

# Description of the female of *Teinobasis fatakula* Marinov & Donnelly, 2013 (Zygoptera: Coenagrionidae) from the Kingdom of Tonga

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## Research Article

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**Abstract.** An expedition in 2024 to 'Eua Island in the Kingdom of Tonga led to the collection of several female *Teinobasis fatakula* Marinov & Donnelly, 2013. *Teinobasis fatakula* is endemic to 'Eua and can only be found inhabiting a single river in the 'Eua National Park. Here we describe the female of this unique damselfly and expand its range.

**Keywords.** Damselfly, dragonfly, Odonata, 'Eua island, Tongatapu

## Introduction

The Kingdom of Tonga is comprised of ~170 islands spanning 747 km<sup>2</sup> in the South Pacific (Franklin et al., 2006). The islands are broken into four main geological regions: (1) Tongatapu and 'Eua, (2) Ha'apai group, (3) Vava'u archipelago, and (4) Niua (Niuatoputapu, Tafahi, and Niuafo'u) and two chains located between the Tonga Trench and the Tofoa Ridge (Volcanic Ridge) (Stone et al., 2019). There are two main types of island origins in this chain: volcanic and coral/reef uplift (atolls). The western chain is actively volcanic while the eastern chain is no longer volcanically active (Scholl et al., 1985). Lovell and Palaki (2002) describes the origin of several Tongan islands, most notably 'Eua. Tongatapu and 'Eua are high islands which have a limestone cap and fringing, lagoon, and algal reefs. While most of Tonga's islands are raised limestone with a layer of volcanic rock underneath, 'Eua also has volcanic rock exposed making it stand out amongst other islands in this chain (Scholl et al., 1985; Stone et al., 2019). While many islands are notable, the island of 'Eua is unique due to its topology, geology, and age (Scholl et al., 1985).

'Eua is one of the oldest (~34–38 MYA), largest (~81 km<sup>2</sup>), tallest (~312 m), and least disturbed volcanic islands in Tonga (Cole, 1970; Drake, 1996). It is located immediately west of the Tonga Trench, and its formation stemmed from the movement of tectonic plates and high levels of volcanic activity but has yet to sink back into the ocean becoming an atoll (Drake, 1996). Over time, the soil (i.e., clay, volcanic ash) has become dense enough to support surface water (e.g., streams, rivers, lakes) and multiple forest types (Bryan, 1972; Drake, 1996). The forests and

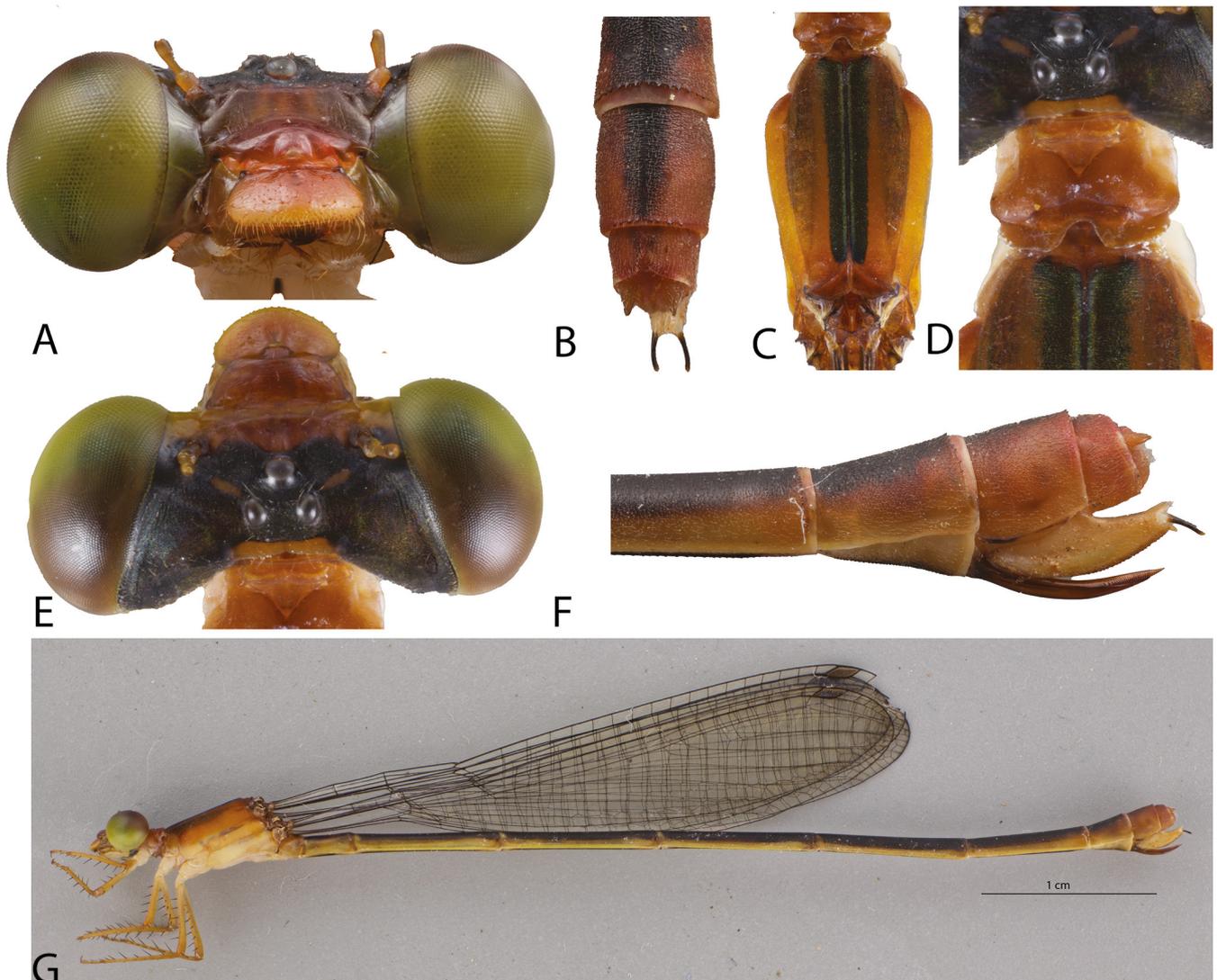
surface water distinguishes 'Eua compared to most of the other islands of this age which have transitioned into atolls with sandy beaches. The subtropical forests found on 'Eua are abundant with freshwater streams, creating an ideal environment for dragonflies and damselflies (Odonata) to inhabit generally (Corbet et al., 2010; Franklin et al., 2006).

Marinov (2012) provided an updated list for the odonates of the islands within the Kingdom of Tonga and included 16 scientific names. Marinov (2013) reviewed the list after a field survey of 'Eua and Tongatapu which resulted in a revised list of 12 odonate species (four damselflies, eight dragonflies). According to these lists, the current total number of odonate species in Tonga is approximately 27 (Marinov, 2012, 2013, 2016; Michalski, 2012; Paulson & Buden, 2003). Following these expeditions, *Teinobasis fatakula* Marinov & Donnelly, 2013 was erected as a taxon new to science based on six male specimens. Female and nymph were unknown (Marinov & Donnelly, 2013). *Teinobasis* Kirby, 1890 is a large genus of damselflies (88 species listed in Paulson et al., 2025) that includes members found in Southeast

Asia, Australia, Madagascar, Seychelles, Solomons, and some Micronesian islands, but the discovery on the isolated island 'Eua significantly expanded its known distribution by ~2800 km (Clausnitzer, 2003; Marinov, 2013). Here we provide the first description of the female of *T. fatakula* and identify a second location where *T. fatakula* is present.

### Material and methods

We collected two mating pairs of a *Teinobasis* species on the same stream where males of *T. fatakula* have been previously collected (Marinov & Donnelly, 2013). The males were identified as *T. fatakula*. These specimens were deposited in the Brigham Young University (Provo, UT) Genomics collection. Several other *T. fatakula* males (one collected) were observed at an additional location expanding its range beyond the one stream. Images were taken with Helicon Remote 4.4.4 using a Canon EOS 6D camera fitted with 50 mm and 65 mm lens and stacked with Helicon Focus 8.2.2. Description



**Figure 1.** *Teinobasis fatakula*, female: (A) head; (B) terminal abdominal segments, dorsal; (C) synthorax, dorsal; (D) pronotum, dorsal; (E) head, dorsal; (F) terminal abdominal segments, lateral; (G) habitus, lateral.

was done using an Olympus SZ-ILST microscope terminology following Garrison et al. (2010). The description is based on one of the collected females, with no significant variation between the two to note at this time.

### **Specimens examined**

Two tandem pairs in ethanol: Kingdom of Tonga, 'Eua Island, stream, -21.3781, -174.9346, elev. 175 m, 21 August 2006, coll. E. Rowe, S.M. Bybee

### **Male collection site**

Kingdom of Tonga, 'Eua Island, -21.356000, -174.949000, 21 August 2006, coll. J. Abbott.

### **Description of female *Teinobasis fatakula* Marinov & Donnelly, 2013**

#### **Head (Fig. 1A, E)**

Labrum dark orange/brown with anterior edge light orange, postero-dorsal tip black; labium pale orange/white, anteclypeus dark orange/brown; postclypeus orange/brown with a dark brown circle medially; genae almost entirely olive green; frons ridged, antefrons dark orange/brown with three light orange lines medially, postfrons dark orange/brown, posterior edge wavy; top of head dark, light brown oval from lateral ocelli reaching  $\frac{2}{3}$  to scape, ocelli dark surrounded by metallic black ring, no post ocular spots; eyes green except postero-dorsal area dark brown.

#### **Prothorax (Fig. 1D)**

Dark orange/brown, flat, medial lobe general shape two ovals that meet medially, not separated, posterior lobe deeply bifurcated centrally, each part subrectangular.

#### **Pterothorax (Fig. 1C, G)**

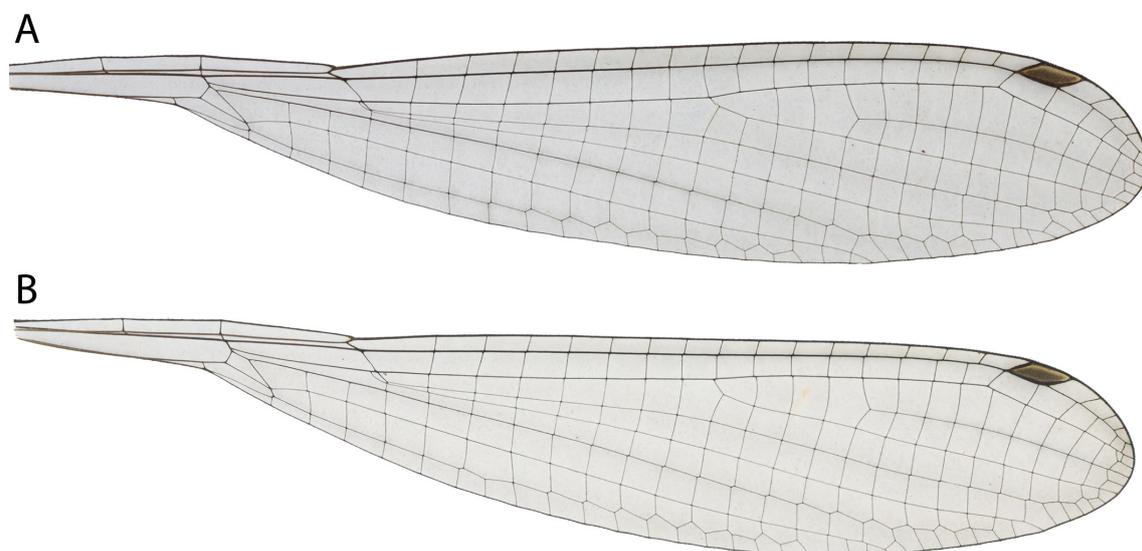
Mesepisternum largely dark orange with a central black stripe running its length, mid-dorsal carina black, mesepimeron dark orange with light black stripe along dorsal edge, metepisternum pale orange with light black stripe  $\frac{3}{4}$  length of interpleural suture, metepimeron very pale orange to white; mesostigmal plate medial portion with depression with middle  $\frac{1}{2}$  deeper than rest, raised edge separates lateral portions which are flat, dark orange/brown all over. Coloration of legs all consistent, coxae and trochanters very pale orange/white, femora very pale orange/white gradually becoming more orange/brown apically, tibiae and tarsi orange/brown, small subapical tooth on tarsal claw, majority of spines long with distance between the same or greater than the length of spines, with the shorter densely set spines arising apically on tibiae. Wings (Fig. 2) with membrane hyaline. Venation black; Pt elongated rhomboid, dull brown with translucent apical edge; Px left FW 16 and HW 15 and right FW 17 HW 16; CuP approximately  $\frac{2}{3}$  distal between Ax in all wings; FW arculus aligned with second Ax, HW arc slightly distal of second Ax; quadrangle subtrapezoidal in both wings.

#### **Abdomen (Fig. 1G)**

S2–8 tergite black dorsally and pale orange laterally, sternite black, S9 mostly dark orange/brown, dorsal black stripe  $\frac{1}{2}$  the width of S2–8, S10 dark orange/brown. Terminal appendages (Fig. 1B, F). Ovipositor  $\frac{1}{2}$  as wide as abdominal S9, twice as long as abdominal S9, light orange, basal plate blade-like with paired stylus, dark brown.

#### **Measurements**

Abdomen length: 50 mm; FW length: 37 mm; HW length 35 mm.



**Figure 2.** *Teinobasis fatakula*, female: (A) forewing; (B) hindwing.

## Discussion

Marinov (2013) noted that *T. fatakula* is restricted to dense shaded streams and does not inhabit open areas, and we confirm this habitat preference. The second location where a male of *T. fatakula* was collected was similar to the original location from Marinov et al. (2013), however the stream appeared to be more seasonal. The habitat preference of *T. fatakula* appears to be similar to that of the ecological niche inhabited by the Fijian endemic genera *Nesobasis* Selys, 1891, *Nikoulabasis* Ferguson, Marinov, Saxton, Rashni & Bybee, 2023 and the near endemic *Melanesobasis* Donnelly, 1984 with high canopy cover and association of native forested riparian systems commented in several studies (e.g., Beatty et al., 2023; Rashni et al., 2023; Saxton et al., 2025).

To date, Tonga odonate checklist covering the low-lying islands of the northern Vava'u group, southern Tongatapu, Niuafou'u and 'Eua Island, includes a total of approximately 27 species with a single species representing genus *Teinobasis*. Of the 88 species in the genus *Teinobasis*, the females of 31 species have been described (Marinov, 2013, 2016; Michalski, 2012; Paulson & Buden, 2003; Theischinger & Richards, 2013). Including *T. fatakula*, that number is now 32 (36%). The female of *T. fatakula* is distinguished from all other species with described females by the combination of a uniformly dark orange-brown, non-metallic prothorax with a posterior pronotal lobe bifurcated into two broadly separated subrectangular parts. However, based on previous descriptions, *Teinobasis* females have a substantial degree of morphological variation and more descriptions are required before definitive characters can be defined and keys can be produced.

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