



## ***Inti* (Hymenoptera: Eulophidae) a peculiar new genus from tropical America**

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### **Abstract**

*Inti* **gen. nov.** (Hymenoptera: Eulophidae: Entedoninae), is described from Costa Rica and the Dominican Republic, and includes one new species, *I. levis* **sp. nov.** The new genus is characterized by four autapomorphies, and the possession of an additional 14 synapomorphies. *Inti* is compared to the Australian genus *Horismenoides* Girault with which it shares the most apomorphies, indicating a possible sister-group relationship. The relationship of *Inti* to the tribe Euderomphalini and to other groups in the subfamily is discussed briefly.

**Key words:** Entedoninae, Euderomphalini, Horismenoides, neotropics, taxonomy

### **Introduction**

The fauna of Eulophidae in tropical America has had several contributions during the last decade, with the addition of several hundreds of new species, which have added considerably to the information on the diversity of the morphology, biology and distribution of this group. Despite these contributions many new taxa from this region remain undescribed and are thus unable to inform hypotheses on the classification and relationships of this group. To add to the knowledge of Eulophidae in tropical America, and to the group in general, an enigmatic new genus including a single new species with a unique combination of characters is described here. Currently there is no genus from tropical America that shows any resemblance to this new genus, here given the name *Inti*.

### **Morphological abbreviations and acronyms**

Abbreviations of morphological terms: HE = height of eye; HW = height of wing, measured across widest part of wing; LG = length of gaster; LM = length of marginal vein; LW = length of wing, measured from base of marginal vein to apical margin of wing; MM = length of mesosoma; MO = mouth opening; MS = malar space, i.e. distance between lower margin of eye and mouth opening; OOL = distance between eye and posterior ocellus; PM = length of postmarginal vein; POL = distance between posterior ocelli; POO = distance between posterior ocelli and occipital margin; ST = length of stigmal vein; WH = width of head; WT = width of thorax, measured across widest part which is usually just in front of attachment point of forewing. For illustrations of the morphological terms see [www.neotropicaleulophidae.com](http://www.neotropicaleulophidae.com).

Acronyms of museums used in the text are as follows: BMNH = The Natural History Museum, London; CNC = Canadian National Collection of Insects, Arachnids and Nematodes, Ottawa; INBio = Instituto Nacional de Biodiversidad, Santo Domingo, Costa Rica.

### ***Inti* Hansson **gen. nov.****

**Type species:** *Inti levis* sp. nov., designated here.

**Etymology.** Named after Inti, the Inca deity of the sun. Name referring to the circular, and thus sun-shaped, female gaster. The gender is masculine.

**Diagnosis.** Head and body smooth and shiny, without reticulation (Figs 2, 4–6, 8–10); frons with upper part of interscrobal surface protruding up and over frontal suture (Fig. 2); frontal suture smoothly arcuate (Fig. 2); vertex and upper frons close to eye margin with a groove (Figs 2, 4); antennal scrobes as narrow and distinct grooves (Fig. 2); scape and pedicel compressed and wide, and pedicel with a dorsal edge (Figs 2, 3); flagellomeres with upper surface of longitudinal sensilla (= multiporous plate sensilla) concave (Fig. 3); pronotum reduced and hardly visible in dorsal view (Fig. 6); pair of setae on midlobe of mesoscutum and scutellum stout (Fig. 6); midlobe of mesoscutum with one pair of setae (Fig. 6); notauli as deep and narrow grooves in posterior 2/3, terminating just before transscutal articulation and with a fovea in very anterior part (Fig. 6); sidelobe of mesoscutum with a small hole centrally (Fig. 6) and with margin between dorsal and lateral parts as a sharp carina (Fig. 5); anterior part of mesepisternum protruding into posterior part of prepectus (Fig. 5); border between upper and lower mesepisternum developed as a sharp carina (Fig. 5); propodeum with callus posterior to spiracle drawn out to a sharp point (Fig. 6); propodeum with wide median carina (Fig. 6); forewing with basal ½ bare (Fig. 1); gaster subsessile, round (Figs 1, 8).

**Description.** Head smooth and shiny (Figs 2, 4). Female flagellum (Fig. 3) with a 3-segmented clava; sensilla ampullacea short and asymmetric (type II sensu Hansson (1990)), present on all flagellomeres, and with prominent elongate sensilla on each flagellomere; with two very small anelli. Scape distinctly compressed in female (Fig. 3), reaching above frontal suture; pedicel with a sharp edge along dorsal margin. Mandible with two large teeth apically and with a row of small teeth above large teeth. Clypeus not delimited (Fig. 2). Tentorial pits not visible (Fig. 2). Malar sulcus present (Fig. 2). Frons (Fig. 2) with interscrobal area protruding upwards and covering median part of frontal suture; frontal suture smoothly curved, close to eyes strongly curved upwards. Upper frons with a groove close to eye margin that continues dorsally on vertex (Figs 2, 4). Border between vertex and occiput with a sharp margin (Fig. 4); occiput without a median groove or fold between occipital margin and occipital foramen.

Mesosoma smooth and shiny (Fig. 6). Pronotum reduced, visible as a narrow strip in dorsal view (Fig. 6). Sidelobe of mesoscutum with margin between dorsal and ventral parts as a sharp carina (Figs 5, 6). Notauli (Fig. 6) starting with a small round fovea anteriorly, as deep and narrow grooves in posterior 2/3, and terminating just before transscutal articulation. Midlobe of mesoscutum with one pair of setae; scutellum with one pair of setae situated in posterior half of scutellum (Fig. 6). Axillae with anterior ½ strongly convex (Figs 1, 6). Dorsellum short and wide, with a deep groove interrupted by longitudinal carinae in anterior ½ (Fig. 6). Pleurae (Fig. 5) with very weak reticulation; border between upper and lower mesepisternum carinate; anterior part of mesepisternum protruding into posterior part of prepectus; transepimeral sulcus (i.e. sulcus separating upper and lower mesepimeron) a straight and very wide and indistinct groove. Propodeum (Figs 1, 6) with a wide concave median carina that widens towards posterior part; median area delimited laterally by wide grooves; part behind spiracles drawn out to a posteriorly projecting point; propodeal callus with three setae. Forewing (Fig. 1) with basal ½ bare; costal cell narrow, as wide as submarginal vein; postmarginal vein 0.3X as long as stigmal vein.

Petiole very small, not visible in type specimens. Gaster (Figs 1, 7) almost circular; first tergite short, covering about 1/8 of gaster.

**Identification.** In the key to the Nearctic genera of Eulophidae by Schauff *et al.* (1997) *Inti* runs to couplet 106, subfamily Entedoninae, and from there females can be separated from those of all other world genera by the four autapomorphies listed in the discussion below. Another option for identification is to use the matrix key to the Neotropical genera of Entedoninae on the website [www.neotropicaleulophidae.com](http://www.neotropicaleulophidae.com).

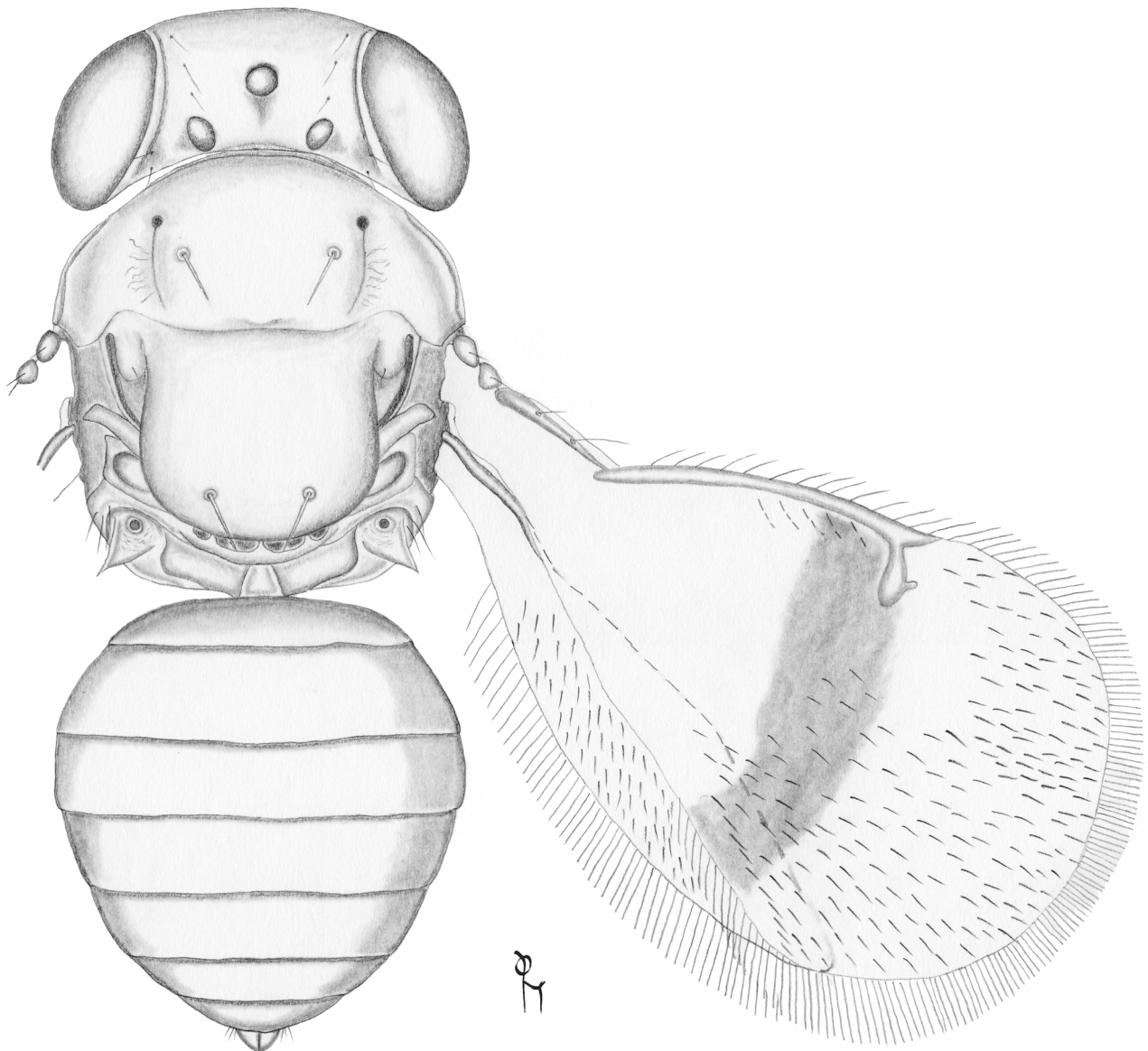
### ***Inti levis* sp. nov.**

(Figs 1–10)

**Diagnosis.** See diagnostic characters for genus above.

**Description.** FEMALE. Length 1.3–1.5 mm. Antenna black with purple tinges. Frons and vertex (Figs 8, 9) black with metallic purple, blue and green tinges. Mesoscutum, scutellum and propodeum (Figs 8, 10) black to dark brown with metallic tinges. Coxae, femora and tibiae black with metallic tinges, tarsomeres 1–3 yellowish-white, tarsomere 4 black. Forewing hyaline with a fuscous band medially, reaching from fore margin to hind mar-

gin of wing (Fig. 1), hind wing hyaline. Petiole black with metallic tinges. Gaster black to brown with metallic purple and blue tinges, 6<sup>th</sup> tergite metallic blue.



**FIGURE 1.** *Inti levis* sp. nov., female holotype, body length 1.5 mm.

For remaining description see the above description for the genus.

**Ratios.** HE/MS/MO = 3.1/1.0/1.8; POL/OOL/POO = 34.0/13.0/1.0; WH/WT = 1.1; LW/LM/HW = 2.0/1.0/1.3; PM/ST = 0.3; MM/LG = 1.0.

**MALE.** Unknown.

**Material examined.** **Holotype** female (BMNH) labelled “COSTA RICA, Cartago, Humo, El Copál, 9°47'N 83°45'W, 1050-1250 m, 29.ii-6.iii.2008, C. Hansson”. **Paratypes:** 2♀ on cards. COSTA RICA. **Limón:** Pococi, Parque Nacional Braulio Carrillo, Estacion Quebrada Gonzales, 4-500 m, 23-30.iii.2002, LN238380/543100, P. Hanson & C. Godoy (1♀, INBio). DOMINICAN REPUBLIC. Barahona, 4 km N. Paraiso, 22.iii.1991, 150 m, L. Masner” (1♀, CNC).

**Etymology.** Name referring to the smooth and shiny body, from the Latin *levis* = smooth.

**Distribution.** Northern Neotropical region (Costa Rica, Dominican Republic).

**Biology.** Unknown.

## Discussion

*Inti* is a peculiar genus of the Neotropical fauna of the subfamily Entedoninae. It is firmly established through four autapomorphies. The remaining apomorphies of *Inti* are also present in other entedonine genera, in a more or less mosaic pattern as listed below:

### Autapomorphies of *Inti*

- frons with upper part of interscrobal surface protruding up and over frontal suture (Fig. 2)
- notaular grooves with a fovea in very anterior part (Fig. 6)
- sidelobe of mesoscutum with a small hole centrally (Fig. 6)
- border between upper and lower mesepisternum developed as a sharp carina (Fig. 5)

### Synapomorphies shared only with *Horismenoides* Girault

- frontal suture smoothly curved into a double arch (Fig. 2)
- sidelobe of mesoscutum with margin between dorsal and lateral parts developed as a sharp carina (Fig. 5)

### Synapomorphies for *Horismenoides* not present in *Inti*:

- malar sulcus absent; the malar sulcus is usually present throughout the Eulophidae but has occasionally been lost in all subfamilies, in Entedoninae it has been lost in e.g. some species of *Emersonella* Girault, *Paracrias* Ashmead and *Pediobius* Walker (Hansson 2002)
- pair of setae on midlobe of mesoscutum and scutellum very short and thin; this is a different apomorphic state from the short and stout setae in
- *Inti*, both are derived from long and moderately thick setae present in most Entedoninae
- axillae strongly advanced forward; also present in tribe Euderomphalini (La Salle & Schauff 1994)
- mesoscutum with a complete median groove; also present in some other Entedoninae genera, e.g. *Parzaommomyia* Girault (Bouček 1988)

### Synapomorphies shared with some other entedonine genera, and with *Horismenoides*

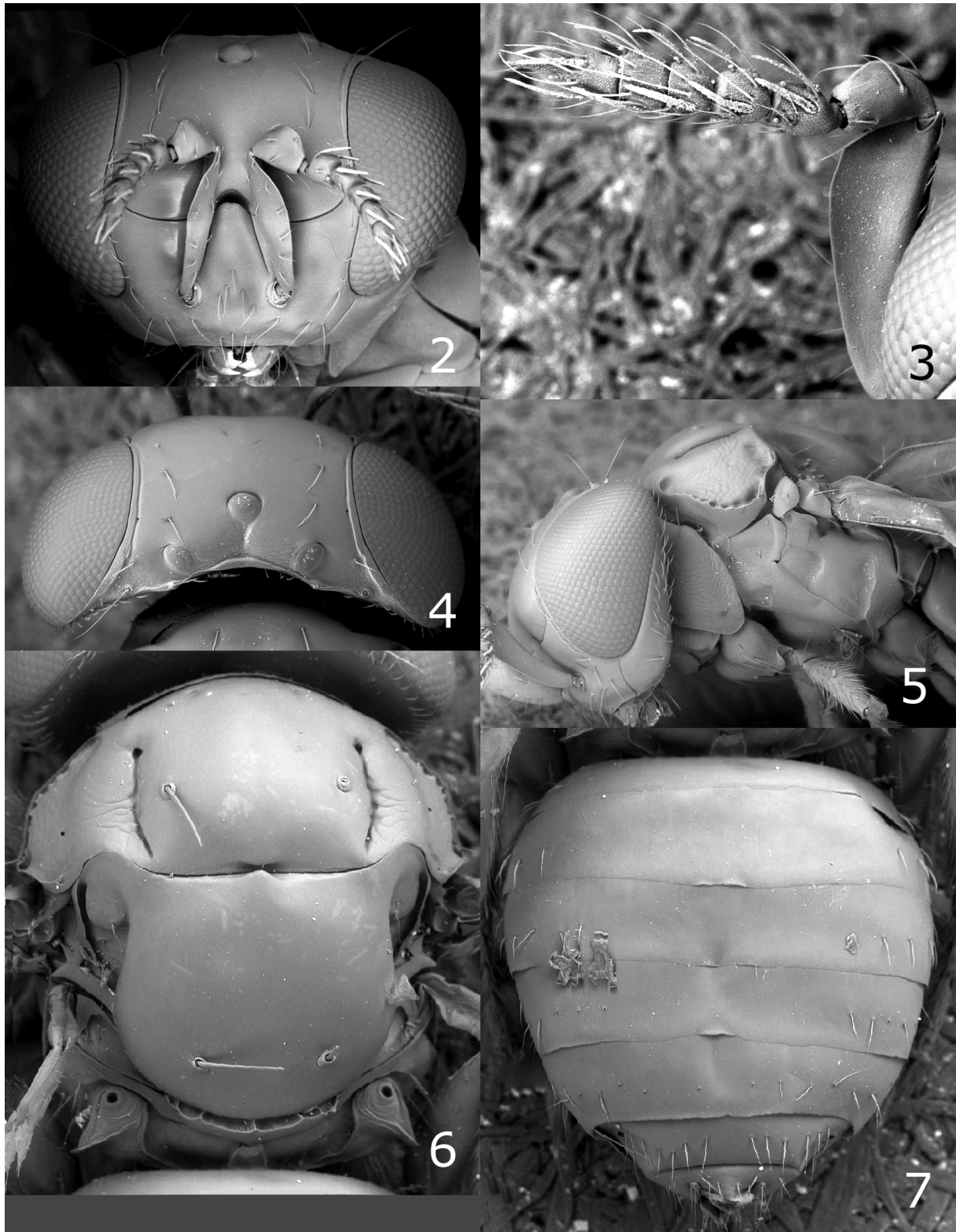
- antennal scrobes as narrow and distinct grooves (Fig. 2); also present in many other entedonine genera, e.g. *Horismenus* Walker (Hansson 2009a) and *Paracrias* (Hansson 2002)
- pronotum reduced and hardly visible in dorsal view (Fig. 6); also present in several other entedonine genera, e.g. *Omphale* Haliday (Hansson 2004)
- midlobe of mesoscutum with one pair of setae (Fig. 6); also present in several other entedonine genera, e.g. *Chrysonotomyia* Ashmead (Hansson 2004) and some *Closterocerus* Westwood (Hansson 1994)
- head and body smooth and shiny, without reticulation (Figs 2, 4–6, 8–10); also present in *Oradis* Hansson (Hansson 2002)
- forewing with basal ½ bare (Fig. 1); also present in some species of *Paracrias* (Hansson 2002) and *Klyngon* Hansson (Hansson & La Salle 2010)

### Synapomorphies shared with some other entedonine genera, but not with *Horismenoides*

- vertex and upper frons with a groove running along eye margin (Figs 2, 4); a similar groove is present in many species of *Emersonella* (Hansson 2002)
- scape and pedicel compressed, and pedicel with a dorsal edge (Fig. 3); also present in *Closterocerus* s. str. (Hansson 1994)
- flagellomeres with upper surface of longitudinal sensilla (= multiporous plate sensilla) concave (Fig. 3); also present in *Horismenus* and *Microdonophagus* Schauff (Hansson 2009b)
- pair of setae on midlobe of mesoscutum and scutellum stout (Fig. 6); a similar state is present in some species of *Astichomyia* Girault (Hansson 2002) and *Chrysonotomyia* (Hansson 2004).
- notauli as deep and narrow grooves in posterior 2/3 that terminate just before transscutal articulation (Fig. 6); a similar state is present in *Eprhopalotus* Girault (Schauff 1991, as *Aabacharis* Schauff)
- anterior part of mesepisternum protruding into posterior part of prepectus (Fig. 5); also present in *Horismenus* (Hansson 2009a) and some species of *Pediobius* (Hansson 2002)
- propodeum with callus posterior to spiracle drawn out to a sharp point (Fig. 6); a similar state is present in some genera of the tribe Euderomphalini (*Entedononecremnus* Girault, *Itahipeus* Hansson & La Salle, and *Sifraneurus* Hansson & La Salle) (Hansson & La Salle 2003)

Other diagnostic features of uncertain polarity for *Inti*:

- propodeum with a wide median carina (Fig. 6), also present in *Horismenoides*
- gaster subsessile, almost round (Figs 1, 8), also present in *Horismenoides*



**FIGURES 2–7.** *Inti levis* sp. nov., female. 2. Head frontal. 3. Antenna lateral. 4. Head dorsal. 5. Head and mesosoma lateral. 6. Mesosoma dorsal. 7. Gaster dorsal.

The above list of apomorphic and diagnostic features shows that *Inti* shares most apomorphies with the Australian genus *Horismenoides* and it is possible that they are sister groups. Bouček (1988), in his treatment of *Horismenoides*, stated that it may be related to *Baeoentedon* Girault and *Euderomphale* Girault, both belonging in tribe Euderomphalini (La Salle & Schauff 1994). La Salle & Schauff (1994) also speculated on the placement of *Horismenoides* in the Euderomphalini, but made no decisive remark about its affiliation. The propodeum in *Inti* is drawn out to a sharp point behind the spiracle (Fig. 6), an apomorphy present also in some genera of the Euderomphalini (see above), which may also indicate a placement in this tribe. However, the fact that the axillae in *Inti* are not strongly advanced forward (which is a key feature for Euderomphalini) and the possession of other apomorphies not present in Euderomphalini may suggest other affinities. For instance, flagellomeres having the upper surface of the longitudinal sensilla concave and the anterior part of the mesepisternum protruding into the posterior part of the prepectus may suggest a relationship with *Horismenus*, whereas the groove along the eye on vertex and upper frons may suggest a relationship with *Emersonella*. Because of this mosaic possession of derived characters I do not presently classify *Inti* in either Euderomphalini or in Entedonini (to which *Horismenus* and *Emersonella* belong), but leave it unplaced until further information becomes available.

No material of *Horismenoides* has been examined, features mentioned here are from the redescription and illustrations in Bouček (1988) and La Salle & Schauff (1994).



**FIGURES 8–10.** *Inti levis* sp. nov., female. 8. Body dorsal. 9. Head frontal. 10. Mesosoma dorsal.

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