Contributions on *Gargaphia* (Heteroptera, Tingidae) systematics: redescriptions of two South American species with considerations on the status of *G. inca*

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ABSTRACT. *Gargaphia inca* Monte, 1943 was synonymized with *G. opima* Drake, 1931 without any declared reasons. *Gargaphia inca* is known only from its type location (Satipo, Peru), and *G. opima* from Colombia (Villavencio) and Peru (Cam. Del Pichis, type-locality), in addition to the new records here presented, including the first record for Ecuador. Both species are redescribed, and the status of *G. inca* is revisited and raised from synonymy. Illustrations of some of the most remarkable differences between these taxa are provided, as well as dorsal habitus images. Discussions on the genus systematic status and this nomenclatural act are presented.

KEY WORDS. *Gargaphia opima*, lacebugs, Neotropical, new records, synonym.

RESUMO. Contribuições sobre a sistemática de *Gargaphia* (Heteroptera, Tingidae): redescrições de duas espécies sul-americanas com considerações sobre o status de *G. inca*. *Gargaphia inca* Monte, 1943 foi sinonimizada com *G. opima* Drake, 1931 sem que as razões para este ato nomenclatural fossem apresentadas. *Gargaphia inca* é conhecida apenas da sua localidade-tipo (Satipo, Peru), enquanto *G. opima* foi registrada para a Colômbia (Villavencio) e Peru (Cam. Del Pichis), além dos novos registros aqui apresentados, que incluem o primeiro registro da espécie para o Equador. Ambas espécies foram redescritas, e *G. inca* foi revalidada. Illustrações de alguns dos caracteres diferenciais foram disponibilizadas, assim como fotos do habitus dorsal. Discussões sobre o *status* do gênero e o ato nomenclatural aqui proposto são apresentadas.

PALAVRAS-CHAVE. *Gargaphia opima*, Neotropical, novos registros, percevejos de renda, sinônimo.

Gargaphia Stål, 1873 is a Neotropical genus of Tingidae (Hemiptera, Heteroptera) comprising about 70 species. Accordingly to Hurd (1946), this genus may be characterized by the interrupted rostral channel. *Gargaphia inca* Monte, 1943 was described after the study of nine specimens collected in Satipo (Peru), and until nowadays this is the unique locality reported for this species. *Gargaphia opima* Drake, 1931 was also described based on individuals collected in Peru, but it was later reported for Colombia and Bolivia (Drake & Hambleton, 1945; Drake & Ruhoff, 1965). Host plant record is available only for *G. opima* [*Canavalia ensiformis* (L.) DC. – Drake & Hambleton, 1945]. Biological, ethological or nymphal data are unknown for these species.

Drake & Hambleton (1945) proposed *G. inca* as junior synonym of *G. opima* without any justification. Monte (1947) replied to this nomenclatural act providing solid arguments and precise illustrations of both species, suggesting that the act was a mistake. After a recent visit to both author's collections, and the access to some of their personal communications, it was clear that Drake and Hambleton never accessed the type-material of *G. inca*. In addition, Monte (1947) declared that he had studied *G. opima* type-material. In this same contribution, Monte (1947) highlighted textual parts of the original description of both species illustrating the remarkable differences between these species. Regardless Monte's efforts to revalidate *G. inca*, the world catalog published (Drake & Ruhoff, 1965) still considered the species as a junior synonym of *G. opima*. Thus, I reassessed this taxonomic issue and redescribed both species, revalidating *G. inca* and providing new distributions records for *G. opima*, including the first record for Ecuador.

MATERIAL AND METHODS

The specimens studied are deposited in the National Museum of Natural History (NMNH – Smithsonian Institution, Washington, D.C., United States) and Museu Nacional (MNRJ – Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ, Brazil). Photographs were taken with a digital camera attached to a stereomicroscope. Drawings were made from pictures, and vectorial image files were produced. Measurements were taken for six specimens per species in Image J software, after calibration for each specimen. They are given in millimeters and represented as follows: mean (lower – higher values). Terminology of Drake & Davis (1960) was followed. Toponyms of the species occurrence data were updated in Global Gazetteer. Geographic coordinates were obtained with Google Earth, and the map was built in Quantum Gis (v. 1.8.0).

RESULTS

Gargaphia opima Drake, 1931

(Figs 1, 3, 4, 6)

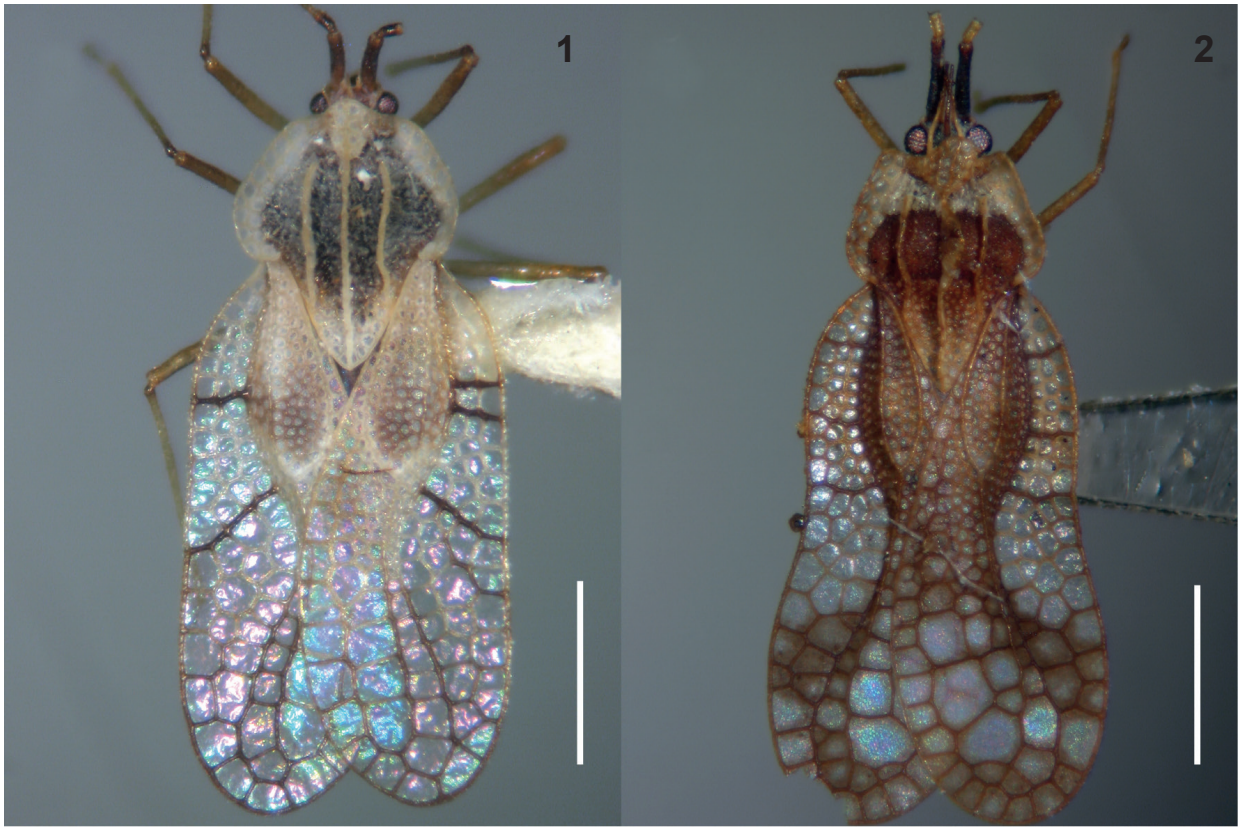
Gargaphia opima Drake, 1931:513; Monte, 1947:232, figs 2, 4; Drake & Ruhoff, 1965:229.

Redescription. Head dark brown, short. Five light

brown cephalic spines; occipitals close to the head surface, divergent; median and frontal pair slightly erected, almost half of the size of the occipitals; frontal pair slightly convergent. Antenae long, slender, pilose; scape and pedicel dark brown, almost black, distiflagellomere darker; basiflagellomere light brown; scape two and a half longer than pedicel; basiflagellomere at least five times longer than scape and two times than distiflagellomere. Bucculae closed in front; rostrum brown, darker at apex; reaching the posterior region of mesosternum. Pronotum black at the disc, distal part of the posterior projection white, tricarinate. Hood small, faintly projected over the head. Paranota biseriate, strongly reflexed, much at middle; slightly constricted before the middle in some specimens; areolas large, rectangular. Carina foliaceous, edge light brown; areolated, entirely uniseriate, areolas usually larger than the areolas of paranota; median carina slightly higher than lateral carina (Fig. 4), becoming obsolete posteriorly; lateral carina parallel at the disc, slightly convergent in the pronotal posterior projection, extending from the base of the hood to the white area of the pronotal posterior projection. Rostral channel interrupted, sternal laminae with small subrectangular areolas; prosternal laminae straight, parallel; mesosternal laminae straight, divergent; metasternal laminae closed anteriorly, strongly curved, forming an angle, convergent posteriorly; concave in the remainder (Fig. 6). Hemelytra large, twice the lenght of the abdomen; edge dark brown, hyaline costal and sutural area, subcostal and discoidal area blackish, whitish in the young adult; discoidal always whitish at the very posterior edge; transversal blackish nervures in costal, area at the median level of the discoidal area, and before sutural area; this with at least two darker nervures, following the end of subcostal area. Costal area with two areolas anteriorly, three areolas after that, and four in the widest part; areolas larger towards the posterior region, there slightly smaller than those of sutural area. Subcostal area biseriate, areolas subequal in size to those on the pronotal posterior projection. Discoidal area almost one third the lenght of the hemelytra; five to six areolas in the widest part, at middle; areolas in general slightly smaller than those of the subcostal area. Legs light brown, tarsi blackish, almost black; mesocoxae closer to metacoxae than procoxae. Abdomen dark brown to black, lighter in young adults.

Measurements. Scape length, 0.18 (0.17 – 0.19); pedicel length, 0.08 (0.07 – 0.08); basiflagellomere length, 0.80 (0.72 – 0.84); distiflagellomere length, 0.38 (0.36 – 0.40); discoidal area length, 0.61 (0.53 – 0.72); total body length without wings, 1.42 (1.33 – 1.51); total body length, 2.09 (1.98 – 2.27); total body width, 0.90 (0.83 – 1.06).

Material examined. COLOMBIA, **Caldas**: San José, 1 specimen, V.1946, E. J. Hambleton col. (NMNH); **Meta**: Restrepo, 5 specimens, 2.X.1965 (new record, NMNH); Villavicencio, 4 specimens, 3.XI.1944, E. J. Hambleton col. (NMNH); (920m), 1 specimen, 11.III.1955 (NMNH); Pachaquiaro, 20 specimens, 4.IX.1965, C. Peralonso col. (new record, NMNH). ECUADOR, **Zamora Chinchipe**: Zamora, 14 specimens, 1-5.VI.1976, A. Langley *et al*. col. (NMNH);



Figs 1, 2. Dorsal *habitus* of *Gargaphia opima* Drake, 1931 and *G. inca* Monte, 1943: 1, *G. opima*; 2, *G. inca*. Scale bar: 0.5 mm.

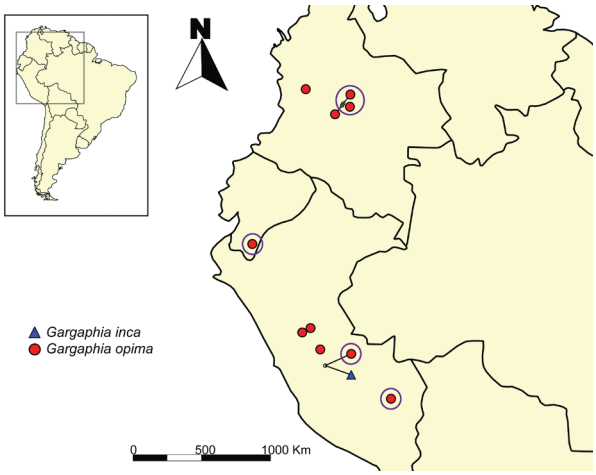


Fig. 3. Distribution of *Gargaphia opima* Drake, 1931 and *G. inca* Monte, 1943. Circles indicate new distribution records.

Zamora, 18 specimens, 10.VI.1965, A. Langley *et al*. col. (new record, NMNH); Zamora, 1 specimen, 12.VI.1965, A. Langley *et al*. col. (NMNH). PERU, **Ucayali**: Aguaytia, 22 specimens, 6.IX.1944, E. J. Hambleton col. (NMNH); **Huánuco**: Tingo Maria, 15 specimens, V.1946, E. J. Hambleton col. (NMNH); **Pasco**: Miriatiriani (Cam. del Pichis), 1 specimen, 9.VII.1920, Bradley col. (MNRJ); **Junín**: Satipo, 2 specimens, 10.X.1941, P. Paprzycki col. (new record, NMNH); **Cusco**: Quince Mil, 8 specimens, X.1962 (new record, NMNH).

Gargaphia inca Monte, 1943 sp. reval.

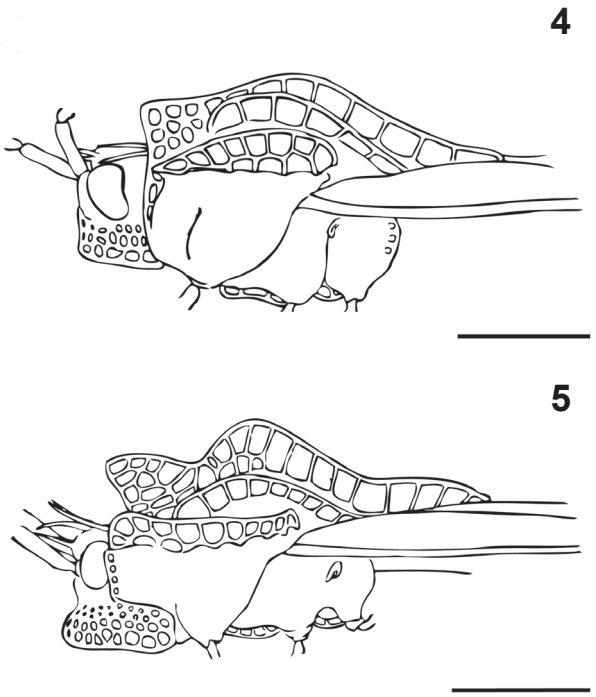
(Figs 2, 3, 5, 7)

Gargaphia inca MONTE, 1943:105, fig. 1; 1947:232, figs 1, 3.
Gargaphia opima DRAKE & HAMBLETON, 1945:365; DRAKE & RUHOFF, 1965:229.

Redescription. Head dark brown, short. Five long cephalic spines; occipital pair light brown, median and frontal pair darker; occipitals close to the head surface, convergent; median and frontal pair erected, same size or longer than occipitals; frontal pair slightly convergent, the longest. Antennae long, slender, almost glabrous; scape dark brown, four times the lenght of pedicel; pedicel and basiflagellomere yellowish; distiflagellomere light brown. Bucculae closed in front, projected forwards; rostrum light brown, tip darker; reaching the posterior region of mesosternum. Pronotum brown at the disc, almost entirely white at the posterior projection, tricarinate. Hood strongly projected over the head. Paranota triseriate anteriorly, biseriate from the middle to the posterior region; uniformly reflexed, slightly constricted before the middle; areolas large, subquadrate or subrectangular, subequal in size between the rows. Carina foliaceous, edge light brown to whitish; areolate, the lateral entirely uniseriate, the median biseriate at the widest part; areolas of lateral carina as those of paranota, outer row of areolas of the median carina rectangular, twice as large as the areolas of lateral carina and paranota; median carina conspicuously higher than lateral carina at the middle (Fig. 5) and with a black stain; lateral carina parallel on the disc, slightly convergent on the pronotal posterior projection, extending from the base of the hood to the white part of the pronotal posterior projection. Rostral channel interrupted, sternal laminae with small subrounded areolas; prosternal laminae convex; mesosternal laminae slightly concave anteriorly, parallel; metasternal laminae in contact anteriorly, convergent posteriorly, strongly concave, anteriorly and posteriorly closed with a straight laminae (Fig. 7). Hemelytra large, twice the lenght of the abdomen; edge light brown, hyaline costal area, with brown stain at the posterior region; subcostal area dark brown, discoidal area lighter; sutural area with brown stain at the rounded tip; three perpendicular dark brown nervures in costal area, anteriorly, posteriorly and after discoidal area. Costal area with two areolas anteriorly, three areolas after that, and five areolas in the widest part; areolas slightly larger towards the posterior region, but always smaller than the areolas of the sutural area. Subcostal area quadriseriate, areolas subequal in size to those in the pronotal posterior projection and discoidal area. Discoidal area more than one third the lenght of the hemelytra; four areolas in the widest part, at middle. Legs light brown, slightly darker than basiflagellomere, tarsi even darker, but still light brown; mesocoxae closer to metacoxae than procoxae. Abdomen black or strongly blackish.

Measurements. Scape length, 0.22 (0.20 – 0.23); pedicel length, 0.07 (0.07 – 0.08); discoidal area length, 0.50 (0.48 – 0.53); total body length without wings, 1.34 (1.30 – 1.39); total body length, 2.08 (2.02 – 2.21); total body width, 0.74 (0.72 – 0.78).

Material examined. PERU, **Junín**: Satipo, type and alotype, IV.1942, P. Paprzycki col. (MNRJ); Satipo, 6 specimens, 23.VIII.1949, P. Paprzycki col. (NMNH).



Figs 4, 5. Lateral view: 3, *Gargaphia opima* Drake, 1931; 4, *Gargaphia inca* Monte, 1943. Scale bar: 0.25 mm (modified from MONTE, 1947).

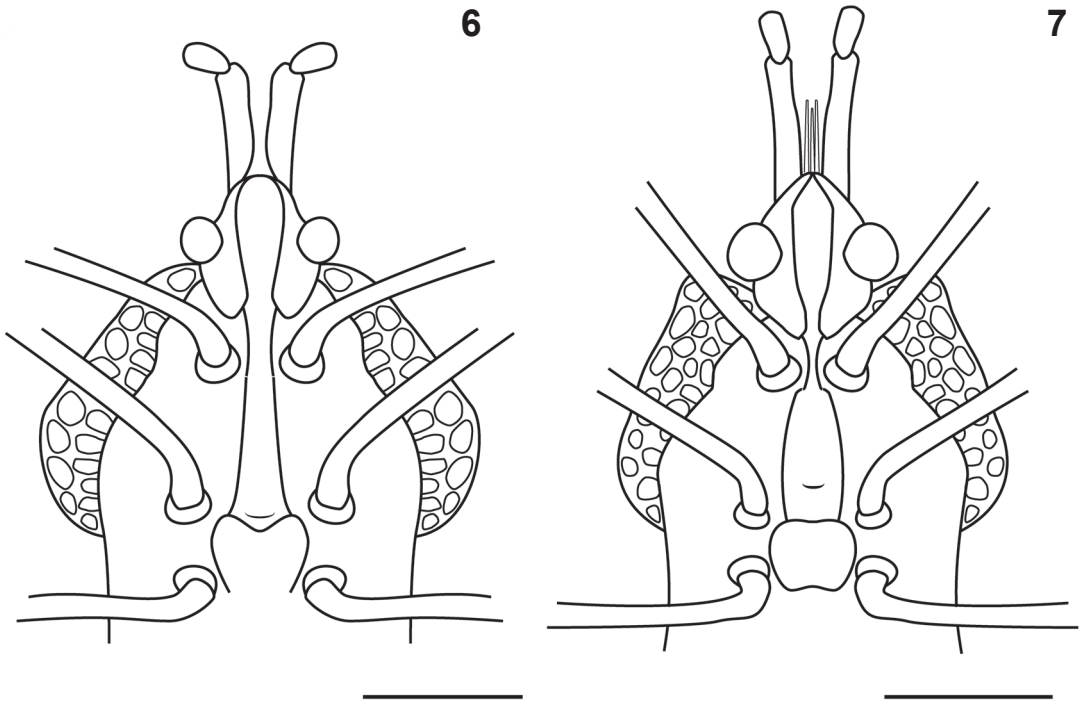


Fig. 6, 7. *Rostrum* channel: 6, *Gargaphia opima* Drake, 1931; 7, *Gargaphia inca* Monte, 1943. Scale bar: 0.25 mm.

DISCUSSION

Besides the differences already observed by Monte (1947), several others could be emphasized: size and position of the cephalic spines, longer and more erected in *G. inca*; projection of the hood, much more pronunciated in *G. inca*; projection of the bucculae in front of the clypeous in *G. inca*; shape of sternal laminae, specially the metasternal laminae and the color pattern of the hemelytra. In addition to these recently differences here reported, the elevation of the median carina, the shape and number of rows of cells of the paranota, and the number of rows of areolas of the subcostal area are the most remarkable differences between these species. Monte (1943) postulated that the median carina of *G. inca* distinguishes the species from all its congeners. Due to aforementioned characters, it is strongly unlikely that both group of specimens assigned to each name be consider the same species.

Along with the sympatry presented by these species of *Gargaphia*, *G. opima* was also reported to four other localities in Peru, as well as four in Colombia and one in Ecuador. The report of this species in Zamora (Ecuador) is the first record in this country. The occurrence in Satipo and Quince Mil (Peru) as well as Pachaquiaro and Restrepo (Colombia) are also first records in these localities. Only two specimens of *G. opima* sampled in Satipo were found in NMNH, both collected in 1941, before the release of Drake & Ruhoff's catalog. However, this record was not published so far. The presence of such specimens from the type-locality of *G. inca* allied with the non-access to the *G. inca* type-material, could be the reason for the synonymy proposed by Drake & Hambleton (1945). The specimen(s) voucher(s) of the record for *G. opima* in Bolivia (Drake & Ruhoff, 1965) was not found in the Drake's collection (NMNH) and was never reported elsewhere, therefore, it was not represented in the map here provided. *Gargaphia inca* remains known only for the type-locality in Satipo (Peru).

Monte and Drake had a personal conflict in the late 1930's, which affected the access to type-material. This battle could be accessed through personal letters between the authors, and between them and the Dr. José Cândido de Mello Carvalho. Several taxonomic acts were taken due these disagreements, and accordingly to Monte (1947), the issue here addressed was only one of them. *Leptopharsa* Stål, 1873, *Phymacysta* Monte, 1942 and *Teleonemia* Costa, 1864 are some of the other genera that played an important role in the author's disagreements. Both authors were incredible productive at that time, and several Neotropical species of Tingidae were described during the conflict. Recently, Montemayor & Dellapé (2010) reassessed the issue with other species of *Gargaphia* (*G. subpilosa* Berg, 1879; *G. bergi* Monte, 1940 and *G. penningtoni* Drake, 1928), which were also target of arguments between Drake and Monte. However, much more is still needed in order to minimize the influence of that rivalry on the Tingidae systematics. Therefore, all of these disagreements should be reassessed and a special attention should be paid to the Neotropical taxa described during that time.

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