

A review of the genus *Gahaniella* Timberlake, 1926
(Hymenoptera: Chalcidoidea: Encyrtidae)
with description of a new species from Mexico

Обзор рода *Gahaniella* Timberlake, 1926
(Hymenoptera: Chalcidoidea: Encyrtidae)
с описанием нового вида из Мексики

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KEY WORDS: Hymenoptera, Encyrtidae, *Gahaniella*, *Gahaniella akhatovi* **sp.n.**, taxonomy, biology, Mexico.

КЛЮЧЕВЫЕ СЛОВА: Hymenoptera, Encyrtidae, *Gahaniella*, *Gahaniella akhatovi* **sp.n.**, таксономия, биология, Мексика.

ABSTRACT: Diagnosis of the New World genus *Gahaniella* Timberlake, 1926, key to females and males, synopsis of 6 known species with indication of their distribution and hosts and description of *G. akhatovi* **sp.n.** from Mexico are provided. Species of *Gahaniella* are endohyperparasitoids of Coccoidea (Homoptera).

РЕЗЮМЕ: В статье даны диагноз рода *Gahaniella* Timberlake, 1926 из Нового Света, определительная таблица видов по самкам и самцам, синопсис 6 известных видов с указанием их распространения и хозяев и описание *G. akhatovi* **sp.n.** из Мексики. Виды рода *Gahaniella* — вторичные внутренние паразиты кокцид (Homoptera: Coccoidea).

Introduction

Species of the genus *Gahaniella* are known only from North, Central and South America, Caribbean Islands, Bermuda and Hawaii. In Bermudan and Hawaiian Islands they are accidental immigrants. Presumably all of them are endohyperparasitoids of Coccoidea on different trees and shrubs, for example on such important cultivated plants as coffee tree *Coffea arabica*, orange *Citrus sinensis*, cacao tree *Theobroma cacao*, mango *Mangifera indica* and maracuya (*Passiflora* species with edible fruits).

The genus *Gahaniella* may be identified among 226 genera of Encyrtidae known from the New World using keys of Trjapitzin & Gordh [1978a, b], Noyes [1980], Noyes et al. [1997] and Trjapitzin et al. [2008a].

In this article an abbreviation used in the text is: F — an antennal funicular segment.

Genus *Gahaniella* Timberlake, 1926

TYPE SPECIES: *Gahaniella californica* Timberlake, 1926, by original designation.

Timberlake, 1926: 23–31; Kerrich, 1953: 800–802; De Santis, 1964: 270–275; Sugonjaev, Trjapitzin, 1988: 183, 184.

DIAGNOSIS. Female. Body compact, not flattened dorsoventrally. Head hypognathous. Frontovortex broad, usually as long as wide. Ocelli forming a triangle with apical angle about 60° or 90° (or more). Toruli above level of lower eye margins (Fig. 1). Scape of antenna not expanded or inconsiderably expanded ventrally; funicle 6-segmented, its segments scarcely increasing in width from F1 to F6; clava 3-segmented, short; all segments of flagellum with longitudinal linear sensillae (Fig. 2). Mandible with one denticle and broad truncation. Formula of palpi 4:3. Pronotum short. Mesonotum 2x as long as wide, without parapsidal lines. Scutellum more or less convex. Wings not abbreviated, hyaline; marginal vein of the fore wing about 2x as long as wide; stigmal vein not longer or 1.5x longer than marginal; postmarginal vein not long or as long as stigmal. Spur of the middle tibia as long as the 1st tarsal segment. Propodeum very short in the middle. Gaster subtriangular, usually as long as mesosoma. Ovipositor sheaths not or slightly exerted. General colour submetallic black, with some brilliant parts. Body length 0.92–1.75 mm.

Male. Head thinner frontooccipitally, frontovortex broader, ocelli larger than in female. Segments of antennal funicle usually with whorls of long hairs (Fig. 3); clava solid or 2-segmented. Body length 0.92–1.4 mm.

BIOLOGY. Six described species of *Gahaniella* and three undescribed had been reared from different Coccoidea, mainly belonging to the family Coccidae, but also to Pseudococcidae, Asterolecaniidae and Ortheziidae, frequently together with primary parasitoids from the families Encyrtidae and Aphelinidae. Hyperparasitism was demonstrated only for *G. tertia* Kerrich in Trinidad on the mealybug *Planococcus citri* Risso (Pseudococcidae), for *G. saissetiae* Timberlake in USA on the black scale *Saissetia oleae* Olivier (Coccidae) [data of F.D. Bennett, see: Trjapitzin et al., 2008 b], for

Gahaniella sp. on *Ceroplastes* sp. in Honduras [data of F.D. Bennett, see Trjapitzin et al., 2008b], for *Gahaniella* sp. (now *tertia*) on *Parasaisetia nigra* Nietner in Bermuda [Simmonds, 1957; Hilburn et al., 1990], and *Gahaniella* sp. (apparently *saissetiae*) on *S. oleae* in Brazil. In the case of *G. tertia* in Trinidad the primary host is *Leptomastix dactylopii* Howard, 1885 (Encyrtidae). Data on immature development of *Gahaniella* species remain unknown to me, but I suppose that their larvae develop within larvae of primary parasitoids, as do larvae of *Metablastothrix isomorpha occidentalis* Voinovich, Trjapitzin et Sugonjaev, 1966 from the genus *Metablastothrix* Sugonjaev, 1964 related to *Gahaniella*.

SYSTEMATIC POSITION. According to structure of mandibles (one denticle and broad truncation) and biology *Gahaniella* is related to the Holarctic genus *Metablastothrix*. It differs from *Metablastothrix* in higher insertion of antennae and in some other characters. In *Gahaniella*, funicle of antenna is rather uniformly segmented, almost not broadening towards apex and has many longitudinal sensillae (Fig. 2); in *Metablastothrix*, it is broadening towards apex and has only small number of such sensillae. Trjapitzin [1973] could not place *Gahaniella* into his classification of the subfamily Encyrtinae, but Trjapitzin & Gordh [1978b] referred *Metablastothrix* and *Gahaniella* to the tribe Microteriyini as genera *incertae sedis* among subtribes of this tribe. And only Sugonjaev & Trjapitzin [1988] referred *Metablastothrix* and *Gahaniella* to the subtribe Syrphophagina of the tribe Microteriyini in the subfamily Encyrtinae. Now I accept point of view of Hayat [2006] that the tribe Microteriyini Hoffer, 1955 is a synonym of the tribe Discodini Hoffer, 1955, but discussion of this problem is not a subject of the present publication.

KEY TO SPECIES OF *GAHANIELLA* *

- 1(10) Clava of antenna 3-segmented; flagellum clavate (Fig. 2), with very short hairs ♀♀
 2(5) Fore coxae dark, with metallic luster; middle femora dark, with brown or brownish bases and apices.
 3(4) Scape of antenna 3x as long as wide; F1 subquadrate, F6 a little wider than long. 1.26–1.34 mm *G. californica*
 4(3) Scape of antenna a little over 4x as long as wide; F1 somewhat longer than wide, F6 subquadrate. 0.92–1.33 mm *G. saissetiae*
 5(2) Fore coxae and middle femora white, yellowish-white or whitish-yellow.
 6(7) Scape of antenna broadened at apex (Fig. 2); pedicel 2x shorter than scape *G. tertia*
 7(6) Scape of antenna broadened in the middle (Fig. 4); pedicel about 3x shorter than scape.
 8(9) Hind tibiae darkened, with yellowish-white apical 1/5–1/2 parts. Clava of antenna as long as 2 preceding funicular segments combined. Distance from toruli to mouth margin 2.5 x more than distance from a torulus to eye margin. 1.1 mm *G. akhatovi*
 9(8) Hind tibiae light (pallid), with darkened apices. Clava of antenna a little shorter than 3 preceding funicular segments combined. Distance from toruli to mouth margin 1.6 x more than distance from a torulus to eye margin 1.75 mm *G. brasiliensis*
 10(1) Clava of antenna solid or 2-segmented; flagellum filiform, usually with long hairs (Fig. 2), except *G. brasiliensis* ♂♂
 11(12) Clava of antenna 2-segmented. (Scape 3x as long as

wide; F1 somewhat more 2x as long as wide). 1–1.32 mm

- *G. californica*
 12(11) Clava of antenna solid.
 13(14) Scape of antenna broadened at apex (Fig. 3).
 *G. tertia*
 14(13) Scape of antenna broadened in the middle (Fig. 1).
 15(16) Funicle of antenna with short hairs, length of them less than width of segments; F1 about 3x as long as wide. ...
 *G. brasiliensis*
 16(15). Funicle of antenna with long hairs, length of them less than width of funicular segments; F1 about 1.5–2x as long as wide.
 17(18). Scape of antenna about 3x as long as wide. 1 mm.
 *G. akhatovi*
 18(17) Scape of antenna almost 4x as long as wide. (F1 somewhat over 2x as long as wide). 0,91 mm *G. saissetiae*

Synopsys of species

Gahaniella akhatovi Trjapitzin sp.n.

Fig. 4.

TYPE MATERIAL. Holotype ♀ — Mexico, Yucatan, Libre Union, ex *Nipaecoccus nipae* Maskell (Pseudococcidae) on a tree with latex, 3.IV.1990, F.D. Bennett (Zoological Institute, Russian Academy of Sciences, Saint-Petersburg, Russia); paratypes: 1 ♂ — with the same label in the same collection.

7 ♀♀, 4 ♂♂ — from the same reared series are not included into the types due to technical reasons. They are preserved in the collection of the Autonomous University of Tamaulipas, Cd. Victoria, Mexico.

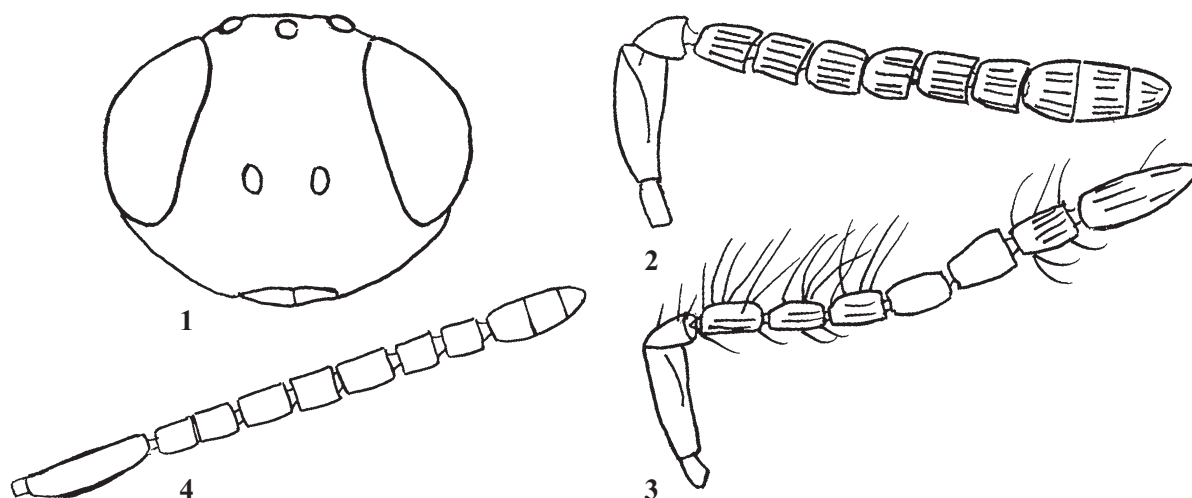
DESCRIPTION. **Female** (holotype and paratype). Frontovortex as long as wide, its minimum width about 3/7 or 5/11 of the maximum head width. Ocelli forming an obtuse triangle with apical angle more than 90°. Occipital margin slightly concave. Distance from toruli to mouth margin 2.5x more than distance to eye margin. Scape of antenna about 3x as long as wide, broadened in the middle (Fig. 4); pedicel 3x shorter than scape and a little longer than wide at apex (4:3); all funicular segments longer than wide; F1 as long as pedicel; clava as long as 2 preceding funicular segments combined. Scutellum as long as mesoscutum. The fore wing 2x as long as wide; submarginal vein thin, curved, costal cell 6x as long as wide; marginal vein somewhat thickened, 2x as long as wide; stigmal vein thin, 1.5x longer than marginal and forms an angle about 30° with the anterior margin of wing; postmarginal vein thickened, as long as stigmal. Mesotibial spur as long as 1st segment of tarsus. Propodeum 7x shorter than scutellum (measurements in the middle). Pygostyli not far from base of gaster; lateral sides of gaster straight, converging posteriad under an angle about 60°. Ovipositor sheaths slightly exerted.

Body black with slight bronze luster, more intensive on dorsal side of thorax. Face and malar spaces with bronze-blue luster. Scape of antenna dark, with bronze-yellow base and apex; pedicel dark, with brownish apex; flagellum black-brown. Mesopleura with greenish-bronze-violet-blue luster. Legs mostly whitish-yellow, including fore coxae; middle and hind coxae and hind femora black (the latter with yellowish bases and apices); hind tibiae darkened, with whitish-yellow 1/5–1/2 apical parts; there is a weak darkening near the base of middle tibiae; last segment of all tarsi darkened.

Frontovortex and all dorsal side of thorax with microcellular sculpture. Mesopleura entirely cellular, with somewhat larger meshes, and lateral sides of propodeum with still larger meshes of sculpture. Dorsal side of thorax with dark hairs. Body length 1.1 mm.

Male. Antennae filiform, with rather long hairs on funicle; clava solid; 3x as long as wide. Fore coxae somewhat darkened. Body length 1 mm.

* *Gahaniella incerta* (Howard, 1881) is not included due to inaccessibility of material.



Figs 1–4. *Gahaniella* spp.: 1–3 — *G. tertia* [after Kerrich, 1953]; 1 — head of female; 2–3 — antennae, 2 — female, 3 — male (sensillae and hairs on F4–F5 not shown); 4 — *G. akhatovi* sp.n., antennae of female, paratype, original (sensillae and hairs not shown).

Рис. 1–4. *Gahaniella* spp.: 1–3 — *G. tertia* [по Kerrich, 1953]; 1 — голова самки; 2–3 — усики, 2 — самка, 3 — самец (сенсиллы и волоски на F4–F5 не показаны); 4 — *G. akhatovi* sp.n., усики самки, паратип, оригинал (сенсиллы и волоски не показаны).

COMMENTS. Relationships of *Gahaniella akhatovi* sp.n. to other described species of *Gahaniella* is now difficult to ascertain. Its female resembles that of *G. tertia* (and secondary hosts of both species belong to the family Pseudococcidae), but *G. akhatovi* sp.n. differs from *G. tertia* in scape of antenna broadened in the middle (at apex in *G. tertia*). This is true also for males of these species. Differences of *G. akhatovi* sp.n. from other species of *Gahaniella* are shown in the key.

ETYMOLOGY. The new species is named after Dr. Askar Akhatov from Moscow, entomology researcher with more than 30 years experience of plant protection, who helped me cordially.

Gahaniella brasiliensis (Gomes, 1941)

Gomes, 1941: 401–402 (*Coccidoxenus*), 1942: 28–29 (*Coccidoxenus*); De Santis, 1980: 199–200 (*Trichomasthus*); Noyes, 1980: 234 (*Trichomasthus*); Sugonjaev, Trjapitzin, 1988: 183, 184 [*G. brasiliensis* (Gomes, 1942) — date of description of the species was indicated erroneously].

NOTES. **Brazil:** State of Rio de Janeiro, ex *Mesolecanium deltae* Lizer (Coccidae), together with *Metaphycus flavus* (Howard, 1881), and ex *Saissetia coffeae* Walker (Coccidae); former Federal District.

Gahaniella californica Timberlake, 1926

Timberlake, 1926: 26–27; Kerrich, 1953: 800, 801; De Santis, 1964: 272–274; Sugonjaev, Trjapitzin, 1988: 183, 184; Trjapitzin et al., 2008a: 156.

NOTES. **USA** (California), ex *Parthenolecanium corni* Bouché (Coccidae) on *Arctostaphylos* sp. and ex *Parthenolecanium* sp., probably *corni* on oak *Quercus californica*. **Mexico** (Tamaulipas): ex adult female of *Differococcus argentinus* Morrison (Coccidae) on the American Spiny Hackberry *Celtis pallida*; ex material of *Orthezia* sp. (Ortheziidae) on dwarf pepper *Capsicum annuum* var. *glabriscutum* (in Spanish: “chile piquín”). **Argentina:** Prov. Salta, ex *Pulvinaria argentina* Leonard (Coccidae), together with *Metaphycus niger* (Brèthes, 1918) and *Coccophagus caridei* (Brèthes, 1918); Prov. Corrientes; in Argentina *G. californica* had also been reared from *Coccus hesperidum* Linnaeus and *Saissetia coffeae* Walker. **Uruguay,** ex an undetermined soft scale (Spanish: “cocchinilla blanda”) (Coccidae), together with *Coccophagus caridei*.

Gahaniella incerta (Howard, 1881)

Howard, 1881: 366 (*Blastothrix*); Peck, 1963: 423 (*Blastothrix*); Noyes, Woolley, 1994: 1331.

USA (Florida), ex *Lecanium* sp. “(Coccidae) on mesquite (*Prosopis*). Female unknown.

Gahaniella saissetiae Timberlake, 1926.

Timberlake, 1926: 27–28; Kerrich, 1953: 800–801; De Santis, 1964: 274–275; Beardsley, 1976: 214; Trjapitzin, Sitdikov, 1993: 169; Browning, 1994: 70–72; Trjapitzin et al., 2004: 76.

NOTES. **USA** (Florida), hyperparasitoid of black scale *Saissetia oleae* Olivier (Coccidae); and according to F.D. Bennett [pers. comm., 1988] ex the encyrtid *Microterys nietneri* (Motschulsky, 1859) in a soft scale (Coccidae) on *Schefflera* sp. (fam. Araliaceae). **Cuba,** ex *S. coffeae* Walker on coffee tree *Coffea arabica*, ex *Toumeyella cubensis* Heidelet Köhler (Coccidae) on citrus, and ex *Milviscutulus mangiferae* Green (Coccidae). **Caribbean Island** St. Croix, ex *Parasaissetia nigra* Nietner. **Venezuela,** ex *Coccus hesperidum* Linnaeus. **Peru,** ex *Ceroplastes* sp. (Coccidae) on maracuya (*Passiflora*). **Brazil,** ex *S. oleae* on olive *Olea europaea* and ex *Coccus viridis* Green on orange *Citrus sinensis*. **Argentina,** ex *Stictolecanium* sp. (Coccidae). **Uruguay,** ex *Ceroplastes* sp., ex palm soft scale *Eucalymnatus tessellatus* Signoret (Coccidae), and ex *Cerococcus* sp. (Asterolecaniidae). **Hawaiian Islands,** an accidental immigrant found for the first time in 1960.

Gahaniella tertia Kerrich, 1953

Kerrich, 1953: 800–802.

NOTES. **Trinidad,** ex *Leptomastix dactylopii* Howard, 1985 (Encyrtidae) — parasitoid of *Planococcus citri* Risso (Pseudococcidae) on cacao tree *Theobroma cacao*. The species was indicated also for Honduras [De Santis & Fidalgo, 1994]. Data of Trjapitzin et al. [2008a] on discovery of *G. tertia* in Mexico (Yucatan) are erroneous and must be referred to *G. akhatovi* sp.n.

Gahaniella sp.

(apparently *saissetiae* Timberlake, 1926).

Compere: 1939: 89.

NOTES. This species has been reared in large numbers from the black scale *Saissetia oleae* Olivier (Coccidae) collected in Brazil. A suspicion that it is not primary parasitoid arose

when its oviposition habits were observed. *Gahaniella* thoroughly explored uninfested soft scales with the ovipositor but did not deposit eggs. After the first shipments into California (USA), all *Gahaniella* were destroyed in quarantine room.

Gahaniella sp. (non *tertia*).

Simmonds, 1957: 9; Hilburn et al., 1990: 167.

NOTES. Bermuda, indicated as hyperparasitoid of *Parasaissetia nigra* Nietner. Most probably, an accidental immigrant.

Gahaniella sp.

Noyes et al., 1997: 205.

NOTES. USA (Florida).

Gahaniella sp.

Trjapitzin et al., 2008b: 74.

NOTES. Honduras, parasitoid of *Microterys nietneri* (Motschulsky, 1859) (Encyrtidae) in *Ceroplastes* sp. (Coccidae) on *Ficus* sp. [Data of F.D. Bennett, pers. comm.].

Conclusions

Information presented in this article shows that species of the genus *Gahaniella* are widely distributed in the warmer regions of the New World from southern USA (California and Florida) to Uruguay and northern Argentina, inclusive. Their secondary hosts range comprises usual injurious coccoids on important cultivated plants. As species of *Gahaniella* are hyperparasitoids (secondary parasitoids) there is a danger of accidental importation or penetration of them into other regions of the world during realization of classical biological control programs non only in nature but also in greenhouses, what is especially important for Russia. This is already proved by non-controlled penetration (ecesis) of two species of *Gahaniella* into Bermuda and Hawaii. In this connection, quarantine measures would be necessary. And this publication might help to identify these hyperparasitoids.

ACKNOWLEDGMENTS. I am thankful to Professor Fred D. Bennett (Isle of Man, U.K.), ex Director of the Commonwealth Institute of Biological Control (Curepe, Trinidad) for sending me some encyrtids from Mexico and for valuable information, to Professor Sergey Sergeevich Izhevsky (Moscow) for friendly help and to Dr. Serguei Vladimirovich Triapitsyn (UCR Entomological Collection, Department of Entomology, University of California, USA) for sending me necessary literature.

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