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THREE NEW GOMPHINE SPECIES FROM VENEZUELA (ANISOPTERA: *GOMPHIDAE*)

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Phyllogomphoides imperator sp. n. (♀ holotype: Amazonas, San Fernando de Atabapo), *Zonophora regalis* sp. n. (♂ holotype: Amazonas, La Ceiba del Ventuari), and *Z. obscura* sp. n. (♂ holotype: Bolivar, El Dorado) are described and illustrated. The first differs greatly from its congeners in the colour pattern of the pterothorax, the second is the largest neotropical gomphine species ever recorded, while the third is the darkest representative of the genus *Zonophora*.

INTRODUCTION

Through the courtesy of Dr. F. Fernández Yépez of the Instituto de Zoología Agrícola, Maracay, and Dr. J. Rácenis of the Museo de Biologia, Caracas, I have been able to study their gomphines assembled in Venezuela. The two lots together consist of 83 specimens and comprise 24 species of which three large-sized species are evidently new, viz. one representative of the genus *Phyllogomphoides* Belle, 1970, and two representatives of the genus *Zonophora* Selys, 1854. They are described below.

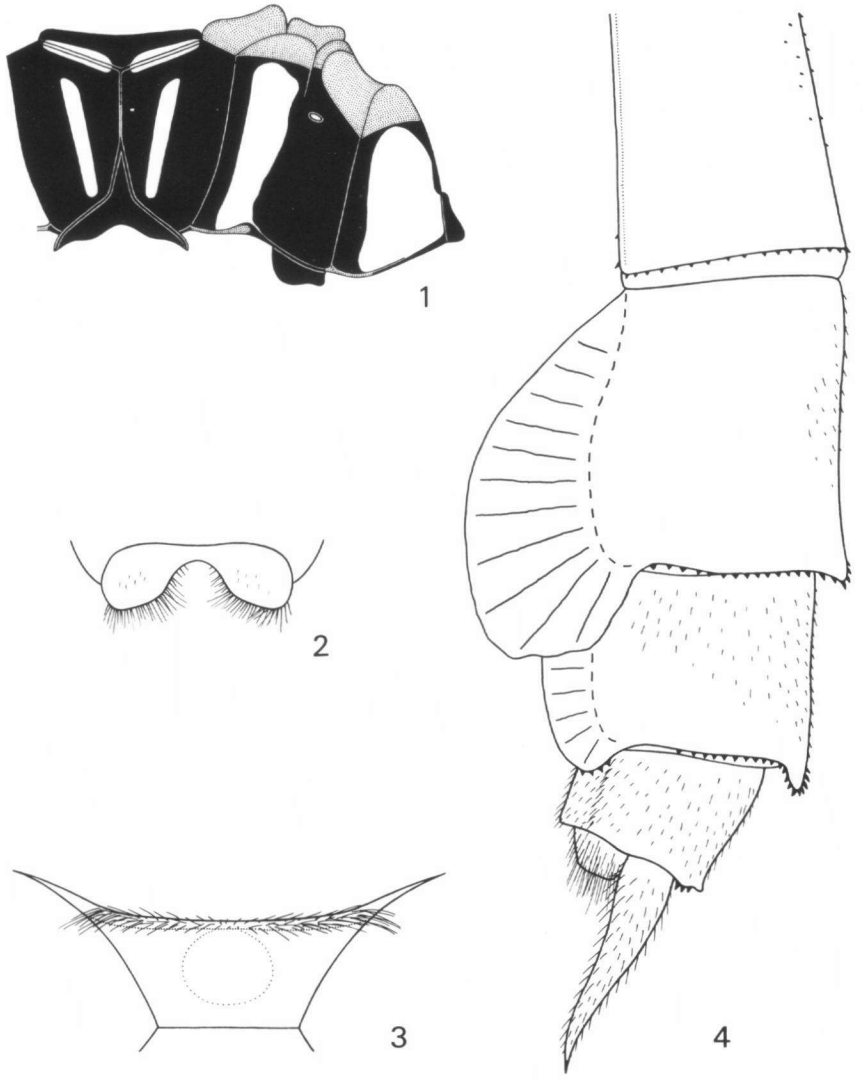
PHYLLOGOMPHOIDES IMPERATOR SPEC. NOV.

Figures 1-4

Material. – V e n e z u e l a: Amazonas, San Fernando de Atabapo, 23.II.1957, 1 ♀ (holotype), leg. J. Rácenis, (Museo de Biologia, Caracas).

This striking species differs considerably from its congeners in the colour pattern of the pterothorax by the lack of a pale midlateral (metepisternal) stripe

and a second pale antehumeral stripe immediately in front of the humeral suture. In size it equals the type species of the genus, *P. fuliginosus* (Hagen *in* Selys, 1854).



Figs. 1-4. *Phyllogomphoides imperator* sp. n., holotype female: (1) diagram of pterothorax; – (2) vulvar lamina, ventral view; – (3) occipital plate; – (4) apical segments of abdomen and caudal appendages, left lateral view.

F e m a l e (holotype). – Total length 72 mm; abdomen 55 mm; hind wing 46 mm; costal edge of pterostigma in fore wing 7 mm.

Pale colours of head greenish yellow except anteclypeus, labium and adjacent mouth parts which are greyish green. Pale colours of thorax, legs and abdomen yellow.

Labrum brown, with a symmetric pair of large, rough triangular pale spots, a minute pale midbasal spot, and a black band along free border. Mandibles pale externally but tip black. Genae pale. Postclypeus brown with pale lateral sides. Vertical part of frons brown. A very narrow pale band covering fronto-clypeal suture. Superior surface of frons concave in middle, very dark brown, with a narrow pale anterior band for entire width of frons. Scapes dark brown, with paler apex. Pedicels and first distaliae black. Other antennal joints brown. Vertex brown, with a pair of low mound-like prominences behind lateral ocelli. These prominences with rather long black hairs. Occipital plate brown, with large central pale spot, its ridge with black hairs. Rear of head brown but paler behind middle of occipital plate.

Prothorax dark brown, its hind lobe velvety black.

Pterothorax dark brown, brightly striped with yellow, the lower parts of lateral sides pruinosed, the dark colours on dorsum nearly black, the two pale lateral stripes very broad and conspicuous, its colour pattern shaped as shown in accompanying diagram.

Femora brown but dorsum of posterior pair paler, dorsum of middle pair with two pale longitudinal stripes, and inner side of anterior pair with a pale longitudinal stripe. Tibiae and claws black.

Wings hyaline but extreme bases flavescent, with black venation but serrate frontal margin of costa yellow. Pterostigma brown, surmounting 9 - 10½ cells. Brace vein present. Basal subcostal cross-vein present. Antenodal and postnodal cross-veins of first series 16:26-26:14/16:18-19:16 in fore and hind wings, respectively. Second primary antenodal cross-vein the sixth in left hind wing, the seventh in right hind wing, and the eighth in both fore wings. Intermedian cross-veins 14-14/8-9 in fore and hind wings, respectively. Supratriangles with two cross-veins. Triangle in left hind wing three-celled, in other wings four-celled. Subtriangle in hind wings three-celled, in left fore wing four-celled, in right fore wing five-celled. Hind wings with six paranal cells, six postanal cells, a three-celled anal loop, two rows of cells in second anal interspace, and area posterior to Cu2 five to six cells wide.

Abdomen black, scantily marked with yellow. Segment 1 pale on middorsum, the sides with large pale spot on lower half at posterior margin. Segment 2 with narrow pale middorsal band, the sides with large pale marking; sides of segment 3 with pale basal spot. Segments 3 to 8 with middorsal pale basal spot which is small on 3, equal in size on 5 to 6, large on 7, and large but indistinct on 8. Ventral tergal margins of segments 3 to 7 pale. End segments shaped as shown in

figure. Segments 9 and 10 black. Lateral expansions of segments 8 and 9 black, those of 9 denticulated along posterior margin. Caudal appendages largely pale, black on basal fourth. Vulvar lamina one-fifth the ninth sternite, its posterior margin deeply excised semicircular.

R e m a r k s. – The females of all species of *Phyllogomphoides* agree in the following two particulars: (1) Vulvar lamina short, its posterior margin deeply excised in middle; – (2) Lateral expansions of abdominal segment 9 denticulated along posterior margin.

These two female characters can be added to the definition of the genus (BELLE, 1970).

ZONOPHORA REGALIS SPEC. NOV.
Figures 5-15

Material. – V e n e z u e l a: Amazonas, La Ceiba del Ventuari, 13.III.1957, 2 ♂ (holotype and paratype), (Museo de Biologia, Caracas), 1 ♂ (paratype), (coll. Belle), all leg. J. Rácenis.

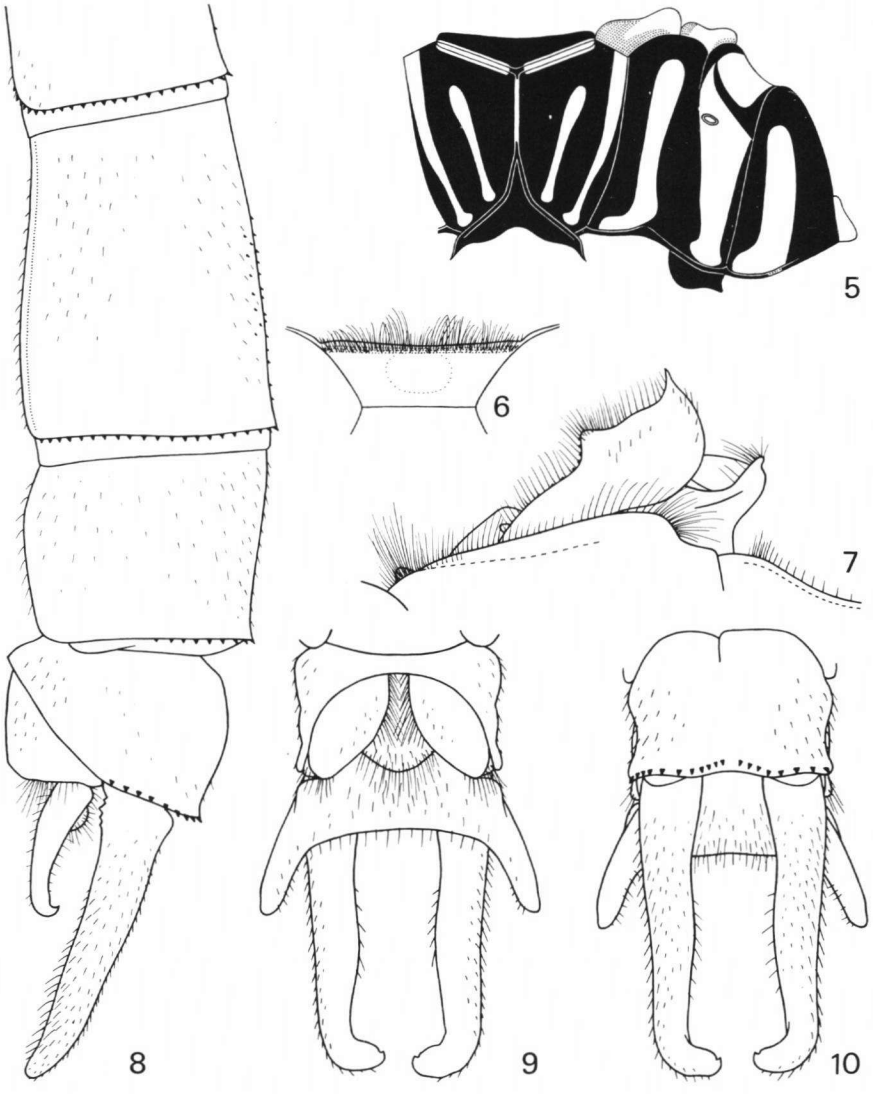
This species, which Dr. J. Rácenis firstly recognized as a new one, is the largest neotropical gomphine species ever recorded.

The male superior caudal appendages agree with those of *Z. surinamensis* Needham, 1944 in not being knotty near the middle. The penis is of very "aberrant" form having at the tip of the glans a pair of recurved, leaf-like plates instead of the usual pair of flagellae although these flagellae are extremely reduced in some species of *Zonophora*.

M a l e (holotype; an old specimen; abdomen broken between segments 5 and 6; wings somewhat damaged; left posterior leg broken off and lost). – Total length 81 mm; abdomen 62 mm; hind wing 51.5 mm; costal edge of pterostigma in fore wing 6 mm, in hind wing 6.5 mm.

Pale colours on head light greenish yellow. Pale colours on prothorax, pterothorax, legs, and abdomen dull yellow.

Face black, with two symmetric pairs of pale spots and a complete pale cross stripe. Labrum black, with a symmetric pair of oblong pale spots. Mandibles pale externally but mesal margin and tip black. Genae black. Anteclypeus yellow at lateral sides, with a median overwash of brown. Postclypeus and vertical part of frons black except for a pale stripe covering fronto-clypeal suture, this pale stripe confluent with pale areas on either side of postclypeus. Superior surface of frons black except for a symmetric pair of widely separated pale oblong spots near front, the spots separated from each other by a distance equal the length of each spot. Scapes black, with pale apical ring. Pedicels black but apex brown.



Figs. 5-10. *Zonophora regalis* sp. n., holotype male: (5) diagram of pterothorax; – (6) occipital plate; – (7) accessory genitalia, right lateral view; – (8) apical segments of abdomen and caudal appendages, left lateral view; – (9) tenth abdominal segment and caudal appendages, ventral view; – (10) the same, dorsal view.

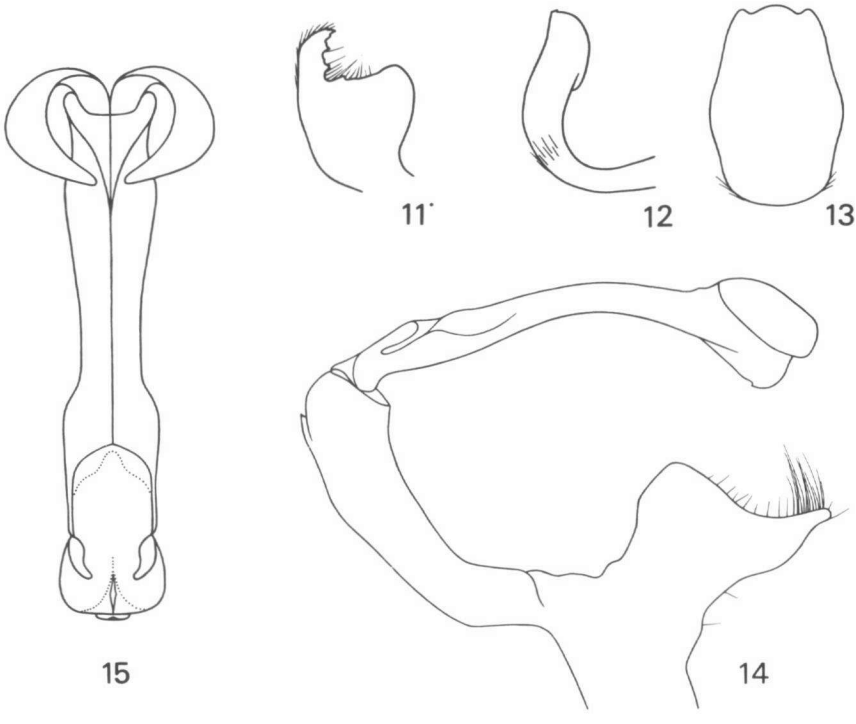
Distaliae brown, becoming more palish successively on apical joints. Vertex black. Conical tips of U-shaped post-ocellar ridge with tall black hairs. Occipital plate black, its ridge fringed with black hairs. Rear of head black. Labium and adjacent mouth parts yellow.

Prothorax black above. Posterior lobe with long black hairs. Median lobe with pale middorsal twin-spot, a larger pale spot at sides, and far down on sides a pale spot extending to anterior coxa.

Dorsum of pterothorax with black hairs which become longer anteriorly, being longest on collar. Pterothorax black with pale stripes. Dark areas on lateral sides pruinosed. Its colour pattern shaped as shown in accompanying diagram.

Coxae and femora dark brown but inner side of anterior femora pale. Tibiae and claws black. Lamina tibialis of anterior tibiae one-fifth the tibial length.

Wings slightly brown with black veins, including frontal margin of costa. Pterostigma brown, surmounting 6-7½ cells. Brace vein strong. No basal subcostal cross-vein. One extra cubito-anal cross-vein in left fore wing only. Ante-



Figs. 11-15. *Zonophora regalis* sp. n., paratype male: (11) right anterior genital hamule, right lateral view; – (12) penis guard, right lateral view; – (13) the same, frontal view; – (14) penis, right lateral view; – (15) glans of penis, ventral view.

nodal and postnodal cross-veins of first series 17:25-25:16/18:17-18:19 in fore and hind wings, respectively. Cell between second and third postnodal cross-veins divided by a cross-vein parallel to costa. First postnodal cross-vein of right fore wing forked. Second primary antenodal cross-vein the sixth in left hind wing, the seventh in other wings. Intermedian cross-veins 9-11/7-5 in fore and hind wings, respectively. Supratriangles and subtriangles open. Triangles two-celled. Hind wings with five paranal cells, five postanal cells, a two-celled anal loop, a four-celled anal triangle, and with area posterior to Cu2 five to six cells wide.

Abdomen predominantly black, nearly bare except on basal segments. Sides of segment 1 with a tuft of brown hairs, pale along posterior border and ventral tergal margin. Segment 2 with middorsal pale stripe, each side with three large pale spots, one at posterior margin, one at ventral tergal margin, and one above auricle. Hairs around genital pocket pale white. Accessory genitalia black, shaped as shown in figures. Sides of segment 3 pale along ventral tergal margin, with pale basal spot and a pale spot anterior to and bordering supplementary transverse carina. These spots also on segments 3 to 7 but decreasing in size, successively. Segments 8 to 10 black. Caudal appendages shaped as shown in figures, black, the superiors only paler along inner margin of incurved tip.

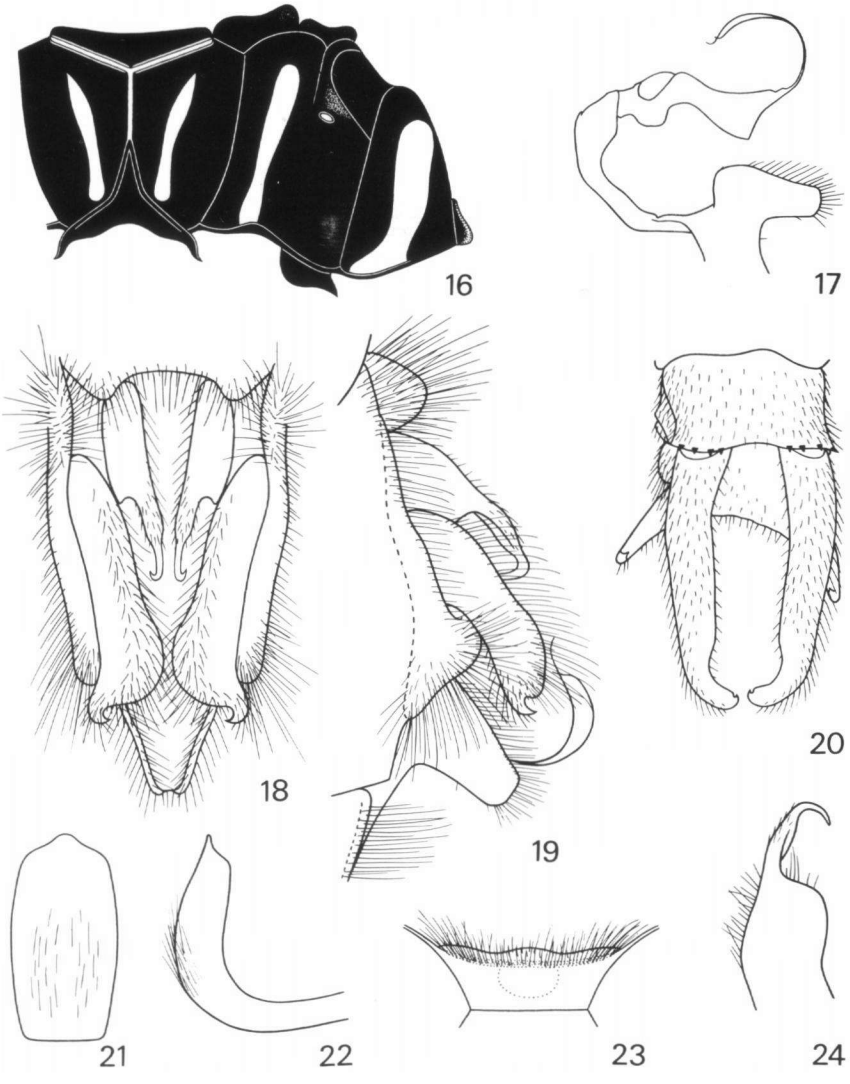
One of the p a r a t y p e s has an extra cubito-anal cross-vein in each of the fore wings and a cross-vein in the supratriangles except in the supratriangle of the right fore wing which has none. The other paratype has no extra cubito-anal cross-veins and a cross-vein in the supratriangle of the right hind wing only. The anteclypeus of this paratype has a pale cross-stripe instead of a pair of pale lateral spots. The hind wings of both paratypes have a three celled anal loop and a four-celled anal triangle.

ZONOPHORA OBSCURA SPEC. NOV.
Figures 16-24

Material. – V e n e z u e l a: Bolivar, El Dorado, Sta. Elena (km 106 - 560 m), 17.IV. 1957, 1 ♂ (holotype), leg. F. Fernández Yépez & C.J. Rosales, (Instituto de Zoología Agrícola, Maracay).

This species is the darkest representative of the genus having the pale mid-lateral stripe of the pterothorax and the second pale antehumeral stripe immediately in front of the humeral suture undeveloped.

The nearest relative is the preceding species, *Z. regalis*, as clearly appears from the male caudal appendages. The accessory genitalia, however, are widely different from this species; the tip of the glans of the penis bears the usual pair of flagellae.



Figs. 16-24. *Zonophora obscura* sp. n., holotype male: (16) diagram of pterothorax; – (17) penis, right lateral view; – (18) accessory genitalia (except penis and penis guard), ventral view; – (19) accessory genitalia, right lateral view; – (20) tenth abdominal segment and caudal appendages, dorsal view; – (21) penis guard, frontal view; – (22) the same, right lateral view; – (23) occipital plate; – (24) right anterior genital hamule, right lateral view.

M a l e (holotype; right fore wing broken near nodus; abdomen broken between segments 4 and 5; apex of abdomen partly crushed). – Total length 64 mm; abdomen 48.5 mm; hind wing 43.5 mm; costal edge of pterostigma in fore wing 4.9 mm, in hind wing 5.2 mm.

Pale colours yellow.

Face black with three pale cross stripes. Labrum with medially attenuated pale cross stripe. Mandibles pale externally but mesal margin and tip black. Anteclypeus with pale cross stripe, the lateral ends black. Postclypeus and vertical part of frons black except for the pale cross stripe which covers the fronto-clypeal suture. Superior surface of frons black with a broad anterior pale band which is narrowly interrupted in middle. Scapes and pedicels black with brown apex. First distaliae black on basal half, brown on apical half. Other distaliae brown, becoming more palish on apical joints successively. Vertex black. Conical tips of U-shaped post-ocellar ridge with tall black hairs. Occipital plate black, somewhat bulbous in middle, its ridge with black hairs. Rear of head black. Labium brown, the adjacent mouth parts pale brown.

Prothorax black, the hind lobe and middorsal part of middle lobe greenish brown.

Dorsum of pterothorax with black hairs which become longer anteriorly, being longest on collar. Pterothorax black with pale stripes. Its colour pattern shaped as shown in accompanying diagram.

Femora brown, becoming black to apex. Tibiae and claws black. Lamina tibialis of anterior tibiae one-seventh the tibial length.

Wings hyaline with dark brown veins including frontal margin of costa. Pterostigma yellowish brown, surmounting 6½-7 cells. Brace vein strong. No basal subcostal cross-vein. No extra cubito-anal cross-vein but only the usual two present. Antenodal and postnodal cross-veins of first series 16:22-21:15/14:15-15:15 in fore and hind wings, respectively. Second primary antenodal cross-vein the eighth in left fore wing, the seventh in other wings. Intermedian cross-veins 9-9/4-5 in fore and hind wings, respectively. Supratriangles and subtriangles open. Triangles two-celled. Hind wings with six paranal cells, five postanal cells, a four-celled anal loop, a four-celled anal triangle, and with the area posterior to Cu2 four to five cells wide.

Abdomen predominantly black, nearly bare on long slender middle segments, moderately hairy on wider segments toward both ends. Side of segment 1 with a tuft of brown hairs. Pleural edges of genital pocket on segment 2 with brown hairs. Segment 1 brown above, pale on sides. Segment 2 brown with pale middorsal spot at posterior border, the sides pale along posterior border, ventral tergal margin, and above auricle. Accessory genitalia black, shaped as shown in figures. Sides of segment 3 pale along ventral tergal margin and with a pale basal spot. Sides of segments 4 to 7 also with a pale basal spot, which is small on segments 4 to 6 but large, subquadrangular and reaching to supplementary

transverse carina on segment 7. Segments 8 to 10 black. Caudal appendages shaped as shown in figure. Superior caudal appendages without basal inferior tooth, pale brown, becoming black at base. Inferior caudal appendage black.

SCHMIDT (1941), in his characterization of *Zonophora*, rightly stated that the acute paraptera are typical of this genus. The paraptera are somewhat more acute in *Z. obscura* than in *Z. regalis*. Regarding the anal loop in the hind wing, this is not open at the proximal side in the present two new species of *Zonophora*. The anal loop is three-celled in *Z. regalis* and four-celled in *Z. obscura*. *Z. surinamensis* has also an anal loop; it is wide and of five cells (NEEDHAM, 1944).

The three species, *Z. regalis*, *Z. obscura*, and *Z. surinamensis*, agree in not having the J-shaped male superior caudal appendages knotty near the middle.

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