



## The genus *Brachyptera* Newport (Plecoptera: Taeniopterygidae) in the Peloponnes, Greece

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### Abstract

A new species of the genus *Brachyptera* (Plecoptera: Taeniopterygidae), *B. kotschani* sp. n. is described on the basis of a male and eight female adults collected in the Peloponnes, Greece. Remarks on the closely related and poorly known *B. dinarica* Aubert, and notes on the distribution and ecology of the *Brachyptera* species known from the Peloponnes are also presented.

**Key words:** Plecoptera, Taeniopterygidae, *Brachyptera kotschani* new species, Peloponnes, Greece

### Introduction

The genus *Brachyptera* Newport, 1848 is a West Palaearctic stonefly genus, comprised of 30 valid species and seven subspecies (DeWalt et al. 2011, Baumann & Kondratieff 2009). The majority of these species are Mediterranean in distribution. Among the Mediterranean peninsulas, the Balkans are the richest with 15 species and one subspecies recorded (Fochetti 2004, Tierno de Figueroa & Fochetti 2001).

The Peloponnes peninsula of Greece forms the southernmost mainland of the Balkans. Its stonefly fauna is rather interesting, despite being poorly investigated with large mountainous areas that remain relatively unstudied. Among the 32 species reported so far, three are endemic and 17 are restricted to the Balkans (Aubert 1956, 1963, Joost 1970, Theischinger 1975, Zwick 1978, Pardo & Zwick 1993, Tierno de Figueroa & Fochetti 2001, 2007). During a collecting tour in April 2009, attempts were made to collect topotype material of stoneflies described from the Peloponnes, and to increase sampling in cover some poorly studied areas.

Herein, I describe a new species of *Brachyptera* found in the southwest and central Peloponnes and compare this species with the closely related but poorly known *B. dinarica* Aubert, 1964. Additionally, notes on the distribution and ecology of the genus in the Peloponnes peninsula is provided.

### Material and methods

Newly collected material was caught by hand, dipnet or by beating sheet. All specimens were stored in 70% ethanol and most have been deposited in the Collection of Smaller Insect Orders, Department of Zoology, Hungarian Natural History Museum (HNHM). One female paratype is deposited in the collection of the former Limnologische Fluss-Station des Max-Planck-Instituts für Limnologie, presently held by Prof. Peter Zwick, Schlitz, Germany (CPZ), and one female paratype is in the Gilles Vinçon Collection, Grenoble, France (CGV). The type series of *B. dinarica* was studied during a visit to the Wien Natural History Museum (WNHM). Specimens used for illustrations are indicated in the material examined. Terminology mainly follows that of Berthélemy (1971) as adapted by Kazanci (2001) and Baumann & Kondratieff (2009).

## Taxonomy

### *Brachyptera kotschani* sp. n.

(Figs 1–10, 13–15)

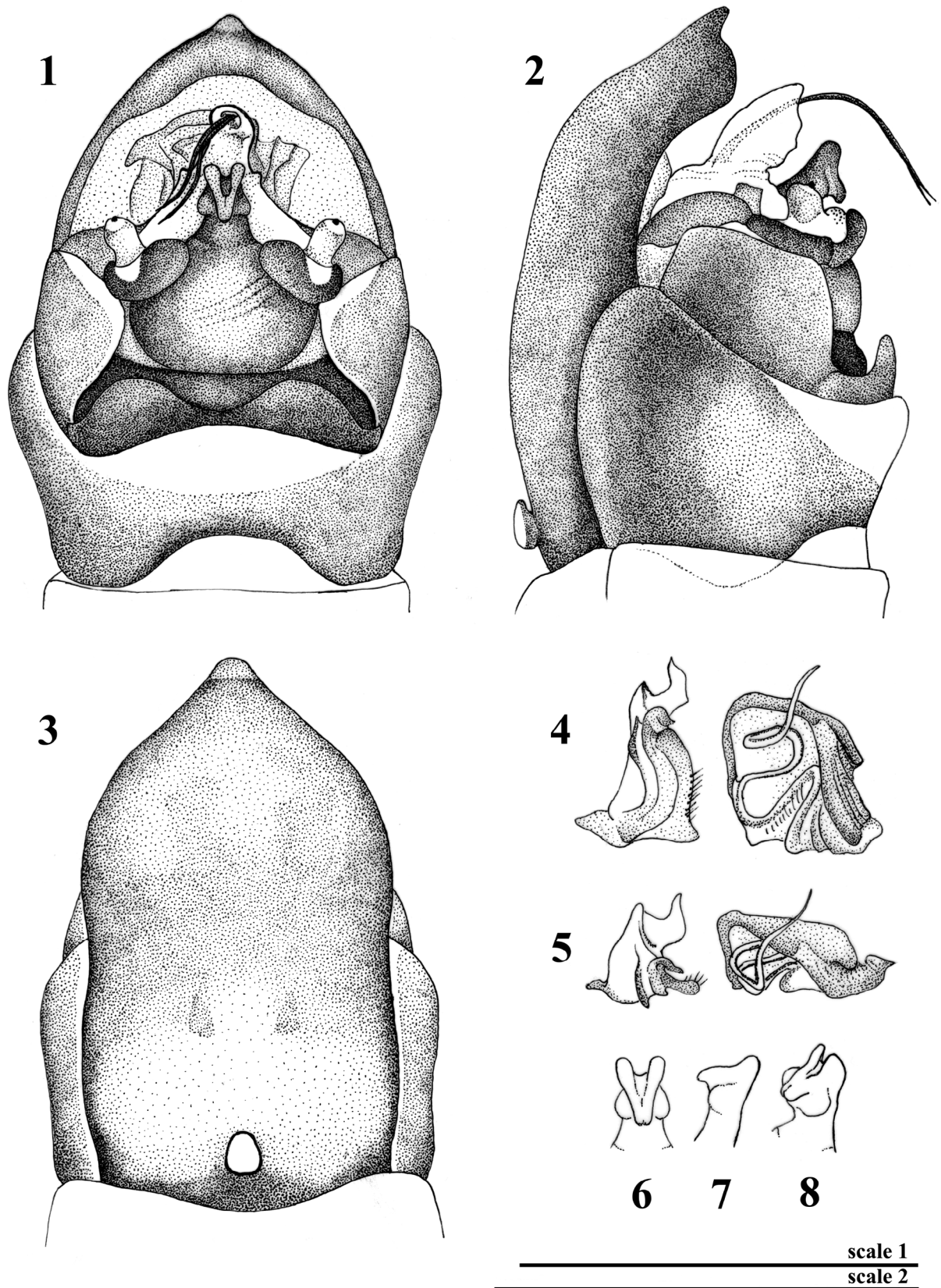
**Type material.** Holotype male: GREECE: Arkadia prefecture, Vitina, stream SW of the city, N 37°39.031' E 22°10.156', 960 m a.s.l., 06.04.2009, leg. L. Dányi, J. Kotschán, D. Murányi (HNHM: PLP3163; used for drawings Figs 1–9, terminalia cutting from segment VIII, paraprocts in a microvial within the same tube). Paratypes: same locality and date: 1f (HNHM: PLP3370; used for drawings, Figs 10, 13); GREECE: Arkadia prefecture, Magoulia, stream SE of the village, N 37°39.425' E 22°08.730', 1035 m, 06.04.2009, leg. L. Dányi, J. Kotschán, D. Murányi: 1f (HNHM: PLP3154); Arkadia prefecture, Elliniko, Gortis ruins, Lousios River, N 37°32.378' E 22°02.788', 320 m, 06.04.2009, leg. L. Dányi, J. Kotschán, D. Murányi: 1f (HNHM: 3149); Arkadia prefecture, Tetrazi Mts, Agia Theodora, stream and karst springs, N 37°21.269' E 21°58.782', 490 m, 05.04.2009, leg. L. Dányi, J. Kotschán, D. Murányi: 4f (HNHM: 3142), 1f (CGV), 1f (CPZ).

**Other material.** GREECE: Messinia prefecture, Agii Apostoli, stream E of the village, N 37°04.158' E 21°47.275', 415 m, 05.04.2009, leg. L. Dányi, J. Kotschán, D. Murányi: 1f (HNHM: 3371; in a poor condition, found dried in a spider web).

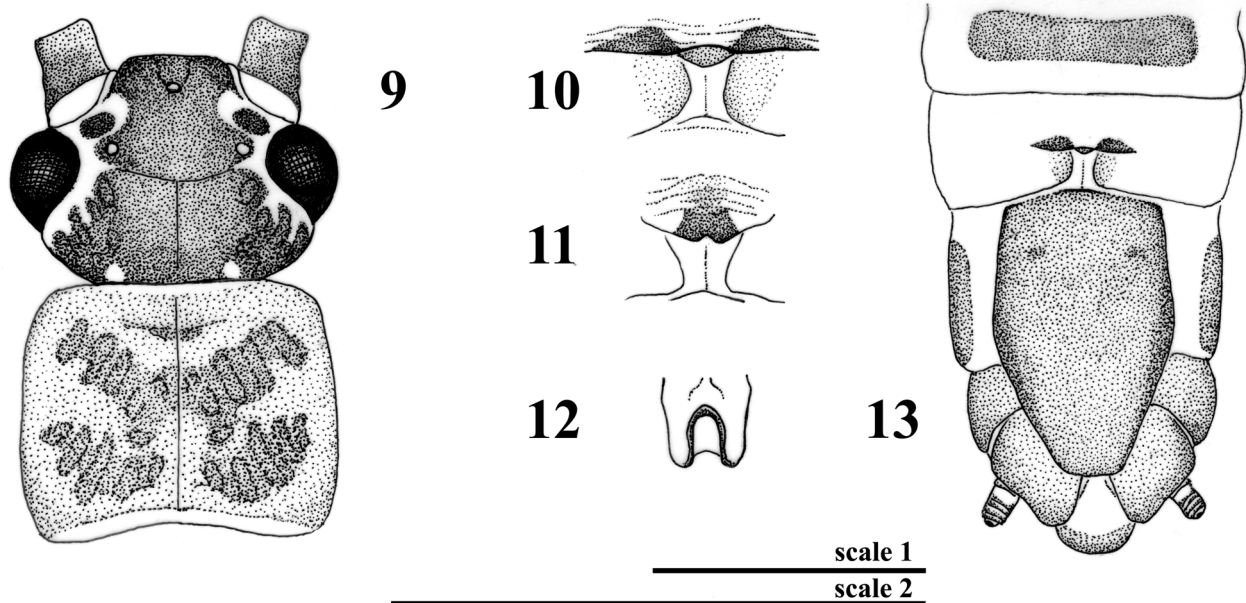
**Diagnosis.** This species is characterized in the male by a V-shaped ventral process of the epiproct with two rounded lobes at its base, a pointed tip of the subgenital plate and a well sclerotised basicercal process. The female is characterized by the pregenital plate having a wide transverse strip that is curved back medially, and by the uniformly brown postgenital plate.

**Description.** Small species, macropterous in both sexes. Body length: male 9.5 mm, females 10.0–13.0 mm; forewing length: male 9.5 mm, females 10.5–12.5 mm. General appearance dark; pilosity short, with the exception of the mesonotum, metanotum and the terminalia which have longer hairs. Head dark brown with distinct yellow markings around the compound eyes, the antennal bases and the tentorial callosities, and with two yellow spots on the occiput (Fig. 9). Tentorial callosities distinct, black; occiput with rugosities obscured by background pigmentation. Eyes normal sized. Antennae nearly as long as the body, scape brown, pedicel and the following six or seven antennomeres are light brown but the distal part of the antenna is darker brown; palpi light brown. Scape longer than wide, pedicel as long as wide, third antennomere subdivided, nearly three times longer than wide, following three or four segments less than two times longer than wide, further antennomeres about two times longer than wide with the exception of the distal fourth of the flagellum where segments decrease in length; antennomeres slightly wider distally than basally. Pronotum light brown, about as wide as long, slightly wider posteriorly, darker rugosities form an X-shaped marking;. Mesonotum and metanotum dark brown. Femora brown, distal half dark brown; tibia and tarsal segments dark brown. Wings brownish grey with two barely visible transverse darker stripes in the apical third; venation brown.

Male abdomen: Tergites I–II mostly pale, weakly sclerotised, tergites III–VIII brown with dark brown patches laterally and posteriorly; a transverse row of four pigmented spots seen on tergites I–VIII. Sternites II–VIII consist of a light brown posterior, two dark brown anterior sclerites; two lateral, dark brown spots seen on the posterior sclerites of segments I–VIII. Tergite IX dark brown with a strongly sclerotised antecosta, widely and deeply incised on anterior surface. Sternite IX dark brown, forming an elongate subgenital plate that is weakly upcurved forming a distinct, separated, pointed tip; vesicle small, rounded (Fig. 3). Tergite X dark brown dorsally and lighter laterally, the dorsal part bearing low, rounded lobes. Basal plate of the epiproct brown, weakly developed; basal bulb large, rounded, brown coloured (Fig. 1). Dorsal sleeve of the epiproct long, extrudable filaments long, dark brown with acute tip (Fig. 2). Distal plate of the ventral process of the epiproct large, V-shaped, the rod of the plate bearing two rounded lobes laterally just beneath the plate; in lateral view, the plate is slightly raised posteriorly while slightly downcurved apically (Figs. 6–8). Left paraproct with well developed, divided apophyses bearing setae mediolaterally; the lateral lobe is not so prominent, sclerotised on outer lateral surface and with an acute tip; membranous prolongation long and erect. Right paraproct with downward, well developed lateral lobe, and a long, slender flagellum; basal vesicle seems to be vestigial (Figs. 4–5). Cerci small, weakly sclerotised and globose; vestigial segment small. Basicercal process well sclerotised and large, tip rounded and slightly bent; membranous only around of the basis of the cercal segment.



**FIGURES 1–8.** Male terminalia of *Brachyptera kotschani* sp. n. — 1: male terminalia, dorsal view; 2: male terminalia, lateral view; 3: male terminalia, ventral view; 4: paraprocts, ventral view; 5: paraprocts, apical view; 6: distal plate of ventral process of epiproct, dorsal view; 7: distal plate of ventral process of epiproct, lateral view; 8: distal plate of ventral process of epiproct, dorso-lateral view — scales 1 mm; Figs. 1–3 to scale 1, Figs. 4–8 to scale 2.



**FIGURES 9–13.** *Brachyptera kotschani* sp. n. (Figs. 9–10, 13) and *B. dinarica* Aubert (Figs. 11–12) — 9: head and pronotum; 10–11: female pregenital plate and vulvar sclerites, ventral view; 12: distal plate of the male ventral process of epiproct, dorsal view; 13: female terminalia, ventral view — scales 1 mm; Figs. 9, 13 to scale 1, Figs. 10–12 to scale 2.

Female abdomen: Tergite I membranous with a poorly sclerotised, dark brown transverse band posteriorly; tergite II entirely membranous. Tergites III–VII membranous with a transverse, light brown sclerotised plate medially; tergite VIII similar, but the sclerotised plate located posteriorly. Tergite IX membranous only antero-medially, brown; tergite X entirely sclerotised, brown. Sternites II–VII membranous with a transverse, brown posterior, and two small, brown anterior sclerites. Sternite VIII membranous beside the pregenital plate and the vulvar lobes. Pregenital plate small but well sclerotised and black, forming a wide transverse strip curved back medially; vulvar lobes weakly sclerotised and light brown, rounded, slightly converging posteriorly (Fig. 10). Sternite IX bear a well developed postgenital plate, and two brown lateral sclerites. Postgenital plate long, uniformly brown to dark brown; tongue shaped, slightly widening medially, posteriorly narrowed and with a blunt, rectangular tip (Fig. 13). Sternite X and the paraprocts normal, brown coloured; epiproct normal, light brown. Cerci small, rounded, segments weakly separated, light brown.

Larva: unknown.

**Affinities.** The new species is closely related to *B. dinarica* but males of *B. kotschani* can be easily separated from it by the V-shaped distal plate of the epiproct and its two rounded lobes (Figs. 6–8). In *B. dinarica* this plate is hook-like with dark margins (Fig. 12). Females of the new species have a pregenital plate with a wide transverse strip that is curved back medially (Fig. 10), while in *B. dinarica* there is a small bifid plate (Fig. 11). The males of the northwest Anatolian *B. sislii* Kazanci, 1983 has a subgenital plate ending in two, upcurved lateral projections and not in a separated, pointed tip as in *B. kotschani* (see Kazanci 1982: Figs. 1–4 and Kazanci 2000: Figs. 6–9). These three species all have a small ventral vesicle. All species emerge in late winter and early spring. *Brachyptera kotschani* cannot be placed into an existing species group sensu Aubert (1946) since the antennae correspond with the *B. risi* group, whereas the basicercal process corresponds to the *B. trifasciata* group. Both states are true of *B. dinarica* as well.

**Ecology and distribution.** The new species was collected from streams ranging in width from 1.5–3.0 m (e.g. Fig. 14) and from a small river (10 m width) in the central and southwest Peloponnes (Fig. 15). The localities are between 320 and 1035 m, and the specimens were caught in early April. All streams were swift flowing and moderately cold with coarse substrates mixed with sand. Occasionally, aquatic mosses clung to larger stones. The riparian vegetation consisted of sedges and other semiaquatic plants, and an open willow, plane tree, or alder gallery. The bulk of the population probably emerges earlier than our collection records would indicate since a preponderance of darkly pigmented female specimens were collected and no larvae attributable to this species remained in

the stream. This is contrary to the other *Brachyptera* species found during our April tour, all of which tended to emerge reach peak emergence later. The holotype was collected with *B. beali beali* (Navás, 1923) (3m, 8f, 4 larvae), *Capnioneura balkanica balkanica* Baumann & Kačanski, 1975 (2m, 5f), *Protonemura beaumonti* (Aubert, 1956) (3m), *P. mattheyi* (Aubert, 1956) (1m) and an *Isoperla* sp. (4 larvae). The paratypes were found in common at the Magoulia locality with *B. b. beali* (4m, 7f, 4 larvae), *C. b. balkanica* (1m, 5f), *Leuctra olympia* Aubert, 1956 (3f), *P. beaumonti* (2m - topotypes), *P. mattheyi* (1m, 2f), *Protonemura* sp. (1 larva), *Nemoura cinerea turcica* Zwick, 1972 (2m, 3f, 2 larvae - collected from small tributary adjacent to stream) and *N. aetolica* Zwick, 1978 (1m, 1f); at the Lousios River with *Protonemura aroania* Tierno de Figueroa & Fochetti, 2001 (1m) and *Dinocras megacephala* (Klapálek, 1907) (2m, 1 larva); at the Agia Theodora locality with *B. b. beali* (9m, 9f, 5 larvae), *B. phthiotica* Berthélemy, 1971 (1m), *C. b. balkanica* (4f), *Leuctra metsovonica* Aubert, 1956 (1f), *P. beaumonti* (5m, 4f) and an *Isoperla* sp. (2 larvae). The dried female from Messinia prefecture, Agii Apostoli, was found together with *B. b. beali* (1f), *P. beaumonti* (7m, 3f, 5 larvae) and an *Isoperla* sp. (2 larvae).

**Etymology.** The species is dedicated to my friend and colleague Dr. Jenő Kontschán (HNHM, and Systematic Zoology Research Group of the Hungarian Academy of Sciences), a noted Acarologist and participant of many collecting tours to the Balkans. The epithet is used as the genitive of a noun of male gender.

### *Brachyptera dinarica* Aubert, 1964

(Figs 11–12)

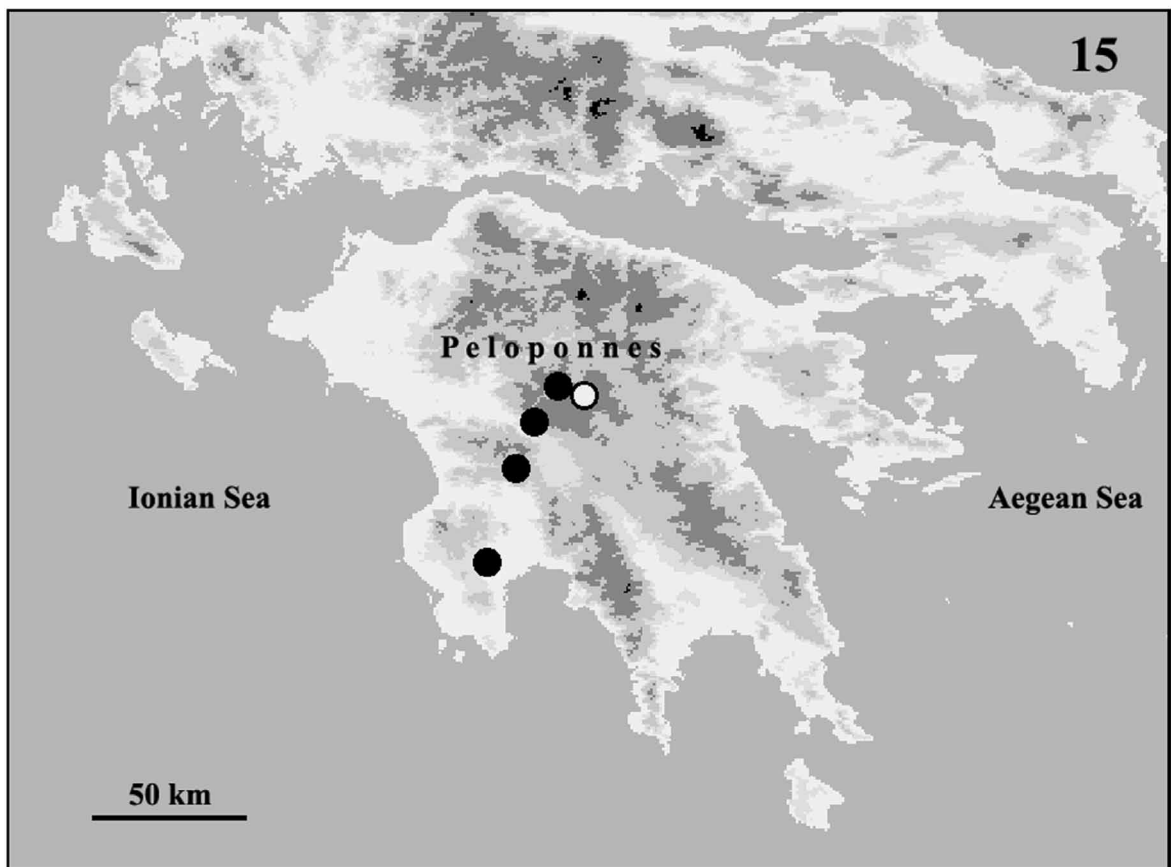
*Brachyptera dinarica* Aubert, 1964 — Aubert 1964: 287 (original description of male and female); Illies 1966: 57 (catalog); Berthélemy & González del Tánago 1983: 14 (comparison with *B. vera*); DeWalt et al. 2011 (catalog).

**Material examined.** Holotype male: ALBANIA: Skodra (Shkodër), 09.02.1918, leg. Karny (WNHM; used for drawing Fig. 12, terminalia prepared on plastic sheet and pinned under the dry specimen). Paratypes: BOSNIA-HERZEGOVINA: Radusa (Raduša), 1902, leg. O. Leonhard: 4f (WNHM; used for drawing Fig. 11, dry specimens, one of the terminalia prepared on plastic sheet and pinned under the specimen).

**Remarks.** In the male of *B. dinarica* the distal plate of the ventral process of the epiproct differs slightly from the illustrations presented in the original description (Aubert 1964: Fig. 4), being narrower than its rod and the dark margins parallel in the basal half (Fig. 12). This structure is similar to those of *Brachyptera sislii* (see Kazanci 1982: Fig. 4 and Kazanci 2000: Fig. 9); nevertheless, the two species differ distinctly in the male subgenital plate (see Aubert 1964: Figs. 1–3, Kazanci 1982: Figs. 1–3 and Kazanci 2000: Figs. 6–8). The paratype females of *B. dinarica* are similar to both *B. tristis* (Klapálek, 1901) and *B. sislii*, and no distinguishing characters were found to separate the females of the latter two species, either using fresh specimens or by comparison with descriptions (*B. tristis*: Kis 1974, *B. sislii*: Kazanci 2000).

Conspecificity of the male holotype of *B. dinarica* and the female paratypes was already questioned by Berthélemy & González del Tánago (1983), and these authors noted that the females are probably conspecific with *B. tristis*. Indeed, the Bosnian male of the type series (labeled as allotype by the original author) is missing in the WNHM, and the Albanian female that Aubert (1964) reported as *B. tristis* in the same paper proved to *B. b. beali* (Berthélemy 1971). The redescription of these two species was accomplished only after the description of *B. dinarica* (*B. tristis*: Kačanski & Zwick 1970, *B. b. beali*: Berthélemy 1971), and Aubert was not familiar with the true *B. tristis* when he described *B. dinarica*. Nevertheless, the paratypes cannot be assigned to *B. tristis* with certainty, as the males of the two species are distinctly differ and the now missing Bosnian male was reported from the same locality as the four female paratypes.

*Brachyptera dinarica* is known only from the six type specimens, and nothing is known about the exact habitat. The early collection date of the holotype suggests a late winter emergence period. Despite intensive collection efforts in Bosnia-Herzegovina, the species has not been recollected (Kačanski 1971, 1976). My own repeated early spring efforts around Shkodër, Albania, also failed to yield additional specimens. Surprisingly, Kačanski (1979) omitted this species from her checklist of Bosnia-Herzegovina stoneflies.



FIGURES 14–15. Distribution of *Brachyptera kotschani* sp. n. — 14: type locality, stream SW of Vitina; 15: known distribution - holotype locality (white circle) and paratypes (black circle).

## Notes on additional *Brachyptera* species known from the Peloponnes

Four additional *Brachyptera* species are known from the Peloponnes Peninsula. A discussion of the distribution and ecology of each is presented.

*Brachyptera b. beali* was reported from three localities in the central Peloponnes and the Aroania Mts (Aubert 1956, Zwick 1978). I found it to be the most common *Brachyptera* on the peninsula (collected from 22 of 43 unique locations during our trip). This species inhabits a wide range of running waters from lowland rivers to montane brooks; although, it seems to be missing from higher elevations. Collection sites ranged from 10 to 1270 m, where it was abundant in most of the cases. Populations consisted of both fully coloured adults and immatured larvae, suggesting an extended emergence period.

A single record of *B. helenica* Aubert, 1956 is known from the north of the peninsula (Aubert 1963). No additional specimens were collected during this study. It is apparently rare in the peninsula.

*Brachyptera graeca* Berthélemy, 1971 was recorded from three records in the Taygetos and one record from the Panahaiko Mts (Aubert 1956, 1963, Zwick 1978). I also collected it from the Taygetos (3 new localities) and the Parnon Mts (2 localities). This species inhabits montane streams and brooks and was collected between the elevations of 595 to 1440 m. It was not abundant, and only mature larvae were found together with both teneral and fully coloured imagoes suggesting a limited emergence period.

*Brachyptera phthiotica* was reported for the first time in the Peloponnes from one locality each in the Taygetos, Tetrazi and Aroania Mts. It inhabited karst springs and a coldwater stream at between 490 to 1600 m elevation. It was never abundant. Specimens were represented by adults and a single pharate larva, suggesting that emergence in the peninsula was nearly complete.

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