

**OPHIOGOMPHUS PUREPECHA SPEC. NOV.
FROM MEXICO
(ANISOPTERA: GOMPHIDAE)**

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Received 8 November 1999 / Reviewed and Accepted 30 January 2000

The new sp. is described, illustrated and compared with *O. arizonicus* Kenn. Holotype ♂: Michoacán state, Los Azufres, Arroyo San Pedro, 4 km NW of San Pedro Jácuro, alt. 2295 m, 29-XI-1998; allotype ♀, same data, but 18-XI-1989; deposited at CNIN, UNAM, Mexico. Its discovery in central Mexico represents a notable southern extension of the range of this genus in America.

INTRODUCTION

Ophiogomphus comprises 26 species of holarctic Gomphidae (PAULSON, 1998) of which 19 species are known for North America and the remaining 7 occurring in Europe and Asia (CARLE, 1992). The greatest concentration of species occurs in the northeastern United States and Canada with an outlying lesser group on the Pacific Coast (NEEDHAM & WESTFALL, 1955). Although the genus is well known, new species have recently been described from the United States (COOK & DAIGLE, 1985; CARLE, 1992; VOGT & SMITH, 1993).

Ophiogomphus is considered to represent a sister group of the Middle American *Erpetogomphus* (GARRISON, 1984), but no representatives of the former genus have been recorded from localities south of the United States. The discovery of a new species in central Mexico represents a notable southern range extension of the genus in North America.

OPHIOGOMPHUS PUREPECHA SP. NOV.

Figures 1-7

Material. — **Holotype** ♂ Michoacán state: Los Azufres, Arroyo San Pedro, 4 km NW of San Pedro Jácuaro, (19°43'58"N, 100°39'34"W) 2295 m, 29-IX-1998 (E. González, L. E. González & M. P. Villeda leg.); — **allotype** ♀: same data as holotype but 18-XI-1989 (M.P. Villeda leg.). — Additional material, **paratypes**: 3 ♂ same data as holotype, 1 ♂ same data as allotype. All material is deposited at Colección Nacional de Insectos(CNIN), Instituto de Biología, UNAM.

Etymology. — The name refers to the Purépechas, an indigenous group from the state of Michoacán, México.

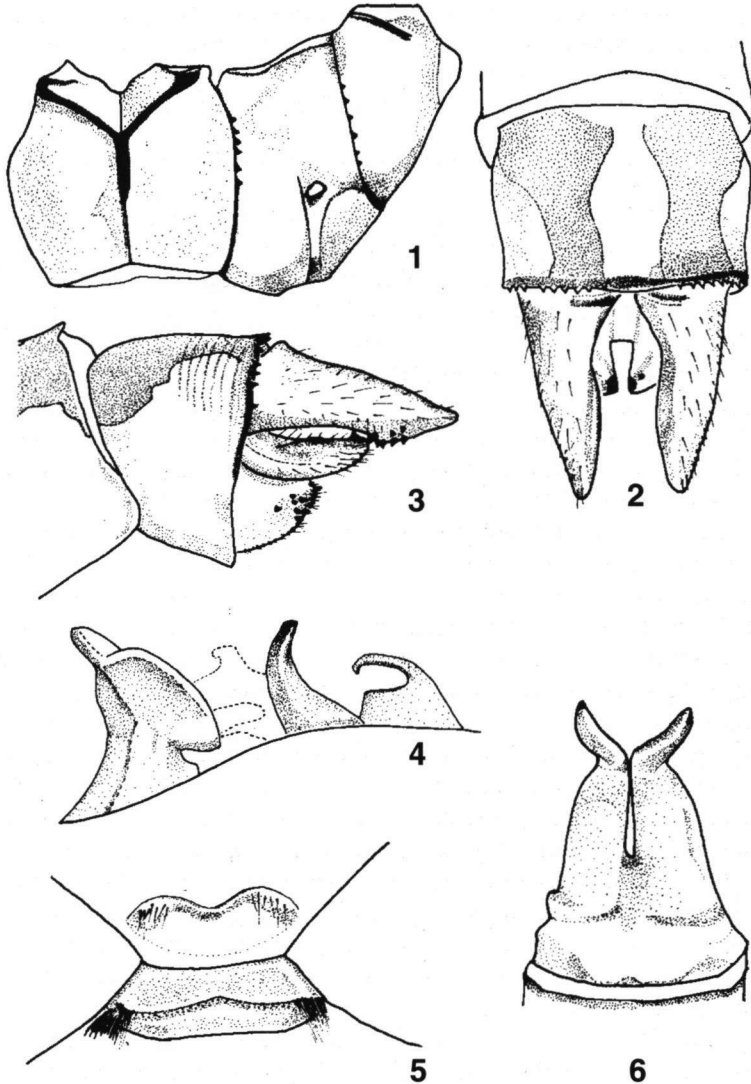
MALE (holotype). — (Colours in life) — **Head.** — Eyes grayish blue; labium and labrum pale green, both unmarked; maxillae and mandibles yellow-green at base, dark brown apically; clypeus and frons yellow green, postfrons with a black transverse band with a median notch and laterally with 5-6 short, conical black denticles, genae pale gray; face and frons covered with short dark brown hairs except a bare area laterally on postfrons in front of base of antennae; antennae black, with an annulus of yellow on the scape and same color on the apex of the flagellum; vertex black around ocelli, with a lemon green spot behind the postocellar ridge; lateral lobes of postocellar ridge covered by long, dark hairs; occiput yellow green, with a fringe of black, long hairs on occipital ridge.

Thorax. — Prothorax yellow green except the following black areas: anterior and posterior lobe, the former with anterior margin pale and the latter with hind margin pale medially; median lobe with a pair of latero-mesal stripes connecting with dark area of hind lobe; pterothorax with a stripe on antealar ridge and continuing anteriorly half way along middorsal carina; lateral sutures with vestiges of narrow line and vestiges of small spots on upper part of humeral suture, metastigma bordered with black (Fig. 1).

Wings. — Venation brown but costa yellow in ventral view; other main longitudinal veins yellow basally, pterostigmata medium brown dorsally, yellow ventrally. Venational details (left HW partially broken): Antenodals: fore wing 12/12, hind wing 9/9; postnodals: fore wing 10/11, hind wing ?/10, second primary antenodal the fifth in all wings, basal subcostal veins wanting, anal loop three celled, anal triangles four celled. Legs: yellow, external surfaces of femora with black stripes; on the first pair, black extending almost all their length, restricted to distal half on second femora or less on third; tibiae proximally and externally black, tarsi black (tarsi of leg 3 lacking).

Abdomen. — Mostly yellow, with black stripes or spots as follows: seg. 1 pale, each side with two dorsolateral spots on hind margin and tufts of black long hairs on its dorsum; seg. 2 with thin, short, dorsolateral stripe just above the level of base of auricle and a short wide subquadrangular spot dorsolaterally behind the first stripe; segments 3-10 with a wide dark dorsolateral stripe extending the length of each segment, this stripe narrowing anteriorly, widening posteriorly, on 4-7 dark

coloration extending slightly along transverse carina, dorsum of 10 mostly black with a median pale suboval spot. Abdominal appendages yellow; in dorsal view cerci gradually narrowing apically (Fig. 2), in lateral view with an antepical



Figs 1-6. *Ophiogomphus purepecha* sp. n.: (1) diagram of thoracic color pattern (holotype); - (2-3) dorsal and lateral view of male abdominal appendages (holotype); - (4) left profile view of male accessory genitalia (holotype); - (5) dorsal view of female occiput (allotype); - (6) ventral view of female vulvar lamina (allotype).

expansion covered with 18-20 denticles (Fig. 3); epiproct yellow, ca 0.6 length of cercus, in lateral view slightly swollen after 0.5 length and with an antepical dorsal tooth (Fig. 3).

Anterior hamuli yellow, dark brown at the apex of distal hooklike process, in lateral view with apical branch hooklike, its apex decurved toward broader basal branch; posterior hamule yellow, dark brown apically and on posterior surface; slightly curved anteroventrally and with tips truncated (Fig. 4).

Measurements (in mm). — Total length (incl. app.) 51.5, abdomen (incl. app.) 37.7, hind wing 30.5, cerci 2.0, epiproct 1.2.

FEMALE (allotype). — (Colours from a non-acetoned dried specimen) — Coloration as in male but: labrum with a yellow line on lateral borders. Legs with pale areas more extensive than in male. Head with no postoccipital horns (Fig. 5). Thorax with black stripes on antealar ridge and middorsal carina, more reduced than male. Wings with 12-13 antenodals (FW) and 7-8 (HW), and 9-10 postnodals (FW), 10-11 (HW); anal loop three celled in right hind wing (LHW damaged). Abdomen colored as male but with pale areas more extensive on segment 10. Cerci yellow. Vulvar lamina light tan, shorter than sternum of segment 9, cleft at distal 0.5, with branches converging distally but apices with inner margins strongly divergent posteriorly (Fig. 6).

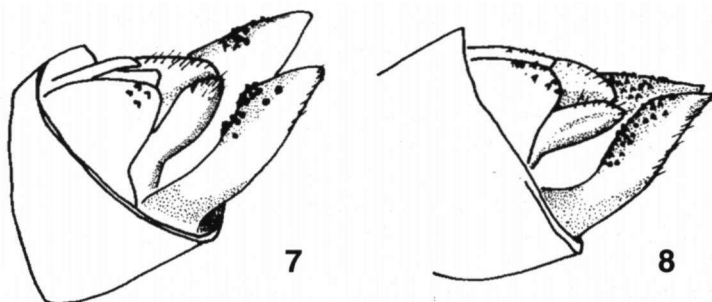
Measurements (in mm). — Total length (incl. app.) 50.0, abdomen (incl. app.) 36.8, hind wing 32.8, cerci 1.6, vulvar lamina 1.7.

VARIATION. — Paratype males: total length 51.3-52.5, abdomen 37.1-38.5, hind wing 30.9-32.2, cerci 1.92-2.15.

DISCUSSION

The absence of prominent dorsal processes in the epiproctal rami of the cercus places *O. purepecha* in the subgenus *Ophiogomphus* (sensu CARLE, 1992), along with *O. bison* Sel., *O. colubrinus* Sel., *O. occidentis* Hag., *O. morrisoni* Sel., *O. arizonicus* Kenn. and *O. severus* Hag.

The short male paraprocts allies *Ophiogomphus purepecha* to *O. arizonicus* from Arizona and western New Mexico. These species can be distinguished by the following set of characters: the cerci of *O. purepecha* are more gradually tapering (both in lateral and dorsal view) than those of *O. arizonicus* which has more pointed tips (Figs 7-8, see also figs 200-201 in KENNEDY, 1917). The distribution of ventral denticles on the cercus of *O. purepecha* is more restricted to the antepical rounded ventral expansion; in *O. arizonicus* these denticles are more evenly distributed (see for comparison Figs 7-8). The female of *O. purepecha* can be also distinguished from *O. arizonicus* by having the free portion of each arm of the vulvar lamina longer and more widely divergent (for comparison see figs 190, 196 and 202 in KENNEDY, 1917). Both sexes of *O. purepecha* have an occipital ridge, thus differing from those of *O. arizonicus* whose sexes do have this ridge not developed medially.



Figs 7-8. Ventrolateral view of male abdominal appendages: (7) *Ophiogomphus purepecha* (paratype); – (8) *O. arizonicus* Kennedy (Arizona: Apache Co., 2.5 mi SE of McNary, 19-VII-1968, R.W. Funk leg., R.W. Garrison det.).

BIOLOGY: – A male and female were originally collected by PVC on 18-XI-1989 at Arroyo San Pedro, a clear stream with small rocky bottom interspersed with sections of fine gravel and sand, near San Pedro Jácuaro. A full description of the physicochemical features of the stream are given by IBARRA (1992). She defines the habitat as a clear-water shallow stream, with an average depth of 12.7 cm and 3.5 m average width, with 6.00 PPM of dissolved oxygen, pH 6.5 and water temperature 18.5°C. The stream is located in an open area surrounded by coniferous trees (*Pinus* and *Abies* spp.).

On 28/29-XI-1998 we returned to the site to collect additional specimens. The first day, the sky was clear but suddenly at 15:00 h, became partially cloudy; one male was collected at approximately 16:30 h when it perched on the sandy stream bank. The second day was clear and sunny and we arrived by 09:30 h but despite an intensive search, we saw no *Ophiogomphus* by the stream. We collected three additional specimens at about 13:30 h, sitting on the ground in a forest gap about 60 m from the stream edge.

Other Odonata species at the stream were: *Hetaerina vulnerata* Hag., *Cordulegaster diadema* Selys and a few *Oploniaeschna armata* Hag. At small pools at the sides of the stream were: *Argia plana* Calv., *Apanisagrion lais* (Br.) *Hesperagrion heterodoxum* (Sel.), *Ischnura demorsa* (Hag.) and *Sympetrum i. illotum* (Hag.).

ACKNOWLEDGEMENTS

We would like to thank Drs R.W. GARRISON and S.W. DUNKLE for helpful comments on the manuscript. R.W. Garrison kindly rendered specimens of some *Ophiogomphus* species from North America for comparison.

REFERENCES

- CARLE, F.L., 1992. *Ophiogomphus* (*Ophionurus*) *australis* spec. nov. from the Gulf coast of Louisiana, with larval and adult keys to American *Ophiogomphus* (Anisoptera: Gomphidae). *Odonato-*

- logica* 21(2): 141-152.
- COOK, C. & J.J. DAIGLE, 1985. *Ophiogomphus westfalli* spec. nov. from the Ozark region of Arkansas and Missouri, with a key to the *Ophiogomphus* species of eastern North America (Anisoptera: Gomphidae). *Odonatologica* 14(2): 89-99.
- GARRISON, R.W., 1984. A revision of the New World genus *Erpetogomphus* Hagen in Selys (Odonata: Gomphidae). *Tijdschr. Ent.* 137: 173-269.
- IBARRA, G.M., 1992. *Contribución al estudio de las náyades de Ephemeroptera de algunos arroyos del noroeste del estado de Michoacán*. Undergraduate thesis. Fac. Cienc., UNAM, México. – [Unpublished]
- KENNEDY, C.H., 1917. Notes on the life history and ecology of the dragonflies (Odonata) of Central California and Nevada. *Proc. U. S. natn. Mus.* 52: 483-635.
- NEEDHAM, J.G. & M.J. WESTFALL, 1955. *A manual of the dragonflies of North America (Anisoptera), including the Greater Antilles and the provinces of the Mexican border*. Univ. Calif. Press, Los Angeles.
- PAULSON, D.R., 1998. Variation in head spines in female *Ophiogomphus*, with a possible example of reproductive character displacement. *Bull. Am. Odonatol.* 5(3): 55-58.
- VOGT, T.E. & W.A. SMITH, 1993. *Ophiogomphus susbehcha* spec. nov. from North central United States (Anisoptera: Gomphidae). *Odonatologica* 22(4): 503-509.