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Results of the Austrian Hydrobiological Mission, 1974, to the Seychelles-, Comores- and Mascarene Archipelagos

Part VIII: The Leptophlebiidae of the Seychelles and Comoro Islands (Ephemeroptera)

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(With 7 text figures)

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Zusammenfassung

Aufgrund des von Prof. Dr. F. Starmühlner 1974 gesammelten Materials von *Hagenulodes braueri* und *Maheathraulus scotti* von den Seychellen und *Thraulus turbinatus* von den Komoren können neue Fundorte dieser Arten mitgeteilt werden. Neben einer Beschreibung der Nymphe von *T. turbinatus* wird auch eine neue Art, *Choroterpes* (*Euthraulus*) *starmuehlneri*, von den Komoren (Anjouan) beschrieben.

Summary

Based on collections made by Prof. Dr. F. Starmühlner in 1974, additional localities are given for *Hagenulodes braueri* in the Seychelles, *Maheathraulus scotti* in the Seychelles, and *Thraulus turbinatus* in the Comoro Islands. A description of the nymph of *T. turbinatus* is given. A new species *Choroterpes* (*Euthraulus*) *starmuehlneri* is described from the Comoro Islands.

Introduction

Prof. Dr. F. Starmühlner, 1. Zoologisches Institut der Universität Wien, collected aquatic animals in the Seychelles, Comoro Islands, Reunion, and Mauritius during 1974. Among the Ephemeroptera sent to me from this expedition were specimens of Leptophlebiidae from the Seychelles and Comoro Islands. This paper reports on these Leptophlebiidae.

All specimens were collected by Dr. F. Starmühlner and all localities are transcribed with original field numbers from Dr. Starmühlner's field notes*). All specimens are deposited in the following collections: FAMU = Florida A & M University, Tallahassee; UU = University of Utah, Salt Lake City; NMNH = U. S. National Museum of Natural History, Washington, D. C.; and NMW = Naturhistorisches Museum Wien.

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Choroterpes (*Euthraulus*) *starmuehlneri* n. sp.
(Fig. 1—2)

Male imago: Unknown.

Male subimago (in alcohol): Length: body, 4.5 mm; fore wings, 4.8 mm. Head light brown, washed heavily with blackish-brown especially on carinae and around ocelli. Upper portion of eyes red-brown, lower portion black. Basal half of ocelli brownish-black, apical half pale. Antennae light brown, apical ⅓ of pedicel uniformly washed with darker brown. Thorax light brown, washed heavily with blackish-brown especially on carinae and anterior ½ of mesobasisternum, mesoscutoscutellum solid dark brown, sutures black. Femora of legs brown except a large blackish-brown macula near median of both dorsal and ventral surfaces extends towards a smaller blackish-brown macula near apex of both dorsal and ventral surfaces; prothoracic tibiae pale except brown at base with brown streak extended along basal half of dorsal margin and a narrow transverse blackish-brown band at apex; mesothoracic and metathoracic tibiae brown dorsally, faded ventrally; remainder of legs pale, except apex of mesothoracic and metathoracic tibiae and tarsal segments edged with blackish-brown. Wings: longitudinal and cross veins of fore and hind wings hyaline, light brown, veins Sc and R_1 of fore wings and vein C of hind wings darker; membrane of fore and hind wings translucent, light brown, except base of fore and hind wings dark brown. Abdomen: light brown, terga heavily and uniformly washed with blackish-brown, except posterior margin of terga 1—6 darker, terga 2—6 with paired, submedian, longitudinal lines extended entire length of each tergum, terga 1—9 with a sublateral, small pale macula; sterna lightly washed with blackish-brown, posterior margin of sterna 1—8 darker near posterolateral corners, sternum 9 with a large, pale, triangular-shaped mark, apex of mark near anterior margin of sternum 9. Genitalia (Fig. 2): light brown; base of forceps bulbous, length of exposed penes ½ length of forceps. Caudal filaments broken off and missing.

Female imago: Unknown.

Female subimago: Unknown.

Mature nymph (in alcohol) (Fig. 1): Head brown, venter paler, dorsum washed with blackish-brown, area between eyes and ocelli darker. Thorax brown, venter paler, color marks as in ♂ subimago. Legs light brown, both dorsal and ventral surfaces of femora with a large, median, blackish-brown macula and a small, apical blackish-brown macula. Abdomen brown, venter

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paler, color marks of ♂ and ♀ nymphs as in ♂ subimago. Gills gray, tracheae black. Caudal filaments light brown.

Specimens: All specimens are from the Comoro Islands, Ile d'Anjouan. Holotype ♂ subimago, Riv. Santsa, Oberlauf bei Adda-Douéni (F/An/21). 21-III-1974. Paratypes: 1 nymph, Mittellauf d. Riv. Mutsamudu (F/An/4). 4-III-1974; 1 nymph, Petite Riv., Oberlauf-Zufluß d. Riv. Mutsamudu (F/An/5). 5-III-1974; 6 nymphs, Riv. Ouani, etwa 1 km vor der Mündung ins Meer (F/An/9). 7-III-1974; 5 nymphs, Riv. Ouani, Oberlauf nach einem Abfluß aus einem Quellweiher von 10 m und bis 2 m Tiefe, daneben Überschwemmungs-

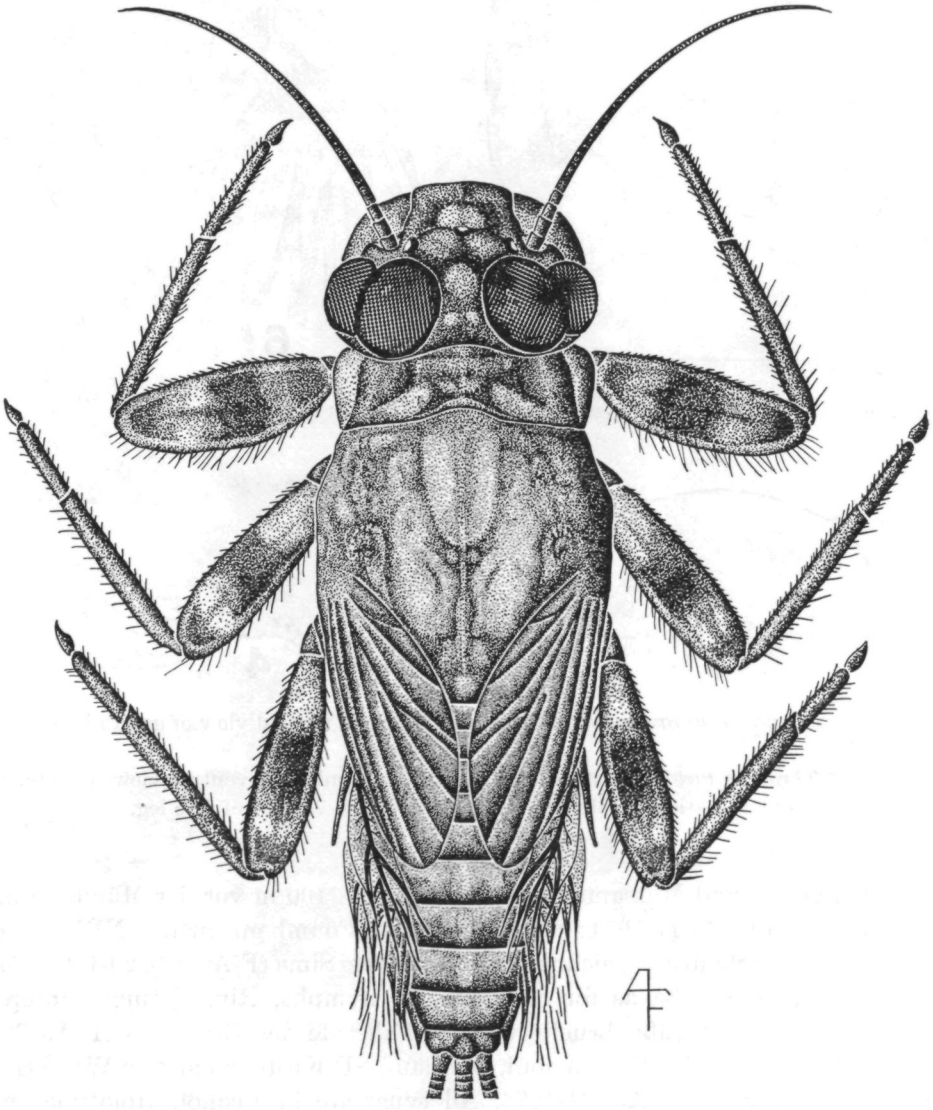

Fig. 1. Mature male nymph of *Choroterpes* (*Euthraulus*) *starmuehlneri* nov. spec.

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tümpel (F/An/10). 8-III-1974; 21 nymphs, Quellbach und Sammelbecken aus Zement (für Nutzwasserzwecke) mit Zufluß und Abfluß bei Bazmini an der Strasse Oueni-Col de Patsi (F/An/12). 9-III-1974; 11 nymphs, Riv. Gégé beim gleichnamigen Dorf, Unterlauf an d. SE-Küste (F/An/15). 13-III-1974; 3 nymphs, Riv. Mahavouli, Unterlauf bei d. Straßenbrücke vor Mirontsi,

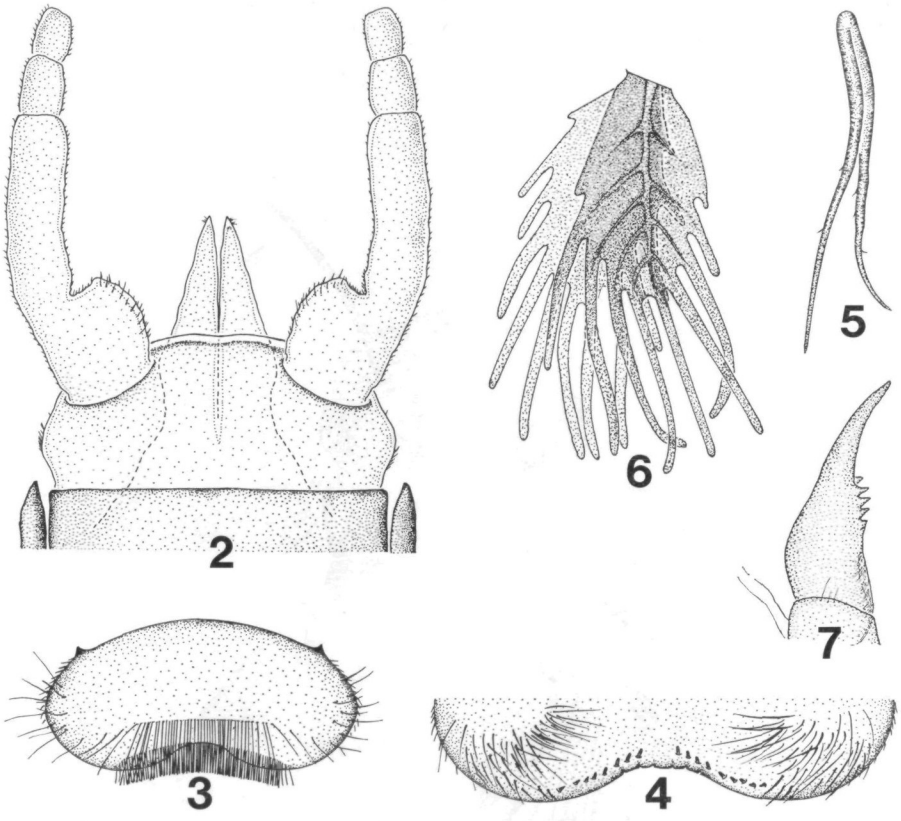

Fig. 2. *Choroterpes* (*Euthraulus*) *starmuehlneri* nov. spec., ventral view of genitalia of male subimago

Fig. 3—7. *Thraulus turbinatus* nymph: 3, labrum; 4, enlarged ventral view of anterior emargination of labrum; 5, gill 1; 6, gill 4; 7, claw of fore leg.

zwischen Ouani und Mutsamudu, NW-Küste, ca. 100 m vor der Mündung ins Meer (F/An/16). 15-III-1974; 8 nymphs, Riv. Foumbani an der NW-Küste, Bachrinnsal oberhalb des gleichnamigen Dorfes bei Sima (F/An/18). 20-III-1974; 31 nymphs, same data as for holotype; 30 nymphs, Riv. Tatinga, unterer Mittellauf bei der Straßenbrücke vor der Fallstufe des E-Werkes (F/An/23). 22-III-1974; 1 nymph, Riv. Pomoni, Oberlauf, SE-Küste, nach dem Wasserfall beim E-Werk (F/An/24).25-III-1974. All types are in alcohol. Holotype and 30 nymphal paratypes are deposited in the collections of FAMU, 28 nymphal

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paratypes in the collections of UU, and 30 nymphal paratypes each in the NMNH and NMW.

Etymology: This species is named for Prof. F. STARMÜHLNER who collected the specimens.

Discussion: The ♂ of *C.* (*E.*) *starmuehlneri* can be distinguished from the other known Ethiopian species of *Choroterpes* (*Euthraulus*) by the following combination of characters: (1) base of genital forceps is bulbous (Fig. 2); (2) length of exposed penes is ½ length of genital forceps (Fig. 2); (3) femora of legs are brown, except a large, blackish-brown macula occurs near median of both dorsal and ventral surfaces and extends towards a small, blackish-brown macula near apex of both dorsal and ventral surfaces; and (4) sternum 9 has a large, pale, triangular-shaped mark, apex of mark is near anterior margin of sternum 9. As the nymph of few Ethiopian species of *Choroterpes* (*Euthraulus*) are known, I will not distinguish the nymph of *C.* (*E.*) *starmuehlneri* from nymphs of other Ethiopian species.

It is not normally my practice to describe a new species based on ♂ subimagos and nymphs; however, this new species is unique and from a remote island.

Based on Dr. STARMÜHLNER's notes, nymphs of *C.* (*E.*) *starmuehlneri* were collected along the quiet shores of streams and rivers. Most nymphs were collected among submerged vegetation, but some were found under stones.

Thraulus turbinatus (ULMER)
(Fig. 3—7)

Hagenulus turbinatus ULMER, 1909: 367; LESTAGE, 1918: 92.

Masharikella turbinata (ULMER), PETERS, GILLIES & EDMUNDS, 1964: 248; DEMOULIN, 1970: 120.

Thraulus turbinatus (ULMER), PETERS & EDMUNDS, 1970: 203; PETERS & TSUI, 1972: 2.

Previously only the ♂ and ♀ imagos of *T. turbinatus* were known. Below is the first description of the nymph of this species.

Mature nymph (in alcohol): Head brown, dorsum uniformly washed with darker brown, carinae darker. Antennae pale. Anteromedian emargination of labrum deeply cleft (Fig. 3—4) with 5 small blunt denticles (Fig. 4). Thorax brown, dorsum uniformly washed with darker brown, carinae darker. Legs: trochanters and femora pale to yellow-brown with a small brown apical macula; tibiae light brown, wsahed with darker brown along carinae; tarsi light brown. Denticles on claws small, progressively larger apically, denticles present only on basal half of claws (Fig. 7). Abdomen brown, uniformly washed with darker brown, dorsum darker, ♂ generally darker than ♀, terga 3—9 with a median, longitudinal, pale line extended entire length of each tergum; sterna brown, washed with darker brown, except lateral margins pale. Dorsal and ventral portions of gills 1 slender, lanceolate (Fig. 5); dorsal and ventral portions of gills 2—7 plate-like, oblong, apical half of each lamella with fringed

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margin (Fig. 6); membrane blackish-gray, tracheae hyaline. Terminal filaments pale.

The above description is based on the following specimens, all from the Comoro Islands, Ile d'Anjouan: 1 nymph, Riv. Ouani, etwa 1 km vor der Mündung ins Meer (F/An/9). 7-III-1974; 3 nymphs, Riv. Gégé beim gleichnamigen Dorf, Unterlauf an d. SE-Küste (F/An/15). 13-III-1974; 2 nymphs, Riv. Santsa, Oberlauf bei Adda-Douéni (F/An/21). 21-III-1974; 3 nymphs, Riv. Pomoni, Oberlauf, SE-Küste, nach dem Wasserfall beim E-Werk (F/An/24). 25-III-1974. All specimens are in alcohol. Four nymphs each are deposited in the collections of FAMU and NMW. One nymph is deposited in the collection of the NMNH. Association of the nymph and previously described imagos is based on the color marks of the legs and the developing ♂ genitalia of fully mature nymphs about to emerge.

Discussion: In the key to mature nymphs *Thraulus* by PETERS & TSUI (1972), the nymph of *T. turbinatus* keys to couplet 5, and *T. bellus* and *T. demoulini*. However, the nymph of *T. turbinatus* can be distinguished from the nymphs of these two species by the abdominal gills 2—7 being fringed only on the apical half (Fig. 6) and denticles on the claws only being on the basal half (Fig. 7).

Based on Dr. STARMÜHLNER's notes, nymphs of *T. turbinatus* were collected under stones and rocks in fast current. As discussed by PETERS & TSUI (1972) the abdominal gill type with reduced fringed margin indicates a species which lives in extremely swift current.

Hagenulodes braueri ULMER

The ♂ imago of this species was originally described by ULMER (1919) and the nymph was later described by PETERS & EDMUNDS (1966).

This species is represented from the following new localities in the Seychelles: 1 nymph, Mahé Island, Riv. du Cap, Oberlauf (F/Sey/3). 5-II-1974; 19 nymphs. Mahé Island, Rochon Riv., Mittellauf an der Forêt Noire Road beim Val Riche (F/Sey/7). 6-II-1974; 16 nymphs, Mahé Island, Zufluß im Mittellauf des St. Louis oder Boulag Riv. (F/Sey/9). 8-II-1974; 6 nymphs, Mahé Island, Hauptast des St. Louis Riv., Mittellauf beim Wassertank Leniol (F/Sey/10). 8-II-1974; 22 nymphs, Praslin Island, Cascade Riv. im Vallée du Mai (F/Sey/14). 12-II-1974; 3 nymphs, Praslin Island, Oberlauf des Cascade Riv., oberhalb von F/Sey/14, im Urwald des Vallée du Mai (F/Sey/15). 13-II-1974; 11 nymphs, Mahé Island, Grande Anse Riv. an der W-Küste, Unterlauf nach der Staumauer, Kaskadenfluß in V-förmigen Tal, Ufer mit dichtem Buschwerk (F/Sey/19). 15-II-1974; 1 nymph, Mahé Island, Rochon Riv., E-Küste, Mittellauf nach dem Damm d. Reservoirs und Aufstau von 15 m und mehr als 1 m Tiefe, Abfluß in einem Kaskadenbach (F/Sey/20). 16-II-1974; 11 nymphs, Mahé Island, Athanas Riv., NW-Küste, Abfluß vom Mt. Niol und Mt. Simpson (F/Sey/22). 18-II-1974; 13 nymphs, Mahé Island, Desert Riv. an der Forêt Noire Road, NW-Küste, Quellbach (F/Sey/24). 19-II-1974; 1 nymph, Mahé

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Island, Cascade Riv., bei der Staumauer, Unterlauf knapp vor Übergang in den Flutrückstau mit beginnender Mangrove (F/Sey/25). 19-II-1974. All specimens are in alcohol. Thirty-two nymphs each are deposited in the collections of FAMU and UU, and 20 nymphs each are deposited in the collections of the NMNH and NMW.

Discussion: Based on Dr. STARMÜHLNER's notes, nymphs of *H. braueri* were collected under stones and rocks near shore in quiet areas to fast current.

Maheathraulus scotti (EATON)

EATON (1913) described *Hagenulus scotti* from ♂ and ♀ imagos. PETERS, GILLIES & EDMUNDS (1964) described the nymph of this species and established the monotypic genus *Maheathraulus*.

This species is represented from the following new localities in the Seychelles: 2♂, 4 ♂ subimagos, 2 ♀ subimagos, 20 nymphs, Mahé Island, Riv. Grand Bois beim Casse Dent an der Forêt Noire Road (F/Sey/4). 6-II-1974; 9 nymphs, Mahé Island, Riv. Rochon, Mittellauf an der Forêt Noire Road beim Val Riche (F/Sey/7). 6-II-1974; 53 nymphs, Mahé Island, Zufluß im Mittellauf des St. Louis oder Boulag Riv. (F/Sey/9). 8-II-1974; 2 ♂ subimagos, 16 nymphs, Mahé Island, Hauptast des Riv. St. Louis, Mittellauf beim Wassertank Leniol (F/Sey/10). 8-II-1974; 1 ♀ subimago, 4 nymphs, Praslin Island, Cascade Riv., im Vallée du Mai (F/Sey/14). 12-II-1974; 5 nymphs, Praslin Island, Oberlauf des Riv. Cascade, oberhalb von F/Sey/14, im Urwald des Vallée du Mai (F/Sey/15). 13-II-1974; 1 nymph, Mahé Island, Riv. Jasmine (auf den Fundortzetteln fälschlich Riv. Madelaine) an der W-Küste (F/Sey/16). 14-II-1974; 1 nymph, Mahé Island, Plaisance oder Pleasance Riv., Oberlauf an der NE-Küste (F/Sey/18). 15-II-1974; 2 nymphs, Riv. Rochon, E-Küste von Mahé, Mittellauf nach dem Damm d. Reservoirs und Aufstau von 15 m und mehr als 1 m Tiefe, Abfluß in einen Kaskadenbach (F/Sey/20). 16-II-1974; 3 nymphs, Mahé Island, Riv. Cascade, bei der Staumauer, Unterlauf knapp vor Übergang in den Flutrückstau mit beginnender Mangrove (F/Sey/25). 19-II-1974. All specimens are in alcohol. One ♂, 2 ♂ subimagos, 1 ♀ subimago and 30 nymphs each are deposited in the collections of FAMU and UU. One ♂ subimago and 27 nymphs are deposited in collections of NMNH, and 1 ♂ subimago, 1 ♀ subimago, and 27 nymphs are deposited in the collections of NMW.

Discussion: Based on Dr. STARMÜHLNER's notes, nymphs of *M. scotti* were collected under stones and rocks near shore in quiet to fast current. In one case nymphs were collected in submerged moss.

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