lateral view: *Anophthalmus bognoloi* sp.n. (right) and *Anophthalmus egonis* (left).

slightly pigmented body suggests that these species live in the subterranean environment, close to the surface. The eyes are already completely atrophied, the body is covered by short and sparse pubescence. These features call for a high degree of specialisation to the life in the subterranean environment.

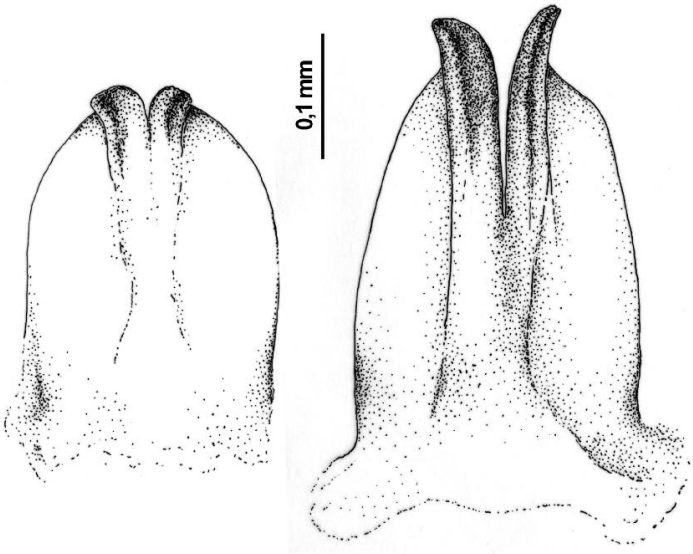
According to the present knowledge, the species of this group mainly populate cracks between rocky blocks and caves that lie superficially under the ground, in the karst area of the Southern Alps. The northern border of the distribution area is constituted by the Carnic Alps, Karavanke Mts and Julian Alps. At south, the distribution area reaches Mt Matajur, Tolmin, the forest of Trnovo and Logaške Rovte.

According to Daffner (1998), Bognolo (2002) and Kofler (2006) as of today nine species and one subspecies are included in this group: *A. mariae* (Schatzmayr, 1904), *A. baratellii* Sciaky, 1985, *A. egonis* (Müller, 1923), *A. tolminensis* (Müller, 1922), *A. besnicensis* Pretner, 1949, *A. besnicensis frater* Daffner, 1998, *A. bojani* Daffner 1998, *A. kahleni* Daffner, 1998, *A. annamariae* Bognolo, 2002 and *A. miroslavae* Kofler, 2006.

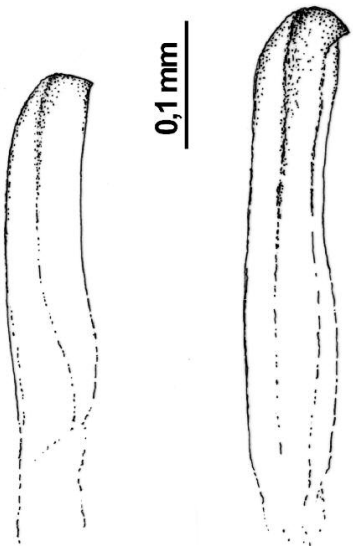
The knowledge on the distribution of this group is still not complete, such that the discovery of new species is not only possible, but also expected.

During my research on the subterranean fauna of beetles in the Triglav national park, I managed to find, with the use of pitfall traps in the cave Jama ob poti na

©Slovenian Entomological Society, download unter www.biologiezentrum.at



Sl. 5: Pogled na kopulacijsko lamelo od spodaj: *Anophthalmus bognoloi* sp.n. (desno) in *Anophthalmus egonis* (levo).
Fig. 5: Copulatory piece, ventral view: *Anophthalmus bognoloi* sp.n. (right) and *Anophthalmus egonis* (left).



Sl. 6: Pogled na kopulacijsko lamelo s strani: *Anophthalmus bognoloi* sp.n. (desno) in *Anophthalmus egonis* (levo).
Fig. 6: Copulatory piece, lateral view: *Anophthalmus bognoloi* sp.n. (right) and *Anophthalmus egonis* (left).

©Slovenian Entomological Society, download unter www.biologiezentrum.at

Komno in the area of Spodnja Komna, an interesting series of specimens belonging to the *A. mariae* group. Despite many years of research in other caves of Spodnja Komna, I have never found specimens of this group in any other location. Accurate examinations showed that the new specimens were significantly different from the species and subspecies of this group so far described. There was no doubt that they were a new, not yet described species. Its description and the comparison with the affined species *A. egonis* are presented here.

Sl. 7: Samici *Anophthalmus bognoloi* sp.n. (desno) in *Anophthalmus egonis* (levo).
Fig. 7: Females of *Anophthalmus bognoloi* sp.n. (right) and *Anophthalmus egonis* (left).

©Slovenian Entomological Society, download unter www.biologiezentrum.at

Measurements and abbreviations

All measurements were taken by means of a microscope, equipped with an ocular micrometer. The total body length was measured from the apex of the mandibles to the apex of the elytra. The length of the head was measured from the anterior edge of clypeus to the insertion on pronotum. The length of pronotum and elytra was measured at middle and the width always in way of the largest part of each specific part of the body.

Biometric measurements for the comparison of the new species with its most affined species *A. egonis* have been carried out on 6 males and 10 females of the new species and on 10 males and 10 females of the species *A. egon*is from the type locality, Pesjakov buden (Krnica, near Bled).

CPMSL: Collection of the Slovenian Museum of Natural History, Ljubljana, Slovenia

CBKS: Collection Bojan Kofler, Škofja Loka, Slovenia

CMBT: Collection Marco Bognolo, Trieste, Italy

Anophthalmus bognoloi sp.n.

Holotype ♂: Slovenia, Spodnja Komna, Bohinj: Jama ob poti na Komno (Slovene Cave Cadastre no. 1676), 1330m, 28.7.2002 – 7.6.2003, leg. B. Kofler (CPMSL).

Paratypes: Slovenia, Spodnja Komna, Bohinj: Jama ob poti na Komno (Slovene Cave Cadastre no. 1676), 1330m, 28.7.2002 - 7.6.2003, 1♂ (CBKS); 7.6.2003 - 2.9.2004, 5♂, 9♀ (CMBT, CBKS, CPMSL); 2.9.2004 - 20.7.2005, 3♀ (CBKS); 23.6.2008 - 24.7.2009, 3♂, 7♀ (CBKS), all leg. B. Kofler.

Medium-large species: 5.09–5.60 mm. Body (Fig. 2) robust, head and pronotum yellow-reddish, elytra yellow-brownish. Head and pronotum shiny in males and females, elytra shiny in males and opaque in females. Upper surface covered by short pubescence.

Head: short, covered with sparse, short pubescence.

Pronotum: large, lateral margin wide. The sides of pronotum are closing in a straight line towards the hind angles (which are right-angled). Fore margin rounded. Pubescence short and sparse.

Elytra: elongated and feebly convex, with four long setae on the third stria. Sides of elytra slightly oval, the maximum width in the second half of elytra. Humerus of elytra transversely cnverging in a straight line, humeral angles shortly rounded. First pore in the »umbilicate series« normally at the same level of the second one. Apex of elytra largely rounded and concavely cut towards the sutural stria. Sutural angle right. Elytra covered with short setae, longitudinally aligned. Distance between setae about 2 times their length.

Antennae: robust, reaching the four-fiths of elytra when stretched backwards. The tenth antennomere is 4 times longer than wide in males and 3.9 times in females.

Legs: long and robust.

©Slovenian Entomological Society, download unter www.biologiezentrum.at

Holotype: Total length 5.60 mm. Antennae: length 4.40 mm. Head: length – width 0.82 vs 0.93mm. Pronotum: length – width 1.06 vs 1.20mm. Elytra: length – width 3.20 vs 1.89mm.

Aedeagus (Figs. 3 and 4): 1.70–1.82mm. Lateral view: base moderately curved, median lobe strongly elongated and slightly curved; apex narrow, moderately curved upwards and hook-shaped at the end, with an internal angle of 90 degrees. Dorsal view: base moderately rounded, median lobe strongly elongated, apex long and slender. The ligula is large, wide and at the anterior margin straight or triangularly cut. Copulatory piece (Figs. 5 and 6) – lateral view: two narrow, long, very large butterfly-shaped teeth diverging outwards at apex. Ventral view: base wide, sides oblique towards the apex, with two very large butterfly-shaped teeth diverging outwards and protruding well over the median part.

Differential analysis

The specimens of the new species, according to their exterior morphology as well as to the shape of the aedeagus and the copulatory piece, are most affined to the species *A. egonis*. However, they differ from the latter for the following features:

	Anophthalmus egonis	***Anophthalmus bognoloi* sp.n.**
Elytra (Fig. 7)	- shiny in females	- opaque in females
Aedeagus (Figs. 3 and 4)	- 1.54 – 1.68 mm - length/width ratio: 5.02	- 1.70 – 1.82mm - length/width ratio: 4.82
Base, median lobe, apex (Figs. 3 and 4)	- median lobe moderately curved - apex distinctively curved upwards and at the end forming a hook angled at 75 degrees	- median lobe slightly curved - apex moderately curved upwards and at the end forming a hook angled at 90 degrees
Ligula (Fig. 4)	- large, heart-shaped	- large, at the anterior margin straight or triangularly cut
Copulatory piece (Figs. 5 and 6)	- short (0.28 – 0.31mm) - length/width ratio: 1.49 - two large teeth, oriented forward at apex and extending over the median part	- long (0.37 - 0.41mm) - length/width ratio: 1.71 - two very large butterfly-shaped teeth, diverging outwards at apex and protruding well over the median part

For the morphology of the aedeagus and, even more, for the characteristic shape of the copulatory piece, with two very large, salient, butterfly-shaped teeth, *A. bognoloi* sp.n. clearly differs from other species and subspecies of the *A. mariae* group.

©Slovenian Entomological Society, download unter www.biologiezentrum.at

***Derivatio nominis*:** The new species is named after my dear friend, excellent entomologist, caver and biospeleologist Marco Bognolo from Trieste.

Habitat: The affined blind beetle *A. egonis* populates a large area and is a very stable species. After the study of several specimens from 14 sites (caves and abandoned mines), I did not find any significant differences between them and the specimens from the type locality (Pesjakov buden). According to presently available data, *A. egonis* populates Pokljuka, Rudnica and the mountain areas north of Bohinj (Pršivec and Viševnik). Far from the presently known distribution area of this species are two new, isolated and not yet published finding sites near Kamna Gorica and Kranj. Also the specimens from these localities do not differ from the specimens of the type locality.

The new species *A. bognoloi* is known only of Spodnja Komna, which lies west of Bohinj (Fig. 1), and only from the cave »Jama ob poti na Komno«, which is located on the steep southern slope, at the altitude of 1330 m above sea level. The cave is about 17 m long and 3 m high. The cave gradually curves from the entrance towards the end, without any niches where during summer ice and cold air might be trapped. During winter (if the cave is not filled up with snow) we find ice stalagmites and stalactites, which however melt already in early spring. In other, colder caves of this area the new species was not found. The nearest finding site of the species *A. egonis* is distant only about 3 km as the crow flies. The new species still has a slightly pigmented body which refers, as for the other representatives of this group, to a way of living near the ground surface. I foresee that the new species particularly populates cracks between rocky blocks and caves that lie close to the subterranean superficial environment, since it was found together with the typical representatives of the endogean fauna of this area, such as *Laemostenus schreibersi* Küster, 1846, *Stomis rostratus* (Sturm, 1812), *Necrophilus subterraneus* (Dahl, 1807) and *Catops subfuscus* Kellner, 1846. As opposed, *A. egonis* prefers colder caves and was found, on the nearby Mts Pršivec and Viševnik, with an associated cave fauna like *Anophthalmus ravasinii alpestris* Daffner, 1996, *Oryotus micklitzi* Reitter, 1885 and *Aphaobius milleri* Schmidt, 1855.

Literatura

Bognolo M., 2002: *Anophthalmus annamariae* sp.n. *(Coleoptera: Carabidae)* and notes on the beetles of the cave Ledenica pri Dolu (Trnovski gozd, Slovenia). Acta entomologica slovenica, **10 (2)**: 121 – 130. Ljubljana.

Daffner H., 1998: Die Arten und Rassen der *Anophthalmus schmidti* und *–mariae* Gruppe (*Coleoptera: Carabidae: Trechinae*). Acta entomologica slovenica, **6 (2)**: 99 – 128. Ljubljana.

Jeannel R., 1928: Monographie des Trechinae. Gen. *Anophthalmus*: 714, 751 – 752. Paris

Kofler B., 2006: *Anophthalmus miroslavae* sp. n. iz Slovenije (*Coleoptera: Carabidae: Trechinae*). Acta entomologica slovenica **14 (1)**: 35 – 42. Ljubljana.

Received / *Prejeto*: 12. 11. 2009

ZOBODAT - www.zobodat.at

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: Acta Entomologica Slovenica

Jahr/Year: 2010

Band/Volume: 18

Autor(en)/Author(s): Kofler Bojan

Artikel/Article: ANOPHTHALMUS BOGNOLOI SP. N. IZ SLOVENIJE (COLEOPTERA: CARABIDAE: TRECHINAE) 19-30