

# Description of *Winklerites macedonicus* n. sp. from the Republic of Macedonia (Carabidae, Trechinae, Bembidiini)

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**Abstract:** *Winklerites macedonicus* n. sp. (Coleoptera, Carabidae, Trechinae, Bembidiini, Anillina), is described from Blaževa Peštera Cave (foothills of the Jakupica Mountain) from central parts of the Republic of Macedonia. This is the fifth *Winklerites* species from the Republic of Macedonia and the first *Winklerites* to be discovered in a cave environment. The new species was placed in the “*weiratheri*” species group (sensu GIACHINO & VAILATI, 2011) and compared to its closest relatives from Macedonia and Greece.

**Key words:** *Winklerites macedonicus*, Carabidae, new species, Macedonia

## Introduction

All of the species of the subtribe Anillina (Coleoptera, Carabidae, Trechinae, Bembidiini) are adapted to endogean life and most of them are depigmented, without eyes and have very small body size (JEANNEL 1937). This subtribe is the closest to the subtribe Lovriciina (GIACHINO *et al.* 2011). The Anillina species on the Balkan mainland belong to the genera *Anillus* Jacquelin de Val, 1851, *Prioniomus* Jeannel, 1937, *Winklerites* Jeannel, 1937, *Caecoparvus* Jeannel, 1937, *Iason* Giachino & Vailati, 2011, *Dicropterus* Ehlers, 1883, and *Parvocoecus* Coiffait, 1956. The genus *Winklerites* represents a separate phyletic series within the Anillina (GIACHINO & VAILATI 2011) and is exclusively distributed on the Balkan Peninsula. So far, *Winklerites* has contained 9 species from Greece, 5 species from Macedonia, 2 from Montenegro, 1 from Bosnia and Herzegovina, 1 from Serbia and 1 from Croatia (GUÉORGUIEV 2007, GIACHINO & VAILATI 2011, 2012, ĆURČIĆ *et al.* 2013).

The species of *Winklerites* can be arranged into four species groups (combined from GUÉORGUIEV 2007 and GIACHINO & VAILATI 2011):

“*hercegovinensis*”, which includes species from Bosnia and Herzegovina, Serbia, Montenegro

and two species from Macedonia, both from the Šar Planina Mt. (*W. fodori* Guéorguiev, 2007 and *W. gueorguievi* Casale & Vailati, 2012).

“*weiratheri*”, which includes species from northern Greece (*W. weiratheri* (J. Müller, 1935), *W. lagrecai* Casale, Giachino et M. Etonti, 1990, *W. luisae* Giachino et Vailati, 2011, *W. casalei* Giachino et Vailati, 2011, *W. zaballosi* Giachino et Vailati, 2011, *W. vailatii* Giachino, 2001 and *W. thracicus* Giachino et Vailati, 2011) and Republic of Macedonia (*W. blazeji* Giachino et Vailati, 2012, *W. moraveci* Giachino et Vailati, 2012, *W. vonickai* Giachino et Vailati, 2012, and *W. macedonicus* n. sp.).

“*andreae*” with only one species, characterised by the medium-size (1.65-1.70 mm), stocky elytra, the elytral disc with no semicircular furrows but with two evident circular foveae in the basal third, and the median lobe of the aedeagus short and subrectilinear, with the basal and distal part not well identified due to the lack of a neat flexion of the median lobe.

“*imathiae*” with only one species, characterised by the medium size (1.60-1.65 mm), elytral disc with two evident semi-circular furrows in the basal fifth, and the median lobe of the aedeagus regularly curved, with a small basal bulb and the apex curved ventrally.

The aim of this paper is to describe the a newly discovered species of the genus *Winklerites* from the Republic of Macedonia.

## Material and Methods

Blaževa Peštera Cave (41°53'19.94"N / 21°16'14.12"E) is situated on Crn Gaber hill, the north part of Karadžica range in the foothills of the Jakupica Mountain (central parts of the Republic of Macedonia), near the village of Nova Breznica (south of Skopje). The entrance of the cave is at altitude of 870 m, in degraded thermophyllous oak community (*Quercus-Carpinetum orientalis*) on fine-grained dolomite bedrock.

The four *Winklerites* specimens were collected by hand on 24.01.2008 only, although several visits of the cave were made prior and after the collection.

The male genitalia were extracted and put in 10% KOH. The examination of the specimens and external measurements were done by a LOMO MBS10 binocular stereomicroscope equipped with an ocular micrometer (accuracy of 0.02 mm). The examination of the male genitalia was performed on a Nikon Eclipse 80i light microscope equipped with a digital camera. All four specimens were glued on cardboards together with their genital organs.

## Results

### *Winklerites macedonicus* n. sp.

#### Type material

Holotype (HT) ♂: Blaževa Peštera Cave, village Nova Breznica, Karadžica, Jakupica Mt., 870 m a.s.l., in wet gravel, 24.01.2008, leg.: S. Hristovski. Paratypes (PT): 1 ♂ and 2 ♀♀, same labels as the holotype. All four type specimens are deposited in the collection of the Macedonian Natural History Museum (MNHM) in Skopje.

### Diagnosis

*Winklerites macedonicus* n. sp. belongs to the “*weiratheri*” species group (sensu Giachino & Vailati, 2011), which is characterised by the specific shape of the aedeagus: median lobe twisted on the right side with enlarged apex. The species of this group inhabit northern Greece, as well as west and southwest Macedonia. *Winklerites macedonicus* n. sp. shows greater similarity to the geographically closer Macedonian species. All of the Greek species (*W. weiratheri*, *W. lagrecai*, *W. luisae*, *W. casalei*, *W. zaballosi*, and *W. vailatii*) have more or less pointed apex of the median lobe (some conspicuously beaked), while *W. macedonicus* n. sp. has a rounded apex with a moderately beaked apical blade. *W. macedonicus* differs from *W. thracicus* (males of the species are unknown) in the smaller size and narrower pronotum.

*Winklerites macedonicus* n. sp. differs from *W. moraveci* from Pelister (Baba) Mt. in the smaller size (1.94 mm vs 2.52 mm), less beaked apex of the median lobe, and more elongated pronotum (width/length ratio is 1.06 in *W. macedonicus* vs 1.43 in *W. moraveci*) with sides more sinuate before the base.

*Winklerites macedonicus* n. sp. differs from *W. blazeji* from Galičica Mt. in the smaller size (1.78-2.08 vs 2.20-2.29 mm) and more beaked apex of the median lobe.

*Winklerites macedonicus* n. sp. differs from *W. vonickai* from Bistra Mt. in the more prominent hind angles of the pronotum, more arcuate aedeagus and apical blade of median lobe rounded (not obliquely truncate as in *W. vonickai*).

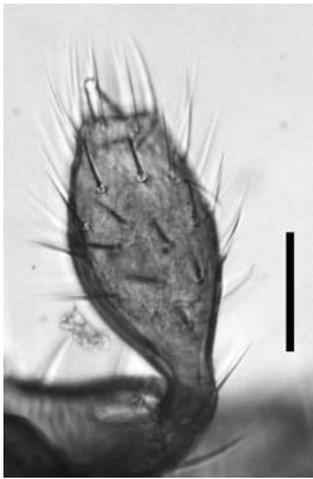
### Description

The morphometric characterisation of the type specimens is presented in Table 1.

Medium-sized *Winklerites*. Total length 1.75-2.08 mm (2.17-2.55 mm from the tip of mandibles

**Table 1.** Morphometric characteristics of the type specimens of *Winklerites macedonicus* n. sp. (dimensions given in mm; HT = holotype; PT = paratype)

Measurements	HT male	PT1 male	PT2 female	PT3 female	average	variation
Total length (tip of mandibles - tip of elytra)	1.75	1.87	2.08	2.05	1.94	1.75-2.08
Total length (tip of mandibles - tip of abdomen)	2.17	2.23	2.55	2.34	2.32	2.17-2.55
Length of elytra	0.97	1.06	1.06	1.06	1.03	0.97-1.06
Maximal width of elytra	0.71	0.63	0.66	0.68	0.67	0.63-0.71
Length/ width ratio of elytra	1.36	1.67	1.59	1.56	1.54	1.36-1.67
Length of pronotum	0.48	0.48	0.47	0.50	0.48	0.47-0.50
Maximal width of pronotum	0.51	0.54	0.54	0.57	0.54	0.51-0.57
Width/ length ratio of pronotum	1.06	1.13	1.16	1.15	1.13	1.06-1.16
Length of antennae	1.06	1.12	1.10	1.09	1.09	1.06-1.12



**Fig 1.** Photograph of the left maxillary palp (ventral view) of *Winklerites macedonicus* n. sp., HT ♂ (scale bar = 0.1 mm)



**Fig. 2.** Photograph of the left side of the pronotum of *Winklerites macedonicus* n. sp., HT ♂ (scale bar = 0.1 mm)

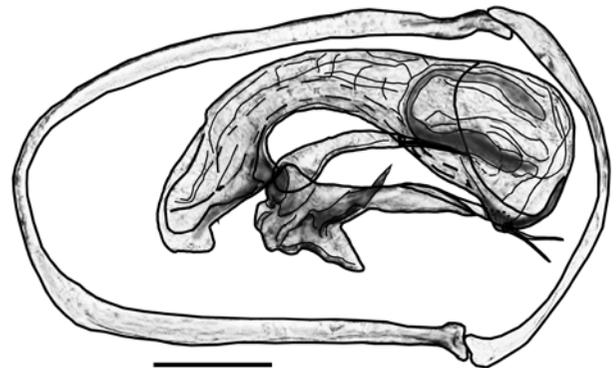
to the last urotergite). Body elongated, completely reddish-yellow; microsculpture isodiametric, distinct; pubescence short and sparse. Two last abdominal tergites not covered by elytra and visible from above.

Head large but not wider than pronotum and as wide as the pronotal base; frontal furrows distinct; eyes completely absent; antennae about 1.1 mm long, reaching anterior third of the elytra, basal antennomeres longer than wide, becoming moniliform towards apex (especially antennomeres 7-10). Mandibles sharply pointed; mentum without tooth; penultimate palpomere of maxillar palpi large ovoidal, the last palpomere very small but visible (Fig. 1).

Pronotum slightly wider than longer (ratio width/length=1.06-1.16), widest at the anterior third; sides narrowed towards base, sinuate basally, almost straight from posterior marginal setae to hind angles, not serrated; margins explanate on the whole length; hind angles distinct, rectangular or almost so; anterior margin slightly concave; anterior angles indistinct; basal margin straight (Fig. 2). Posterior marginal seta moved from hind angles forward; anterior marginal seta situated in the anterior fourth of the pronotum together with 2-3 smaller marginal setae in front of it. Disc convex with sparse pubescence, midline evident; basal foveae deep, impunctate.

Abdominal sternites with microscopic sculpture of transversal large meshes. Last visible abdominal sternite in males with shallow oval impression, last visible sternite in females lacks such an impression.

Elytra elongate, subparallel, 1.36-1.67 time longer than both wide, with very distinct incision before apex from each side, separately rounded at apex; shoulders prominent but widely rounded, mar-



**Fig. 3.** Aedeagus of *Winklerites macedonicus* n. sp., HT ♂, left lateral view (scale bar = 0.1 mm)

gin indistinctly serrate near the base. Elytral disc flat, without evident striae; microsculpture of large and distinct isodiametric meshes; scutellar pore present; two discal setae, anterior seta in the basal third, the posterior one at the level of 7<sup>th</sup> umbilical seta. Pubescence sparse with short, stiff, erected and dark hairs. The general position of umbilical setae as in the other *Winklerites* species.

Protibiae more massive than the meso- and metatibiae, the outer angle of protibia obliquely truncated before apex. Protarsi in males with two dilated protarsomeres, the first one wider than the second.

Aedeagus relatively big (cca 0.35 mm in length), strongly arcuate; the bulb slender (lateral view); median lobe twisted on the right side (dorsal view); the apex of the median lobe enlarged; the apical blade rounded with well-developed and strongly chitinised beak (lateral view). Inner sac with a large, well-chitinised C-shaped copulative lamella. Parameres unequal, both ending with two apical setae (Fig. 3.).

**Etymology.** Named after the Republic of Macedonia.

**Distribution**

*Winklerites macedonicus* n. sp. is known only from the type locality: Blaževa Peštera Cave, the village of Nova Breznica, Jakupica Mt. The broader area consists of fine-grained dolomite and a number of caves are known. However, *Winklerites* specimens were not discovered in any of the other visited caves (Bozguni Cave, Hristijanovna Cave, Jasika, etc.). No specimens were collected under stones or other underground habitats in the vicinity of Blaževa Peštera Cave, although several research trips were conducted.

**Ecology**

The specimens of *Winklerites macedonicus* n. sp. were discovered in a small cave in wet gravel. This is the first *Winklerites* species to be found in a cave, since all of the other representatives of the genus inhabit forests (actually, all of the species inhabit beech forests with the exception of *W. thracicus* found in a oak forest at even lower altitude, 400-550 m a.s.l.), and are found under deeply embedded stones. The vegetation around the cave is represented by a degraded thermophyllous oak community (*Quercus-Carpinetum orientalis*) on fine-grained dolomite bedrock at 870 m a.s.l. It seems that the dry climate of the area was the primary reason for settlement of *W. macedonicus* n. sp. in the humid cave environment.

Several visits of Blaževa Peštera were made prior and after the discovery of the type series. None of the other visits resulted in collection of other specimens, which points to the possible mobility of *W. macedonicus* n. sp. between the cave and the surrounding hypogean habitats.

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**Discussion**

According to JEANNEL (1963) and JEANNE (1973), *Winklerites* belongs to the genera of North-Aegeid origin. It is considered that the species of *Winklerites* adapted to the endogean life during Oligocene (JEANNEL 1937, 1963).

Genus *Winklerites* is exclusively distributed on the Balkan Peninsula. It is known from Croatia (Dalmatia), Bosnia and Herzegovina (Herzegovina), Montenegro, Serbia, Republic of Macedonia (the Šar Planina, Pelister, Galičica and Bistra mountains) and Greece. The Macedonian species belong to the “*hercegovinensis*” and “*weiratheri*” species groups. The species of the “*hercegovinensis*” group are known from the Dinaric Mountains and from the Šar Planina in Macedonia. Macedonian species of the “*weiratheri*” group inhabit mountainous regions east and south-east of the Šar Planina and west of the Vardar valley, as well as the north and north-east parts of Greece.

The recently described species from Macedonia (since 2007) have filled in the gap in the distribution of *Winklerites* between the Dinaric Mountains and the Greek mainland. The localities of these species fall within the assumed distribution of *Winklerites*, as presented by JEANNEL (1937). Thus, new *Winklerites* species might be expected from Albanian and the western Macedonian mountains.

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