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Abstract.—We describe five new species in the *aurita* group of the genus *Azteca*: ***Azteca andreae* sp. n.** (French Guiana), ***Azteca diabolica* sp. n.** (Panama), ***Azteca laurae* sp. n.** (Brazil), ***Azteca linamariae sp. n.*** *(Brazil and Colombia) and* ***Azteca snellingi* sp. n.** (Panama). Four of these new species are based on gynes, while the last is based only on the worker caste. All of them bear the *aurita* group characteristics. The second taxon is remarkable, as it differs from all of the other members of the group in the exaggerated, horn-like extensions of the posterolateral vertex margins. *Azteca snellingi* sp. n. is named in honor of our colleague, Roy Snelling, in tribute to his life-long contribution to knowledge of the world of Hymenoptera. A key to all known species of the *aurita* group, based on gynes, is provided. We report also for the first time an intercast case for the genus *Azteca*, based on an *Azteca schimperi* specimen.

Resumen.—Se describen cinco **nuevas especies** de hormigas del grupo *aurita* del género *Azteca*: ***Azteca andreae*** (Guyana Francesa), ***Azteca diabolica*** (Panamá), ***Azteca laurae*** (Brasil), ***Azteca linamariae*** y ***Azteca snellingi*** (Colombia y Brasil). Cuatro de las especies son descritas basadas en hembras, enguanto la última basada en la casta obrera. Todas poseen las características del grupo *aurita*. El segundo taxón es el más particular; es fácil diferenciar esta especie de las otras ya que presenta los márgenes posterolaterales del vértex exageradamente extendidos similares a unos cuernos. *Azteca snellingi* sp. n. es nombrada en honor a nuestro colega Roy Snelling quien consagró su vida al conocimiento de los himenópteros. Se presenta una clave actualizada basada en las hembras de las especies del grupo *aurita*. Reportamos también por primera vez un caso de intercasta para el género *Azteca*, con un espécimen en la especie *Azteca schimperi*.

Key words.—Ants, *Azteca*, identification keys, taxonomy

Palabras claves.—Hormigas, *Azteca*, claves para identificación, taxonomía

Azteca Forel is a genus of dolicoderine ant whose species-level taxonomy is still unclear. The only revision of the entire genus was conducted in the late nineteenth century (Emery 1893). Since then, no systematic review of the genus has been carried out and only isolated studies have allowed some species to be identified (Longino 1989, 1991a, 1991b, 1996). Recently, Longino (2007) reviewed the Costa Rican fauna and included a definition and global revision of the *aurita* group.

The *aurita* group of *Azteca* is monophyletic and characterized by: palpal formula 4,3; middle and hind tibia lacking an apical spur; an extremely convex anteromedial border of the clypeus that extends well beyond anterolateral clypeal lobes; HLB/HLA $>$ 1.04 (Longino 2007, except latter trait discussed here; for further description of the measurements, see Materials and Methods). Gynes are generally small, similar in size to major workers. The integument is extremely smooth and shiny, glass-like, with an extremely dilute appressed pubescence (the pilosity, when present, is characterized by a stubble of short, stiff, fully erect setae). The petiole is bluntly subpyramidal to bilobed, never flat and scale-like (Longino 2007). Worker characters are provided in the group diagnosis by Longino (2007). The characteristics of gynes in this group suggest a syndrome of social parasitism (Hölldobler and Wilson 1990).

In this paper, we describe five new species of the *aurita* group: *Azteca andreae* (French Guiana), *Azteca diabolica* (Panama), *Azteca laurae* (Brazil), *Azteca linamariae* (Colombia and Brazil) and *Azteca snellingi* (Panama). The *A. diabolica* specimens (gynes only) were collected during the IBISCA international project through an intensive tridimensional sampling of arthropods in a Panamanian tropical rain forest (Basset et al. 2007), while the *A. snellingi* specimens were caught later in the same area. The other species were collected using Malaise traps (winged individuals) or manually from nests. An updated key derived from the one created by Longino (2007), based on the gynes of known species of the group, is provided.

MATERIALS AND METHODS

All measurements, indices and morphological characters are the same used by Longino (2007) and were made using a Nikon SMZ645 stereomicroscope with an ocular micrometer at 80× magnification.

Measurements (all in millimeters):

HLA: head length, full frontal view; perpendicular distance from the line tangent to the anterolateral clypeal lobes to the line tangent to the most extreme posterior of the vertex lobes. This measure was chosen because the anterolateral clypeal lobes are always visible, while the anteriormost extent of the medial lobe may be obscured by the closed mandibles.

HLB: medial head length; this is the same as HLA except that it is measured from the anteromedian rather than anterolateral lobe of clypeus. This measurement is important for the *A. aurita* group, where the lateral lobes are not well defined and the median lobe protrudes to a great extend. For most *Azteca*, HLA and HLB are very similar.

HW: head width; full frontal view, maximum width of head capsule above the eyes.

SL: scape length; length of the scape shaft from the apex to basal flange, not including the basal condyle and neck.

EL: eye length; maximum length of the eye.

OCW: width of the median ocellus.

Indices:

CI: cephalic index; 100*HW/HLA.

SI: scape index; 100*SL/HLA.

MTSC: number of metatibial setae; with the tibia seen from the anterior, such that the outer (dorsal) margin is in profile, and the number of erect to suberect setae (distinct from any underlying pubescence) are seen projecting from the outer margin.

Photographs were taken using a Nikon SMZ 1500 stereomicroscope at 40× and digital camera SIGHT DS - Fi 1. The images were fully-focused montage images created with the Combine version Z5 software package and edited using COREL PHOTO-PAINT ×3 version 13.

Types will be deposited in the follow collections: California Academy of Sciences, San Francisco, California, USA (CASC); Laboratório de Mirmecologia do

Centro de Pesquisas do Cacau (CPDC), Comissão do Plano da Lavoura Cacaueira, Ilhéus, Bahia, Brazil; Insect Collection, Instituto Humboldt, Claustro San Agustín, Villa de Leyva, Boyacá, Colombia (IAvH); Instituto de Ciencias Naturales, Universidad Nacional, Bogotá D.C., Colombia (ICN-MHN); collection of John T. Longino, Evergreen State College, Olympia, Washington, USA (JTLC); Los Angeles County Museum of Natural History, Los Angeles, California, USA (LACM); Museu de Zoologia, Universidade de São Paulo (MZUSP), Brazil; and Royal Belgian Institute of Natural Sciences (RBINS).

TAXONOMIC SYNOPSIS OF THE *AZTECA AURITA* GROUP

Azteca andreae Guerrero, Delabie & Dejean. New species. French Guiana.

A. aurita Emery 1893. Panama to Amazonian Brazil.

= *silvae* Forel 1899. Synonymy, Longino (2007):55.

A. diabolica Guerrero, Delabie & Dejean. New species. Panama.

A. lallemandi Forel 1899. Panama, Colombia, eastern Brazil.

= *pruinosa* Mann 1916. Synonymy Longino (2007):56.

A. lanuginosa Emery 1893. Southern Brazil.

A. laurae Guerrero, Delabie & Dejean. New species. Western Amazonian Brazil.

Azteca linamariae Guerrero, Delabie & Dejean. New species. Amazonian Colombia and Western Amazonian Brazil.

A. nanogyna Longino 2007. Costa Rica.

A. pilosula Forel 1899. Costa Rica, Panama.

= *lacrymosa* Forel 1899. Synonymy, Longino (2007):57.

A. schimperi Emery 1893. Mexico to Argentina.

= *A. fiebrigi* Forel 1909. Synonymy, Longino (2007):58.

= *A. clariceps* Santschi 1933. Synonymy, Longino (2007):58.

= *A. pallida* Stitz 1937. Synonymy, Longino (2007):59.

A. snellingi Guerrero, Delabie & Dejean. New species. Panama

TAXONOMIC KEY TO SPECIES (GYNES) OF THE *AZTECA AURITA* GROUP [ADAPTED FROM LONGINO (2007)]

1.	Orange head and orange or light brown body; long scape, SI > 70	**2**
-	Uniform brown color; short scape, SI < 70	**7**
2.	Erect pilosity absent on dorsum of the head, lateral margins of the mesosoma, petiole, and gaster	**3**
-	Short, erect pilosity present on the dorsum of the head and mesosoma, petiole, and gaster	**6**
3.	Very pronounced vertex lobes appearing as elongate, horn-like projections (Fig. 6); a seemingly wide, U-shaped occipital margin	***diabolica* n. sp.**
-	Angulate vertex lobes never forming horn-like projections	**4**
4.	Head relatively broad CI > 99	***linamariae* n. sp.**
-	Head relatively narrow CI < 99	**5**
5.	Sides of the head flat and sub-parallel, only weakly diverging posteriorly; eyes more or less at mid-length of the head, HW < 1.30	***aurita***
-	Sides of the head flat and not sub-parallel, strongly diverging posteriorly; eyes anterior to the mid-length of the head, HW > 1.30	***laurae* n. sp.**
6.	Dense, short, erect pilosity on scape and tibiae; head relatively narrow (CI < 97)	***pilosula***
-	Scape and tibiae lacking erect pilosity; head relatively broad (CI > 97)	***lallemandi***
7.	Gastral dorsum lacking erect setae; HLA > 1.35	**8**
-	Gastral dorsum with erect setae; HLA < 1.35	**9**
8.	Head, scapes, mesosoma, legs and petiole with erect hairs; scapes relatively long, SL > 0.90	***schimperi***

- Head, scapes, mesosoma, legs and petiole devoid of any erect hairs; scapes relatively short, SL < 0.90 . . . . . ***andreae* n. sp.**
9. HLA about 1.3mm . . . . . ***lanuginosa***
- HLA about 0.86mm . . . . . ***nanogyna***

TAXONOMIC TREATMENT

Azteca andreae n. sp. Guerrero, Delabie & Dejean (Figs 1 & 2)

Holotype (gyne): FRENCH GUIANA, Sinnamary, 5°22′39″N 52°57′35″W, Carton nest in *Cecropia* sp tree, 24 Jul 2008, (A. Dejean, P-J Malé, S. Groc and J.H.C. Delabie) [CPDC]; **paratypes**: 7 gynes, same locality, [CASC,CPDC, ICN, JTLC, LACM, MZSP, RBINS].

Measurements of holotype: HLA 1.42, HLB 1.48, HW 1.08, AHW 0.72, SL 0.82, EL 0.34, OCW 0.08, CI 76, SI 58, MTSC 0.

Measurements of paratypes (N= 7): HLA 1.38–1.42, HLB 1.46–1.52, HW 1.06–1.10, AHW 0.70–0.76, SL 0.80–0.86, EL 0.32–0.36, OCW 0.06–0.08, CI 75–80, SI 57–61, MTSC 0.

Diagnosis.—*Azteca andreae* is a member of the *A. aurita* group with the body completely covered with small, widely scattered pits (foveate surface) bearing a very short white hair; scapes short, SI 57–61.

Gyne characters.—**Head**: Palpal formula 4,3. Dorsal surface of mandibles smooth and shiny; from an oblique angle from above, weak longitudinal waves can be observed that are not visible in full dorsal view, and with scattered small and widely-spaced holes, each with a short hair on the basal surface, with long hairs behind masticatory margin and anterior half of the outer margin of the mandibles; masticatory margin armed with strong apical and blunt tooth, sub-apical tooth, followed by very rounded teeth extending to the basal margin. Clypeal plate without conspicuous pilosity; medial clypeal lobe strongly convex and protruding, extending well beyond the lateral clypeal lobes. Head sub-rectangular, longer than wide; cephalic capsule in lateral view strongly convex in the front; posterior margin with blunt angulations, deeply excavated in the middle of the V-shape. Scape not reaching posterior margin of cephalic corner; funiculus covered with dense, long and appressed pilosity.

Mesosoma: Smooth and shiny, without conspicuous pilosity. Dorsal surface of propodeum much longer than posterior surface, the latter with a short projection at the base, tube-shaped and facing posteriorly. Edge of metapleural gland orifice bears long, golden hairs. Middle and hind tibiae lacking apical spur.

Metasoma: Petiolar node strongly subtriangular with rounded apex; anterior face of petiole excavated, posterior face nearly twice the length of anterior face; petiolar posteroventral lobe weakly convex behind, straight in the anterior half. Tergites and sternites of the gaster shiny.

Head, mesosoma, petiole and legs dark, reddish brown, gaster yellowish brown with some darker areas. Body shiny.

Worker characters.—**Measurements** (N= 5): HLA 1.18–1.36, HLB 1.20–1.46, HW 1.20–1.36, SL 0.84–0.96, EL 0.20–0.26, CI 100–102, SI 67–75.

Palpal formula 4,3. Middle and hind tibiae lacking apical spur. Same combination of characters as *Azteca schimperi* in Longino (2007). Minor workers with tube-like propodeal spiracles projecting outwards, unlike those of *A. schimperi*.

Male characters.—**Measurements** (N= 4): HLA 0.70–0.72, HW 0.67–0.68, SL 0.11–0.12, EL 0.30, CI 94–97, SI 16–17.

Head: Mandibles sub-triangular, outer edge twice as long as inner edge, masticatory margin unarmed, with only a small projection in the middle of margins and a sharp apical tooth; a basal tooth differenti-

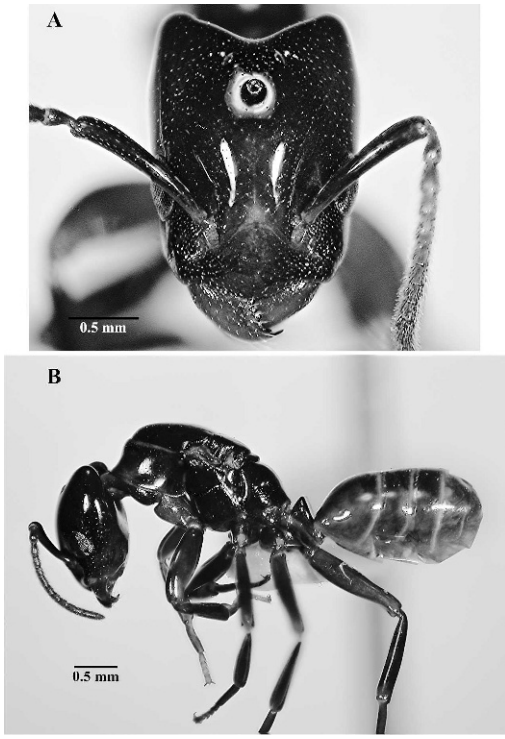

Fig. 1. Paratype female of *Azteca andreae* (French Guiana; CASENT 0179545). A). Full frontal view of the head of *A. andreae*. B). Lateral view of the body of *A. andreae*.

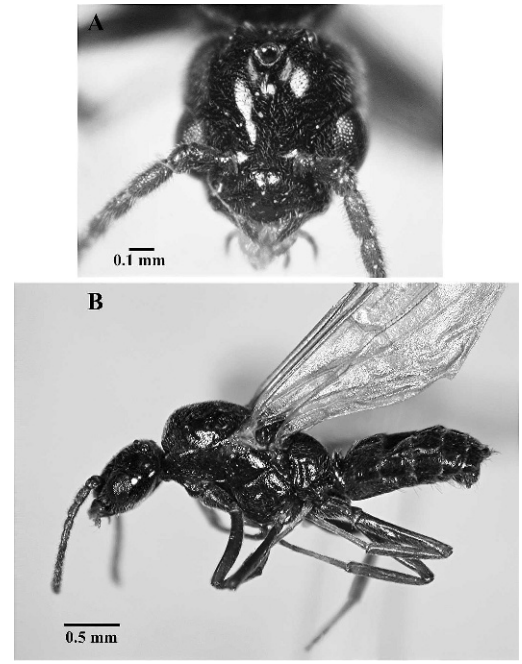

Fig. 2. *Azteca andreae* male from French Guiana (CASENT 0179546). A). Full frontal view of the head of *A. andrea*. B). Lateral view of the body of *A. andreae*.

ates masticatory and basal margins. Clypeal plate strongly convex, as medial clypeal lobe extends well beyond small, lateral clypeal lobes; surface smooth with small foveae near anterior ridge of clypeal plate. Scapes small, trapezoidal, thin at base and wider distally; pedicel small, nearly equal to maximum scape width; second funicular segment roughly twice as long as scape; remaining funiculus little longer than scape; scape with smooth surface and a few scattered hairs; funicular segments 3–11 with long, dense and appressed pilosity, surface densely punctate and dull. Eyes large, located near anterior half of the cephalic capsule, separated from mandible insertion by less than 0.1 mm; eyes break the plane on side of head. Lateral ocelli protruding slightly above vertex in dorsal view. Margins of the cephalic capsule, above the eyes, slightly convex; posterolateral corners rounded.

Mesosoma: Parapsidal furrows weakly developed. Anepisternum and katepisternum divided by a deep mesopleural groove. Anterior and posterior surfaces of propodeum undifferentiated. Propodeal spiracles visibly protruding.

Metasoma: Petiolar node rectangular with rounded corners and straight dorsal face; anterior surface much longer than posterior surface; petiolar node partly fused to gaster. Tergites and sternites smooth and shiny. Pygostyle thin and long, with distal half curved downwards and squared at the tip, smooth and shiny.

Body dark brown, shiny, slightly punctate in some areas, covered with very sparse decumbent, long white hairs.

Etymology.—Azteca andreae is named in honor of Andrea Dejean, the third author's wife, in acknowledgment of her considerable editorial help with myrmecology papers in English.

Range.—French Guiana.

Natural History.—This species constructs large, conspicuous globular carton nests at the base of the stem or near the crown of *Cecropia* trees (Fig. 4). Alain Dejean has observed and collected several *A. andreae* nests from trees in French Guiana, the vast majority of which were *Cecropia obtusa* Trecul. *A. andreae* can also nest on *C. palmata* Willd, which also often shelters *Azteca alfari* or *A. ovaticeps*. The nests observed by A. Dejean always were in pioneer vegetation highly-altered through human activity.

All nests collected contained colonies with many workers, dozens of winged females and few males; for example, type series of this species came from a colony with hundreds of workers, hundreds of winged females (only 55 were collected), five male, several brood and pupae, although no queen was observed. Other collections made by A. Dejean produced colonies with some physogastric females (Fig 5).

Comments.—*A. andreae* is close to *A. schimperi* but can be distinguished by morphological characters of gynes and males; the major workers of the two species are indistinguishable. *A. andreae* gynes conspicuously lack pilosity over the entire body, while *A. schimperi* gynes are densely covered with erect hairs on the head and mesosoma. The anteromedial portion of the clypeus protrudes more in *A. andreae* than in *A. schimperi*; the masticatory margin of the mandibles of *A. andreae* is armed with blunt teeth, while *A. schimperi* has sharp teeth. The scapes of *A. andreae* are significantly shorter than those of *A. schimperi* (0.80–0.86 vs. 0.94–1.01 mm, respectively); the posterior margin of the head is much more excavated in *A. andreae* than in *A. schimperi*, and the posterolateral corners are also more angular in the first species; another important character amongst the females of both species is the color: *A. andreae* females are a dark reddish brown, while *A. schimperi* females are uniformly brown.

The males of both species are very similar in color, type and distribution of hairs, and wing venation; however, when we examined the male *genitalia* of both species, we found that there are conspicuous differences. The pygostyle on *A. andreae* is smooth and shiny, thin, long, and with the distal half curved downwards and squared at the tip, while those on *A. schimperi* are short, thick and with a rounded tip (Fig. 3).

The major workers of both species are indistinguishable, although the workers of *A. andreae* have a relatively smaller head; however, the ranges of both species overlap. The minor workers are also undifferentiated, but *A. andreae* have thin, protruding tube-shaped propodeal spiracles, whereas *A. schimperi* are open at the propodeum.

The females of *A. lanuginosa*, *A. schimperi* and *A. andreae* are related to each other and show a clear gradation in the quantity, distribution and type of body hair. The first species is the only one of them with an abundant, erect pilosity all over the body, including the gaster (Longino 2007); it becomes sparse in *A. schimperi* and disappears altogether in *A. andreae* (in the latter two species, the gaster is devoid of any hair).

Azteca diabolica n. sp. Guerrero, Delabie & Dejean (Fig. 6)

Holotype (gyne): PANAMA, San Lorenzo Forest, IBISCA project, 9°16′47.58″N, 79°58′29.94′W, Flight-interception trap in the canopy, 3–13 Ago 2004 (M. Rapp) [CPDC]; **paratypes:** 1 gyne, same location, Fogging #FOC3-6C, 13 Oct. 2004 (J. Bail) [RBINS]; 1 gyne, same location, Fogging FOG-R1-5, 20 Oct. 2003 (J. Schmidl) [ICN]. 2 gynes, same location, Fogging #J-2, 17 Oct. 2003 (J. Schmidl) [CPDC, MZUSP].

Measurements of Holotype: HLA 1.48, HLB 1.56, HW 1.12, AHW 0.72, SL 1.24, EL 0.30, OCW 0.06, CI 76, SI 84, MTSC 0.

Measurements of Paratypes (N= 2): HLA 1.60–1.62, HLB 1.64–1.74, HW 1.20–1.24, AHW 0.78–0.80, SL 1.34–1.36, EL 0.30–0.32, OCW 0.06, CI 75–77, SI 84–85, MTSC 0.

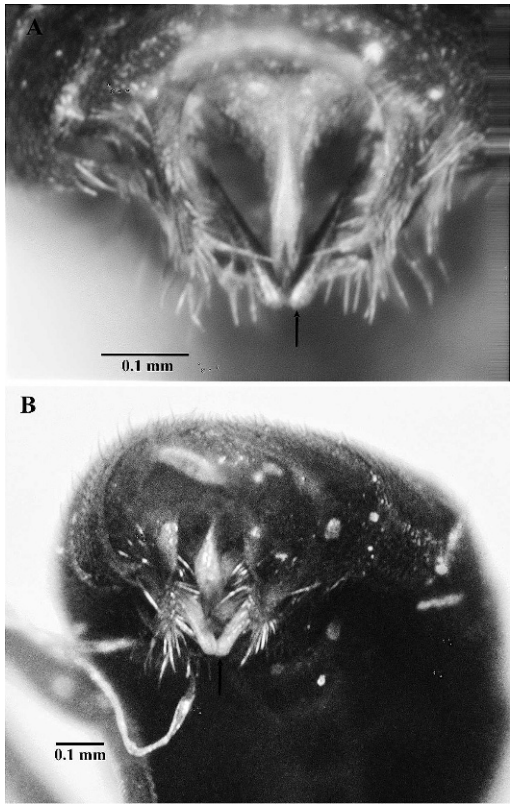

Fig. 3. Genitalia of male *A. andreae* and *A. schimperi*. The arrow indicates the pygostyle.

Fig. 4. *A. andreae* nests built in *Cecropia* spp. trees.

Diagnosis.—*Azteca diabolica* is a member of the *A. aurita* group with a deep and smoothly rounded excavation at the posterior vertex margin extending to the corners that form posteriorly-projecting rounded horns. Mesosoma smooth, shiny and hairless. Propodeal spiracles protruding. Gastral tergum and sternum with hairless, polished surface.

Gyne characters.—**Head**: Palpal formula is 4,3. Dorsal and ventral surfaces of head hairless. Dorsal surface of mandibles mostly smooth and shiny, with fine longitudinal striae near masticatory margin; masticatory margin armed with five teeth and two denticles, with no angle or tooth separating it from basal margin; basal margin slightly serrated; surface of mandibles with scattered, sub-decumbent long hairs. Clypeal plate with sub-decumbent, sparse pilosity; medial clypeal lobe strongly convex and protruding, extending well beyond lateral clypeal lobes. Head almost rectangular, somewhat swollen between ocellar region and compound eye; posterior margin highly angular, horn-like laterally, deeply excavate medially. When laid back, scape reaches prolongations of vertex at apex of posterolateral projection; scape and funiculus provided with abundant, nearly erect pilosity.

Mesosoma: Smooth and shiny, without appressed hairs. Middle and hind tibiae lacking apical spur. Dorsal surface of propodeum shorter than posterior surface; propodeal spiracles protruding.

Metasoma: Petiolar node bluntly triangular, posterior surface straight, twice as long as anterior surface; posteroventral petiolar lobe very low, very shallowly convex, ending posteriorly in a somewhat

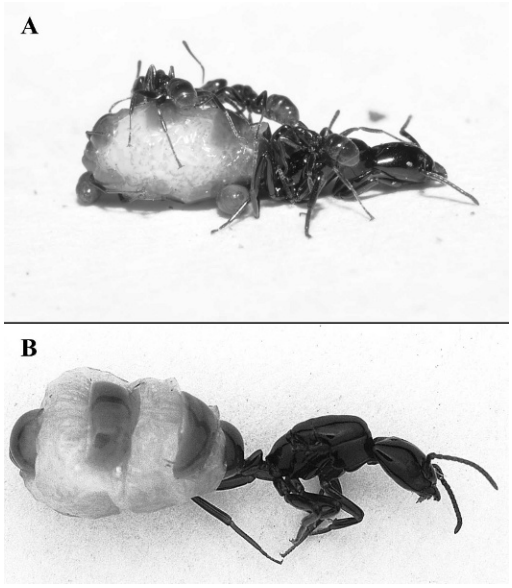

Fig. 5. Physogastric *A. andreae* queens from French Guiana. A. Physogastric *A. andreae* queen attended by workers. B. Preserved physogastric *A. andreae* queen.

abrupt shelf. Tergites and sternites hairless, smooth and shiny.

Body reddish brown, surface smooth and reflective.

Worker and male.—Unknown

Etymology.—The name refers to the form of the head of the gyne which suggests popular representations of the Devil.

Range.—Panama.

Natural History.—The five specimens were collected from the rain forest canopy, first with a flight-intercept trap, later by applying a chemical treatment to vegetation. Three gynes were collected by fogging; one from a tree where both *Azteca* sp.2 *chartifex* group and *Azteca instabilis* (Fr. Smith) occurred, the two others from a tree with *Azteca* sp.2 *chartifex* group. This suggests that *A. diabolica* may be a social parasite, in particular of carton-nesting species of the *chartifex* group.

Comments.—The gyne differs from those of other species in the *A. aurita* group in being almost hairless, having only sparse, short and decumbent hairs on the clypeus,

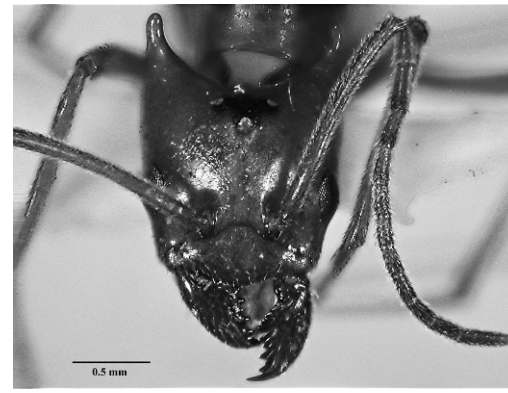

Fig. 6. Head of *Azteca diabolica* (Paratype female, Panama; ICN-022611), full frontal view.

mandibles and legs. Some species in the *aurita* group have a strongly pronounced lateral vertex margin, but none is as pronounced as in *Azteca diabolica*.

Azteca laurae n. sp. Guerrero, Delabie & Dejean (Fig. 7)

Holotype (gyne): BRAZIL, Rondônia, Parque Estadual Guajará Mirim, 10°19′17″S, 64°33′47″W, #5256, Malaise trap, 02 Mar. 1998 (J.R.M. Santos) [CPDC].

Measurements of Holotype: HLA 1.56, HLB 1.62, HW 1.46, AHW 0.90, SL 1.24, EL 0.36, OCW 0.06, CI 94, SI 79, MTSC 0.

Diagnosis.—*Azteca laurae* is a member of the *A. aurita* group with an inverted, cone-like (cuneiform) head whose sides strongly diverge from the lateral region; surface of head smooth and shiny, with very thin and weak punctations visible laterally by tilting the specimen (dorsal-oblique view), although these one more noticeably visible in the ocellar region (full frontal view).

Gyne characters.—**Head**: Palpal formula 4,3. Dorsal and ventral surface devoid of any type of hair, although very short and sparse hair covers a small portion of the genae. Dorsal surface of mandibles completely smooth and shiny, clearly seen in spaces between the sparse, long hairs. Masticatory margin of mandibles armed with four teeth and two denticles.

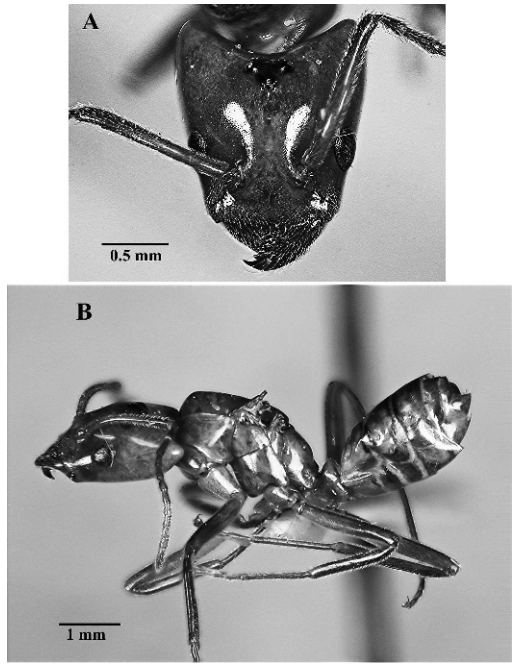

Fig. 7. Holotype female of *Azteca laurae* (Brazil; CPDC-5256). A). Full frontal view of the head of *A. laurae*. B). Lateral view of the body of *A. laurae*.

Clypeal plate covered with abundant short, nearly erect pilosity; medial clypeal lobe strongly convex, projecting outwards, with hairless anterior ridge extending well beyond lateral clypeal lobes. Vertex with prominent, rounded corners deeply excavated in middle in U-shape with gently-rounded tips. Ocelli in a loose clump, forming a dark stain in dorsoposterior region. Scapes barely reaching extensions of vertex; scapes and funiculus covered with abundant, short, sub-decumbent pilosity, shorter than maximum width of scape.

Mesosoma: Smooth and shiny, with no conspicuous hairs, only a few very short, appressed hairs becoming sparser towards katepisternal and propodeal region. Dorsal side of propodeum almost equal in length to posterior surface, nearly undifferentiated due to absence of a defined boundary; propodeal spiracles weakly protruding. Middle and hind tibiae lacking spurs.

Metasoma: Petiolar node triangular, sloping gently posteriorly; posterior margin almost twice as long as anterior; petiolar lobe weakly convex behind; ventral surface roughly parallel to dorsal surface. Gaster hairless, surface polished and very shiny.

Body reddish brown, surface smooth and reflective.

Worker and male.—Unknown

Etymology.—The name is in honor of Laura Mariano Delabie, the second author's daughter.

Range.—Western Amazonian Brazil.

Natural History.—The holotype was collected in the mature forest of the Parque Estadual Guajará Mirim, Rondônia, Brazil, using a Malaise trap.

Comments.—The gyne of this species is closely similar to *A. aurita*, differing in the amount and distribution of the hairs on the dorsum of the head and the scapes. *A. laurae* has very few short hairs on the genae, while the anterior part of the head of *A. aurita* is covered with a uniform vestiture of short, dense, white pilosity. The scapes of *A. laurae* are sparsely covered with short hairs, while those of *A. aurita* are densely covered by the same type of pilosity present in the dorsal region of the head. Another notable trait is the shape of the head, the sides of which are almost parallel in *A. aurita* (Fig. 8), while in *A. laurae* they diverge posteriorly, resulting in a cuneiform-shaped head (Fig. 7); the vertexal margin in *A. laurae* is wider and slightly more concave than in *A. aurita*.

Azteca linamariae n. sp. Guerrero, Delabie & Dejean (Fig. 9)

Holotype (gyne): COLOMBIA, Vaupés, Estación Biológica Mosiro-Itajura (Caparú), Antigua Cabaña, 1° 4′S, 69° 3′W, 60 m, Malaise trap, 18–27 mar 2003 (J. Pinzón), M.3610 – Insects of Colombia project [IAvH]; **paratype** (**gyne**): BRAZIL, Rondônia, Parque Estadual Guajará Mirim, 10°19′17″S, 64°33′47″W, #5248, Malaise trap, 28 Jan. 1998 (J.R.M. Santos) [CPDC].

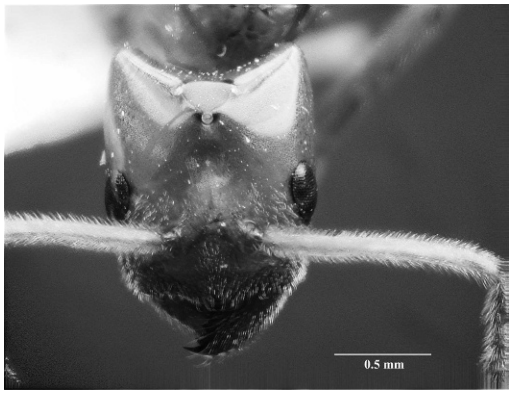

Fig. 8. Head of an *Azteca aurita* female from Panama, full frontal view.

Measurements of Holotype: HLA 1.86, HLB 2.0, HW 1.84, AHW 1.18, SL 1.48, EL 0.40, OCW 0.14, CI 99, SI 80, MTSC 8.

Measurements of Paratype: HLA 1.82, HLB 1.86, HW 1.82, AHW 1.16, SL 1.46, EL 0.44, OCW 0.14, CI 100, SI 80, MTSC 8.

Diagnosis.—*Azteca linamariae* is a member of the *A. aurita* group with the dorsal and ventral surfaces of the head, mesonotal dorsal region and gastral tergum and sternum covered with abundant, very thin, short, white, scale-like setae. It is the largest queen of any known species in the *aurita* group.

Gyne characters.—**Head**: Palpal formula 4,3. Ventral surface with abundant pilosity, as well as long, very closely spaced, erect hairs covering all head margins and back of foramen magnum. Mandibles smooth and shiny, with abundant decumbent pilosity, longer hairs toward masticatory margin. Clypeal plate covered with short, abundant pilosity; medial clypeal lobe strongly convex, but projected slightly toward the front, extending well beyond lateral clypeal lobes. Head nearly rectangular, slightly diverging laterally, flat in the ventral region; posterior margin deeply excavated, sharply angled with rounded corners. Scapes a significant distance from corners of vertex with nearly erect, short hairs approximately equal to half maximum width of scapes; funiculus cov-

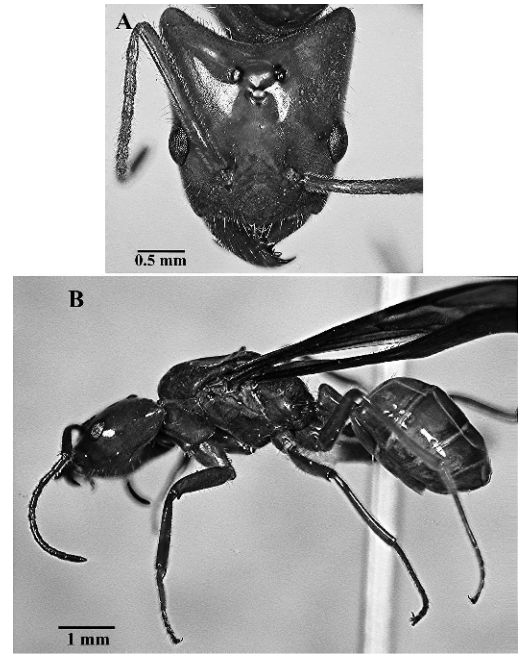

Fig. 9. *Azteca linamariae* (Holotype female, Colombia; IAvH- M 3610). A). Full frontal view of the head of *A. linamariae*. B). Lateral view of the body of *A. linamariae*.

ered with abundant, appressed, sub-decumbent pilosity much shorter than that of scapes.

Mesosoma: Smooth and opaque, with some sparse and scattered long hairs, mainly on promesonotal dorsum, mostly appressed below propodeal spiracle. Sides of propodeum shorter than posterior region; propodeal spiracles projecting slightly outward. Middle and hind tibiae lack spurs.

Metasoma: Petiolar node triangular, with front straight and nearly as long as posterior surface; posteroventral lobe often convex, inverted, and hump-like. Gaster smooth and polished, without long hairs.

Head reddish brown, mesosoma brown, gaster yellowish-brown with a highly polished and reflective surface.

Worker and male.—Unknown

Etymology.—This name is in honor of Lina María Ramos, the first author's wife, busy and active like an ant.

Range.—Amazonian Colombia and Brazil.

Natural History.—The holotype was collected in the upland Amazonian forest at the Mosiro-Itajura (Caparú) biological station in Vaupés, Colombia. This area is mainly covered by primary forest. The paratype was collected in a Malaise trap in the Parque Estadual Guajará Mirim, Rondônia state, Brazil.

Comments.—The gynes of this species are similar to those of *A. pilosula*, from which it is distinguished by hair characters. *A. pilosula* has long, dense, white hairs on all sides of the head and on other regions of the body, while *A. linamariae* has very thin, short, white, scale-like setae, as well as some emerging long hairs (like those of *A. pilosula*) covering the head margins and the back of the foramen magnum and promesonotal dorsum, but not the dorsum of the head, lateral margins of the mesosoma, petiole or gaster. *A. linamariae* is the largest known species in the group, and the gyne is much darker in color than that of *A. pilosula*.

The holotype and paratype differ only in the venation of the forewings. The forewings of both specimens have an r-rs cross-vein starting in the anteroinferior portion of the stigma; however, this cross-vein in the paratype is attached to Rs1 and Rs2 base veins. The holotype r-rs cross-vein, on the other hand, is attached to the Rs short vein. The latter diverges in Rs1 and Rs, posteriorly; moreover the paratype has two crossveins, 1 cu-a and 2cu-a, forming a small cell, while in the holotype there is only a crossvein, 1 cu-a, and no small cell. Despite this difference in the pattern of venation of the forewing and the great distance (around 1.350 km) between the two capture sites, these two specimens undoubtedly belong to the same species described above. Further material collection should confirm this identification and elucidate the small differences presented here.

Azteca snellingi n. sp. Guerrero, Delabie & Dejean (Fig. 10)

Holotype (major worker): PANAMA, Colón, San Lorenzo Forest (SLPA), área metropolitana, IBISCA project, 9°16.793'N, 79° 58.499'W, manual collection in the canopy, 26 Feb 2008 (N. B. Espirito Santo & S. P. Ribeiro) [CPDC]; **paratypes:** 6 major workers, same data as for holotype [1, CASC; 1, ICN; 1, JTLC; 1, LACM; 1, MZSP; 1, RBINS].

Measurements of Holotype: HLA 1.56, HLB 1.66, HW 1.60, SL 1.30, EL 0.30, CI 103, SI 83.

Measurements of Paratype (N=6): HLA 1.44–1.58, HLB 1.52–1.66, HW 1.44–1.60, SL 1.18–1.32, EL 0.24–0.30, CI 99–101, SI 81–88.

Diagnosis.—*Azteca snellingi* is a member of the *A. aurita* group with a large head, slightly wider than long, with margins strongly convex; metanotal groove wide and deep; workers have reddish brown head and dark brown body.

Worker characters.—**Head**: Palpal formula 4,3. Mandibles completely flat, apical tooth much larger than anterior; dorsal surface with dense longitudinal sculpture; surface rough and opaque. Median clypeal lobe strongly convex, extending well beyond lateral clypeal lobes. Sides of head strongly curved, corners of posterolateral margins angled; posterior margin (vertex) strongly concave. Scapes curved, not reaching posterolateral corners of head.

Mesosoma: In lateral view, pronotum weakly convex or straight toward anterior, without a posterior face. Mesonotum strongly convex, rising well above pronotum like a hump; globular in front, gently flattened posteriorly. Metanotal sulcus large and deep. In lateral view, propodeum roughly flat, dorsal face much larger that the posterior face. Middle and hind tibiae lacking spurs.

Metasoma: Petiolar node large, with rounded end, sloped at front; posterior face nearly twice as large as the anterior face. Ventral lobe conspicuously uniformly convex.

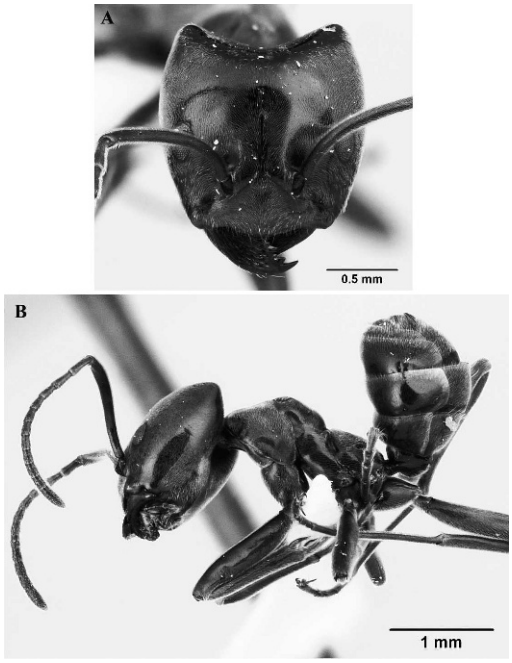

Fig. 10. *Azteca snellingi* (Paratype, worker major, Panama; CASENT 0179543). A). Full frontal view of the head of *A. snellingi*. B). Lateral view of the body of *A. snellingi*.

Body entirely covered with fine, dense punctations. Pubescence thin and whitish, appressed, covering each tagma; some setae conspicuous near base of ventral lobe of petiole and sternites 2–4. Body with shiny, weakly reflective surface. Part of head, scape and mandibles dark reddish-brown. Posterior third of the head dark brown. Mesosoma, legs, petiole and gaster dark brown.

Gyne and male.—Unknown

Etymology.—This ant is named in honor of Roy Snelling, our colleague and friend, who contributed notably to the knowledge of Hymenoptera.

Range.—Panama.

Natural History.—Specimens of the type series were collected at different heights on the canopy in the San Lorenzo forest, Panama. Two were collected at 21m from a *Pouteria caimito* (Ruiz & Pav.) Radlk. (Sapotaceae) tree. Others were collected at 20m and 23.7m height from *Luehea seemannii* Planch. & Triana. (Tiliaceae).

Comments.—This species is close to *A. aurita* and *A. pilosula*. While workers of *A. aurita* and *A. pilosula* are undistinguishable (Longino 2007), those of *A. snellingi* have a distinctly larger head, as long as it is wide. Posterior margin of the head with a deep concavity and continuous while the other two species has a V-shaped concavity. In general *A. snellingi* is a species with workers (reproductive castes unknown) larger than *A. aurita* and *A. pilosula* workers (CI 99–101 vs. *A. aurita*: CI 85–88, *A. pilosula*: CI 89–90). Sides of head strongly convex in *A. snellingi*, however, some *A. pilosula* workers (*A. lacrimosa* syntype and lectotype, synonymized by Longino 2007) have curved margins but not become as convex as in *A. snellingi*. *Azteca snellingi* mandibles, with the dorsal surface as those of *Azteca aurita*, but those of *A. snellingi* are more opaque. Furthermore, the anterior region of the mesonotum is higher and more globular in *A. snellingi*. Metanotal groove is wide and deep in *A. snellingi* whereas other two species is absent or inconspicuous.

Azteca snellingi also differs from *A. aurita* and *A. pilosula* in the distribution and kind of the hairs on the body. *A. snellingi* workers have no erect hairs in the petiolar node in contrast *A. pilosula* workers have erect hairs on the anterior face and apex of the petiole. Lateral margins of petiole lacking of any pilosity whereas *A. pilosula* has erect, conspicuous and scattered setae. *A. snellingi* workers have no erect hairs on the posterior margin of the head whereas *A. pilosula* workers posterior margin of head with sparse, very short erect setae grading into white pubescence (Longino 2007). *A. snellingi* is reddish-brown and the body is entirely dark brown, which is notable in this species as no other known worker in the *aurita* group presents this coloration pattern.

This species will key to couplet 2 in Longino's (2007) key to *A. aurita* group workers. The following modifications to the key will accommodate the new species:

2. Head relatively broad (CI > 105); posterolateral margins of the vertex rounded and cordate, not bluntly angulate . . . . . ***A. lallemandi***
- Head relatively narrow (CI < 106); posterolateral margins of the vertex bluntly angulate **3**
3. Head light orange brown; mesosoma, legs, and gaster darker reddish-brown . . . . . ***A. aurita, A. pilosula***
- Scape, mandibles and a part of the head dark reddish-brown; posterior third of the head is dark brown. Mesosoma, legs, petiole and gaster dark brown . . . . . ***A. snellingi* n. sp.**
4. Pubescence dilute and tightly appressed; color usually brown with an orange head . . . . . ***A. schimperi***
- Pubescence more abundant, giving a somewhat wooly appearance; color all brown . . . . . ***A. lanuginosa***

Other relevant material relative to this group was also studied:

Azteca aurita Emery (Fig. 8): COLOMBIA, Putumayo, PNN La Paya, riparian forest, 0°7′S, 74°56′W 320m, Malaise trap (M.2440), 19 Sep-1 Oct 2001 (R. Cobete) – 1 gyne [IAvH]. BRAZIL, Amazonas, Manaus, 12 sep 1962, # 3414, (K. Lenko) – 1 male, 3 minor workers [MZSP]; Mato Grosso, Sinop, 12°31′S, 55°32′W, Oct 1974, #12458, (M. Alvarenga) – 3 major workers [MZSP]; Mato Grosso, Vila Vera, Oct 1973, #10348 (M. Alvarenga) – 1 gyne [MZSP]; Para, Belém, 12–19 Aug 1962 (K. Lenko) – 1 dealate gyne [MZSP]. PANAMA, Colon, San Lorenzo Forest, IBISCA project, 9°16.793′N, 79°58.499′W, flight-interception trap in the canopy, 3–13 Ago 2004 (M. Rapp) – 2 gynes [CPDC]; same location, fogging (FO-R3-05c), 13 Oct 2004 (J. Bail) – gyne [CPDC]; same location, fogging (FOG-R1–4), 20 Oct 2003 (J. Schmid) – 1 gyne [CPDC]. PERU, Cusco, Pillcopata, 7 Dec 1974, #15, (J.A. Escalante) – 1 minor worker, 2 major workers [MZSP].

Azteca lallemandi Forel: BRAZIL, Bahia, Ilhéus, Praia do Norte, 27 Jun 2004 (J.H.C. Delabie) – 1 gyne [CPDC]; same location, 04 Dec 2004 (J.H.C. Delabie) – 3 gynes [CPDC]; same location, 27 Dec 1994 (I.C. Nascimento; J.H.C. Delabie) – 5 gynes [CPDC]. PANAMA, San Lorenzo Forest, IBISCA project, 9°16′47″N, 79°58′W, mosaic, Oct 2003 (A. Dejean, J. Orivel, B. Corbara, H.-P. Aberlenc & M. Leponce) – 1 gyne [CPDC]; same location, fogging (FO-R3-05re, FO-R3-01), 18 May 2004 (J. Schmidl & J. Bail) – 2 gynes [CPDC]; same location, light trap, (LC3-C3-3), 20 May 2004 (A. Cornejo *et al.*) – queen [CPDC].

Azteca lanuginosa Emery: BRAZIL, Rio de Janeiro, Cascadura,1 Jan 1906, # 2317 – 2 minor workers [MZSP].

Azteca pilosula Forel: BRAZIL, Bahia, Ilhéus, Ilhéus - Para, (J.H.C. Delabie) – 1 gyne [CPDC].

Azteca schimperi Emery: BRAZIL, Amazonas, Manaus, 14 Apr 1981, Carton nest in *Cecropia concolor*, (INPA #428F) – 1 alated gyne, 1 male (measured), 2 minor workers [MZSP]; measurements of *Azteca schimperi* male: HLA 0.74, HW 0.66, SL 0.10, EL 0.28, CI 89, SI 14. COSTA RICA, San Jose de Costa Rica, (H. Schmidt) – 1 major worker [MZSP].

DISCUSSION

Longino (2007) proposed four features that distinguish the species in the *aurita* group from other species of ants of the genus *Azteca* (see introductory section), but one of those, the proportion HLB/HLA > 1.04, is not a consistent and stable feature within some of the females studied here (*e.g.*, *A. linamariae* paratype). This trait, therefore, should not continue to be used as diagnostic tool for the *aurita* group while all the other traits are strongly consistent: the palpal formula is 4,3; the middle and hind tibia lack an apical spur; the anteromedial border of the clypeus is strongly convex and extends well beyond the anterolateral clypeal lobes. These traits can, however, still be of great taxonomic value for separing the *aurita* group from other groups of species in the genus *Azteca*.

Fig. 11. *Azteca schimperi* major worker with vestigial wings, Costa Rica.

Until now, *Tapinoma nigerrimum* (Nylander) is the only species in the Dolichoderinae subfamily for which winged or stumped workers have been reported (Scupola 2008), something that is always considered to be a characteristic of gynes. Unexpectedly, the examination of the *Azteca aurita* group material coming from MZSP allowed us to observe a major worker of *A. schimperi* coming from Costa Rica with all of the morphological characters of a worker except for its vestigial wings (Fig. 11). This worker presents some characteristics that differentiate it from normal workers: the head is a little larger than the normal major workers from the same species (HLA: 1.56 vs. 1.16–1.51 mm), the median ocellus a little more developed and similar to that of the gynes of *A. schimperi*, and there is the presence of wing rudiments on the mesosoma. The elements that determine these kinds of morphological anomalies are generally considered to be environmental factors, as these are essential for the determination and development of the casts (Scupola 2008); these environmental factors, which have a decisive function in the formation of a hybrid phenotype, are poor nutrition and different chemicals (Heinze 1998). Nevertheless, simple genetic accidents, viruses or parasites can also provoke the development of abnormalities. This is the first report of the intercast syndrome in the genus *Azteca* and the second for the Dolichoderinae subfamily, after the results reported by Scupola (2008) for *Tapinoma nigerrimum*.

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