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A new species of *Uscanoidea* Girault (Hymenoptera, Trichogrammatidae), an egg parasitoid of *Monalonion dissimulatum* Distant (Hemiptera, Miridae)

Jean Gamboa[1,2], Lucía Pérez-Benavides[1,2], Esaú Ospina-Peñuela[1], Francisco Serna[2], Gennaro Viggiani[3]

1 *Laboratorio de Entomología Universidad de la Amazonia LEUA, Facultad de Ingeniería, Universidad de la Amazonia, sede Centro, Carrera 11, 5-69, Florencia, Caquetá, Colombia* **2** *Museo Entomológico UNAB, Facultad de Ciencias Agrarias, Universidad Nacional de Colombia, sede Bogotá, Carrera 30, 45-03, Bogotá D.C., Colombia* **3** *Laboratorio di Lotta biologica, Dipartimento di Agraria, Università degli Studi di Napoli "Federico II", Via Università, 133, Portici, Napoli, Italia*

Corresponding author: Jean Gamboa (j.gamboa@udla.edu.co)

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Abstract

A new species of *Uscanoidea* Girault (Hymenoptera: Trichogrammatidae), *Uscanoidea ricoi* Viggiani, Gamboa & Pérez-Benavides, **sp. nov.**, is described and illustrated. The species is a solitary egg parasitoid of *Monalonion dissimulatum* Distant (Hemiptera: Miridae), the main insect pest on cocoa crops. An identification key for the described *Uscanoidea* species of the world is provided. The new species has a high potential for the biological control of the true bug *M. dissimulatum* in cocoa plantations in the Neotropical region.

Keywords

Antennal club, biological control, cocoa, fore wing, genitalia

Introduction

During a research project in cocoa (*Theobroma cacao* L.-Malvaceae) agroforestry systems in Colombia, several specimens of a Trichogrammatidae (Hymenoptera: Chalcidoidea) emerged from eggs of *Monalonion dissimulatum* Distant (Hemiptera: Miridae) from cocoa pods. The parasitoid was identified as a member of the subfamily Oligositinae, tribe Chaetostrichini, which, according to Owen et al. (2007) comprises several genera, including *Adryas* Pinto & Owen, *Bloodiella* Nowicki, *Brachista* Walker, *Burksiella* De Santis, *Chaetostricha* Walker, *Kyuwia* Pinto & George, *Lathromeroidea* Girault, *Pseuduscana* Pinto, *Uscana* Girault, *Uscanoidea* Girault, *Zaga* Girault, and *Zagella* Girault. Morphological comparison among these genera indicated the inclusion of the parasitoid in *Uscanoidea*. At present, *Uscanoidea* includes 12 rather different species whose members are distributed in the Oriental, Nearctic, and Neotropical regions (Pinto 2006; Noyes 2022). From comparison of the collected specimens with described species in *Uscanoidea* it emerged that the egg parasitoid of *M. dissimulatum* represents a new species.

In the Neotropical region, *M. dissimulatum* is the phytophagous bug that causes the highest incidence of fruit damage in cocoa plantations (Lavabre 1977; Vélez 1997; Schuh 2002–2013). Nymphs and adults of *M. dissimulatum* are sucking bugs, producing punctures on cocoa pods (fruits) and feeding on the cells of the epicarp. When one to seven week old fruits 10 to 12 cm long are attacked, they turn black, harden, and die. Further, when maturing fruits are attacked, they produce small stunted seeds (almonds) (de Abreu 1977).

In South America, different cocoa agroecosystem productions are found, and most are considered agroforestry systems (Johns 1999; Sambuichi 2006; Suárez et al. 2018). In those plantations, which have a greater plant diversity and are managed under traditional technologies, most farmers do not control *M. dissimulatum* populations. However, the few that do employ synthetic insecticides. Considering this context, it is necessary to develop new pest management practices for phytophagous insects based on recognizing and using the natural diversity of beneficial insects associated with cocoa plantations, such as predators and parasitoids.

The aim of this paper is to describe a new species of *Uscanoidea*, which has potential value for *M. dissimulatum* pest control.

Methods

In the departments of Caquetá and Huila in Colombia, 251 cocoa plantations ranging from 1–32 hectares in size were sampled. In each plantation, a manual four-hour sampling was used to search for *Monalonion dissimulatum* eggs inside cocoa pods. Eggs of *M. dissimulatum* are typically inserted into cocoa pods, and localized by detecting the two lengthend aeropiles extending out from the anterior pole of the egg.

Cocoa pods containing *M. dissimulatum* eggs were collected in 23 localities, 12 in the municipalities of El Doncello, El Paujil, San Vicente del Caguán and Belén

de los Andaquíes in the Department of Caquetá, and 11 in the municipalities of Agrado, Colombia, Neiva, Timaná, Rivera, and Paicol in the Department of Huila. The cocoa pods were transported in plastic bags placed inside a styrofoam box to the Laboratory of Entomology of the University of the Amazonia (LEUA) in the city of Florencia, Caquetá.

Mature *Monalonion* eggs, typically yellowish-white in color, were extracted manually under Olympus SZ61 stereomicroscope, using a blade, forceps, a pin, and a fine-tipped paintbrush. The eggs were placed into 15 × 15 × 8 cm plastic boxes with a top opening on the lid and sealed with muslin for aeration, simulating brood chambers. After emergence, any adult parasitoids were preserved in ethanol 96% before point mounting. Additionally, some specimens were slide mounted following the protocol proposed by Woolley and Dal Molin (2017), with the following modifications: 1) wings were removed and deposited directly in clove oil; 2) the parasitoid bodies were rinsed in 10% KOH for 15 to 45 minutes depending on the degree of sclerotization in a water bath; 3) each specimen was immersed in 10% glacial acetic acid for about 3 minutes, and then into distilled water, sequentially into 35%, 50%, 75%, and 96% ethanol, and then clove oil diluted with 96% ethanol in 1:1 and 3:1 ratios for at least 15 min each; 4) each specimen was then transferred to clove oil for at least 30 min before slide mounting; 5) on the slides, each appendage and head were separated from the body, covered with a thin layer of Canada balsam, and finally covered with a coverslip; 6) lastly, the slide-mounted specimens were placed into a lab oven at 50 °C for 4 to 5 days. Dry specimens were studied under an Olympus SZ61 stereomicroscope at 90× magnification, and slide-mounted specimens were examined with an Olympus CX21 optical microscope at 400× magnification. Photographs were taken with a LEICA M205A stereomicroscope with a built-in camera and a HITACHI TM4000Plus II Environmental Scanning Electron microscope. A distribution map of the species of *Uscanoidea* was plotted with the software QGIS version 3.26.2.

The curatorship of all specimens was carried out following the protocols established in the LEUA: 1) specimens sizing less than 15 mm are point mounted; 2) specimens sizing less than 3 mm are slide-mounted within the mounting medium (Hoyer, entelan, canadian balsam) according to the specialist of the insect group; 3) labels on both point- and slide-mounted contain the basic information regarding locality, geographic coordinates, altitude, date, and collector. A second label contains scientific information of the host (scientific and family names), and collecting method.

Genus *Uscanoidea* was identified using the keys in Doutt and Viggiani (1968) and Pinto (2006). Terminology follows Doutt and Viggiani (1968), and Pinto (2006). The abbreviations used in the description are: c1: first club segment, c2: second club segment, c3: third club segment, c4: fourth club segment, c5: fifth club segment, md: metanotum disc, pd: propodeum disc, and eh: exit hole. The specimens described were deposited in the entomological collection LEUA in Florencia, Caquetá, Colombia, and in the entomological collection of the Università degli Studi di Napoli "Federico II," Dipartimento di Agraria, Portici, Italy, (MUSA).

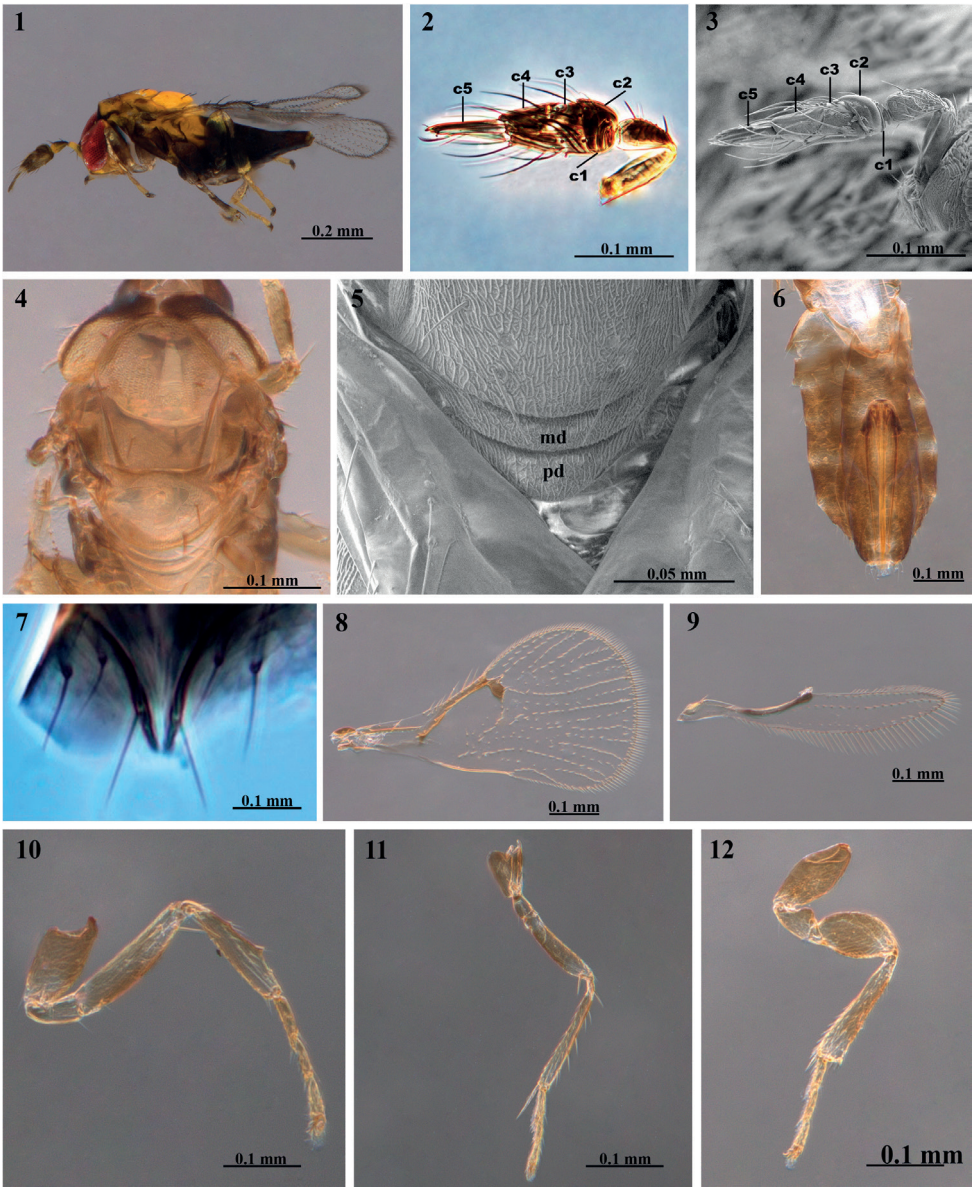
Results

Sixty eight individuals of *Uscanoidea ricoi*, sp. nov. were reared from the same (68) number of eggs of *Monalonion*, of which six were slide-mounted and the remainder point-mounted.

Taxonomy

***Uscanoidea ricoi* Viggiani, Gamboa & Pérez-Benavides, sp. nov.**
https://zoobank.org/ED75F2BA-35D7-4FC2-9902-4B5749FD861F
Figs 1–30

Description. Female (Figs 1–12). ***Colour*:** Eyes red, vertex and face mostly yellow, occipital area black. Antenna dark brown, with scape, ventral aspect of the pedicel, and apical club segment lighter. Mesosoma. Pronotum black and yellow, mid lobe of mesoscutum, axillae, scutellum, metanotum and propodeum yellow. Pleural and ventral areas of mesosoma black or dark brown. Fore wing hyaline with dark brown venation. Legs mostly brown or dark brown, but with lighter parts on femur, tibia and tarsus. Metasoma (gaster) black. ***Body length*:** 0.7 mm. ***Head*.** As wide as mesosoma; mandible tridentate, maxillary palpus 1-segmented. Antenna (Fig. 2) with scape 4× as long as wide; pedicel slightly longer than half length of scape; 2 anelli; club conical, 3.5–4× as long as wide, asymmetrical 5-segmented; C1 (Fig. 2, c1) very short, somewhat longer than second anellus, ring-like and closely appressed to base of C2, without setae but with one lateral basiconic peg sensillum; C2 (Fig. 2, c2) asymmetrical, dorsal length 4× as long as ventral length, slightly wider than C3, with long setae (Fig. 3), distal margin with basiconic peg sensilla and one placoid sensillum; C3 asymmetrical, 0.8× as long as C2 and with setae and sensilla as for C2, but with a slightly curved placoid sensillum; C4 1.8× as long as C3 and with one distal basiconic peg sensillum; C5 tapered, narrow, 4–5× as long as wide, with 2 or 3 placoid sensilla, one prominent and as long as C5; terminal basiconic peg sensillum, and a short terminal seta. ***Mesosoma*.** 0.8× as long as metasoma; pronotum very short, with a few setae; mid lobe of mesoscutum subtrapezoidal (Fig. 4), 1.7× as long as scutellum, with faint reticulate sculpture and two pairs of rather short setae; scutellum with setae and sculpture as for mid lobe of mesoscutum; metanotum (Fig. 5, md) with disc slightly shorter (0.7×) than that of propodeum (Fig. 5, pd). Mesophragma apically concave. ***Wings*.** Fore wing (Fig. 8) 1.6× as long as wide; venation 0.58 wing length; Subcostal vein 1.3× marginal vein length, premarginal vein 0.6× Marginal vein length, Stigmal vein shorter than premarginal vein, with a short neck; costal cell 1.5× Marginal vein length and with a group of 6–8 setae, distally near the premarginal vein; 1 seta on the Subcostal vein, 2 setae on the premarginal vein and 3 main setae on the Marginal vein; disc with 17–20 regular and distinct rows of setae; radial sector 1 curved from stigma toward the wing base and with 7 or 8 setae; fringe with longest setae half the length of stigmal vein. Hind wing (Fig. 9) with 3 rows of setae on the disc. ***Legs*.** Fore leg: trochanter almost parallel-sided; femur narrow, 4–6× as long as wide with a rather long seta on the distal ventral; tibia front margin



Figures 1–12. *Uscanoidea ricoi* sp. nov., female **1** habitus, lateral view **2** antenna **3** setae on antenna **4** mesoscutum **5** metanotum and propodeum **6** metasoma **7** hypopygium **8** fore wing **9** hind wing **10** fore leg **11** mid leg **12** hind leg; c1 – first club segment, c2 – second club segment, md – metanotum disc; pd – propodeum disc.

with 3 spines, the middle one prominent (Fig. 10). Mid leg: fragile; tibia with a row of rather long setae on the external margin, somewhat shorter than the corresponding basitarsomere, one long seta on the distal ventral end, spur as long as basitarsomere (Fig. 11). Hind leg: robust; trochanter having a dorsal globular prominence; femur 2× as long as wide; tibia robust with spur as long as half basitarsus; tarsomeres

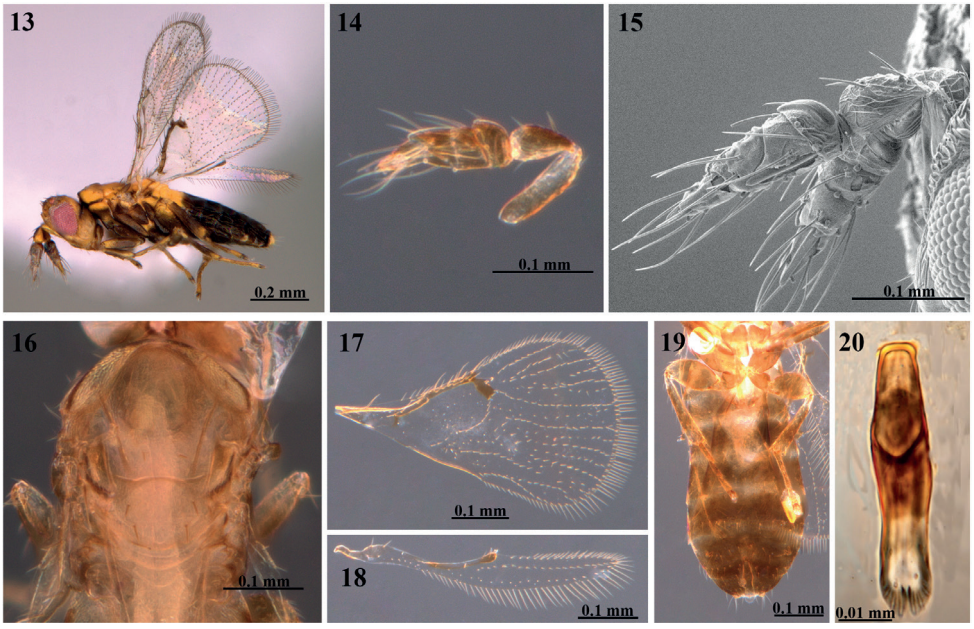
subequal (Fig. 12). ***Metasoma*.** Subconical (Fig. 6), ovipositor internally inserted at level of terga III-IV, not extruded; ovipositor length/hind tibia length ratio 1.76; hypopygium (Fig. 7) reaching the basal half of ovipositor, with two median converging ridges and two long, subapical setae.

Male (Fig. 13). Body coloration as the female. Antenna (Fig. 14) slightly shorter (3.0×) and with fewer asymmetrical segments than in female, C5 shorter, 2.5× as long as wide and with several long setae (Fig. 15), as on the preceding segments. Mesoscutum as female (Fig. 16). Fore wing fringe (Fig. 17) as long as stigmal vein length. Hind wing as the female (Fig. 18). Metasoma 1.3× as long as wide, with posterior apex less pointed than in female (Fig. 19). Genitalia (Fig. 20) simple, tubiform, slightly wider in the middle, basal 2/3rd brown, 4.4× as long as wide, length 0.125 mm, basal anterodorsal aperture 2× as long as wide; without ventral setae, parameres, volsellae, and aedeagal apodemes. Metatibia length/genitalia length ratio 1.7.

Etymology. The specific epithet is named in honor of Leonidas Rico Martínez, President (Rector) of Universidad de la Amazonia (Florencia, Caquetá, Colombia), (from 2011 to 2016). He supported the foundation of the LEUA, with the aim of investigating the diversity of insects present in the Colombian's Amazon.

Examined material. ***Holotype*.** Colombia • ♀; Caquetá, El Doncello, Vda. Los Laureles, Fca. Los Matapollos; 01°41'53"N, 75°17'48"W; 620 m alt.; 30 Jul. 2022; E. Ospina and L. Pérez leg.; emerged from an egg of *Monalonion dissimulatum* collected in cacao pod; LEUA-51438. Holotype is deposited in Laboratory of Entomology of the University of the Amazonia (LEUA), Florencia, Caquetá, Colombia (LEUA), section Central Taxonomic Collection (CTC).

***Paratypes*.** Colombia • ♂ (**Allotype**); same data of holotype; LEUA-51442; deposited in LEUA • 2 ♀♀; same data of holotype; LEUA-51439/51440; LEUA • 5 ♀♀ and 4 ♂♂; Caquetá, El Doncello, Vda. La Ceiba, Fca. Bethel; 01°43'48"N, 75°16'55"W; 511 m alt.; 05 Jul. 2022; L. Pérez and E. Ospina leg.; emerged from egg of *Monalonion dissimulatum* collected in cacao pod; LEUA-51441; deposited in MUSA • 1 ♀; Caquetá, Belén de los Andaquíes, Vda. Agua Dulce, Fca. El Morichal; 01°20'34"N, 75°49'10"W; 328 m alt.; 13 Oct. 2021; L. Pérez and E. Ospina leg.; LEUA-51413; LEUA • 1 ♀; Caquetá, El Doncello, Vda. El Recreo, Fca. La Siberia; 01°42'53"N, 75°17'22"W; 452 m alt.; 06 Sep. 2022; Y. Rodríguez leg.; LEUA-51420; LEUA • 1 ♀ and 1 ♂; same collection data as for preceding; 18 Jul. 2021; L. Pérez and E. Ospina leg.; LEUA-51421/51422; LEUA • 1 ♂; Caquetá, El Doncello, Vda. La Ceiba, Fca. Bethel; 01°43'48"N, 75°16'55"W; 511 m alt.; 10 Ago. 2022; E. Ospina and L. Pérez leg.; LEUA-51408; LEUA • 5 ♀♀ and 3 ♂♂; same collection data as for preceding; 19 Jul. 2021; L. Pérez and E. Ospina leg.; LEUA-51959/51960/51961/51962/51963/51964/51965/51966; LEUA • 1 ♂; Caquetá, El Doncello, Vda. Los Laureles, Fca. Los Matapollos; 01°41'53"N, 75°17'48"W; 620 m alt.; 19 Jul. 2021; E. Ospina leg.; LEUA-51424; LEUA • 2 ♀♀ and 3 ♂♂; same collection data as for preceding; 06 Sep. 2022; L. Pérez leg.; LEUA-51426/51427/51428/51429/51430; LEUA • 1 ♂; Caquetá, El Doncello, Vda. Serranía, Fca. La Playa; 01°41'52"N, 75°18'05"W; 621 m alt.; 18 Jul 2021; L. Pérez and E. Ospina leg.; LEUA-51437; LEUA • 1 ♀ and 2 ♂♂; Caquetá, El Paujil, Vda. La Providencia, Fca. El Coralito; 01°32'23"N, 75°29'12"W; 320 m alt.; 20 Ago.



Figures 13–20. *Uscanoidea ricoi* sp. nov., male **13** habitus, lateral view **14** antenna **15** setae on antenna **16** mesoscutum **17** fore wing **18** hind wing **19** metasoma **20** genitalia.

2021; L. Pérez and E. Ospina leg.; LEUA/51969/51970/51971; LEUA • 1 ♀ and 1 ♂; Caquetá, El Paujil, Vda. La Rivera, Fca. La Fortuna; 01°36'50"N, 75°19'47"W; 663 m alt.; 18 Ago. 2021; L. Pérez and E. Ospina leg.; LEUA-51433/51434; LEUA • 1 ♀; Caquetá, San Vicente del Caguán, Vda. Alto Pocetas, Fca. La Chinita; 02°16'21"N, 74°40'40"W; 375 m alt.; 10 Sep. 2021; E. Ospina and L. Pérez leg.; LEUA-51976; LEUA • 2 ♀; Caquetá, San Vicente del Caguán, Vda. Buenos Aires, Fca. La Jardinera; 02°17'05"N, 74°40'46"W; 605 m alt.; 26 Sep. 2021; E. Ospina and L. Pérez leg.; LEUA-51406/51407; LEUA • 1 ♀; Caquetá, San Vicente del Caguán, Vda. La Reforma No. 2, Fca. La Victoria; 02°16'50"N, 74°41'44"W; 422 m alt.; 09 Oct. 2021; L. Pérez and E. Ospina leg.; LEUA-51423; LEUA • 2 ♀♀; Caquetá, San Vicente del Caguán, Vda. Sotará, Fca. Villanueva; 02°01'29"N, 74°51'42"W; 293 m alt.; 11 Sep. 2021; L. Pérez and E. Ospina leg.; LEUA-51412/51977; LEUA • 1 ♀; same collection data as for preceding, Fca. Parcela 4; 02°01'44"N, 74°50'55"W; 302 m alt.; 04 Oct. 2021; L. Pérez and E. Ospina leg.; LEUA-51435; LEUA • 2 ♀♀ and 2 ♂♂; Huila, Agrado, Vda. La Galda, Fca. El Trapiche; 02°14'52"N, 75°46'19"W; 827 m alt.; 23 Feb. 2022; E. Ospina and L. Pérez leg.; LEUA-51414/51415/51416/51417; LEUA • 2 ♀♀; same collection data as for preceding, Fca. Santana; 02°15'02"N, 75°46'23"W; 829 m alt.; 23 Feb. 2022; E. Ospina and L. Pérez leg.; E. Ospina and L. Pérez leg.; LEUA-51980/51981; LEUA • 1 ♀; Huila, Colombia, Vda. Horizonte Bajo, Fca. La Fortuna; 03°25'54"N, 74°46'05"W; 793 m alt.; 25 Ago. 2021; E. Ospina and L. Pérez leg.; LEUA-51410; LEUA • 4 ♀♀; Huila, Colombia, Vda. Ariari, Fca. La Esperanza; 03°25'58"N, 74°46'16"W; 782 m alt.; 25 Ago. 2021; E. Ospina and L. Pérez leg.; LEUA-51972/51973/51974/51975; LEUA

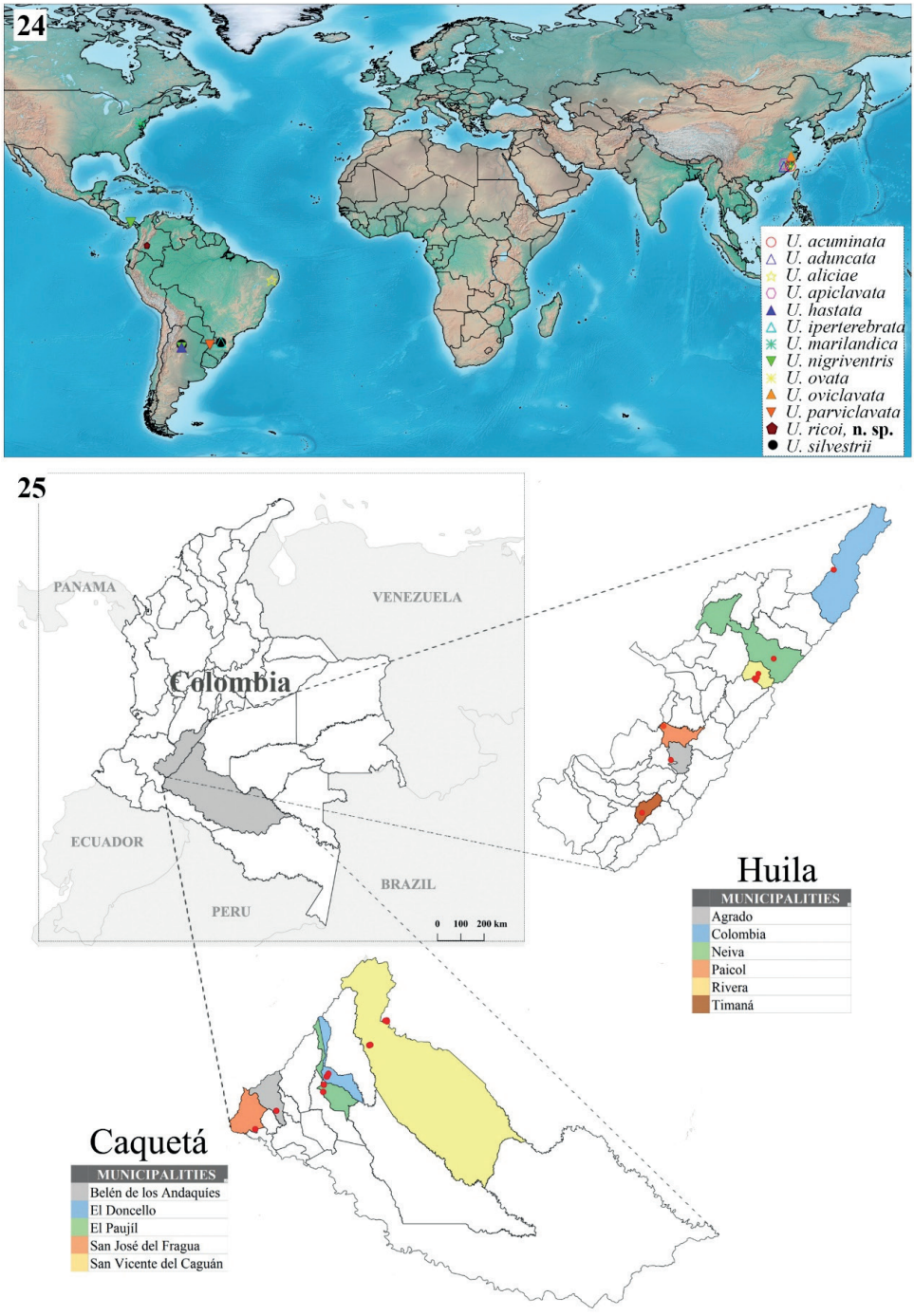
• 1 ♀ and 1 ♂; Huila; Neiva; Vda. Floragaita; Fca. El Tesoro; 02°52'45"N, 75°08'21"W; 928 m alt.; 26 Oct. 2021; E. Ospina and L. Pérez leg.; LEUA-51978/51979; LEUA • 1 ♂; Huila, Paicol, Vda. El Alto, Fca. Alemania; 02°27'12"N, 75°46'44"W; 916 m alt.; 15 May. 2022; E. Ospina and L. Pérez leg.; LEUA-51436; LEUA • 1 ♀; Huila, Timaná, Vda. Cascajal, Fca. Las Palmeras; 01°55'17"N, 75°56'59"W; 1250 m alt.; 28 May. 2022; L. Pérez and E. Ospina leg.; LEUA-51982; LEUA • 1 ♀ and 1 ♂; Huila, Rivera, Vda. El Guadual, Fca. La Primavera; 02°47'09"N, 75°14'03"W; 793 m alt.; 31 Jul. 2021; L. Pérez and E. Ospina leg.; LEUA-51431/51432; LEUA • 2 ♀♀ and 1 ♂; Huila, Rivera, Vda. Mesitas, Fca. La Balsa; 02°44'47"N, 75°14'57"W; 894 m alt.; 29 Jul. 2021; E. Ospina and L. Pérez leg.; LEUA-51409/51418; LEUA • 1 ♂; same collection data as for preceding; Fca. Caracolí; 02°44'49"N, 75°14'57"W; 869 m alt.; 28 Jul. 2021; E. Ospina and L. Pérez leg.; LEUA-51425; LEUA • 1 ♀ and 1 ♂; Huila; Rivera; Vda. El Viso; Fca. La Labranza; 02°45'22"N, 75°15'22"W; 760 m alt.; 28 Jul. 2021; E. Ospina and L. Pérez leg.; LEUA-51967/51968; LEUA. All additional material emerged from eggs of *Monalonion dissimulatum* collected in cocoa pod.

Biology. *Uscanoidea ricoi*, sp. nov., is a solitary parasitoid of eggs of *Monalonion dissimulatum* (Hemiptera: Miridae: Bryocorinae: Monaloniini) (Figs 21–23). Adult emergencies have been recorded in February, May, July, August, September and October. The parasitoid is multivoltine, like its host.

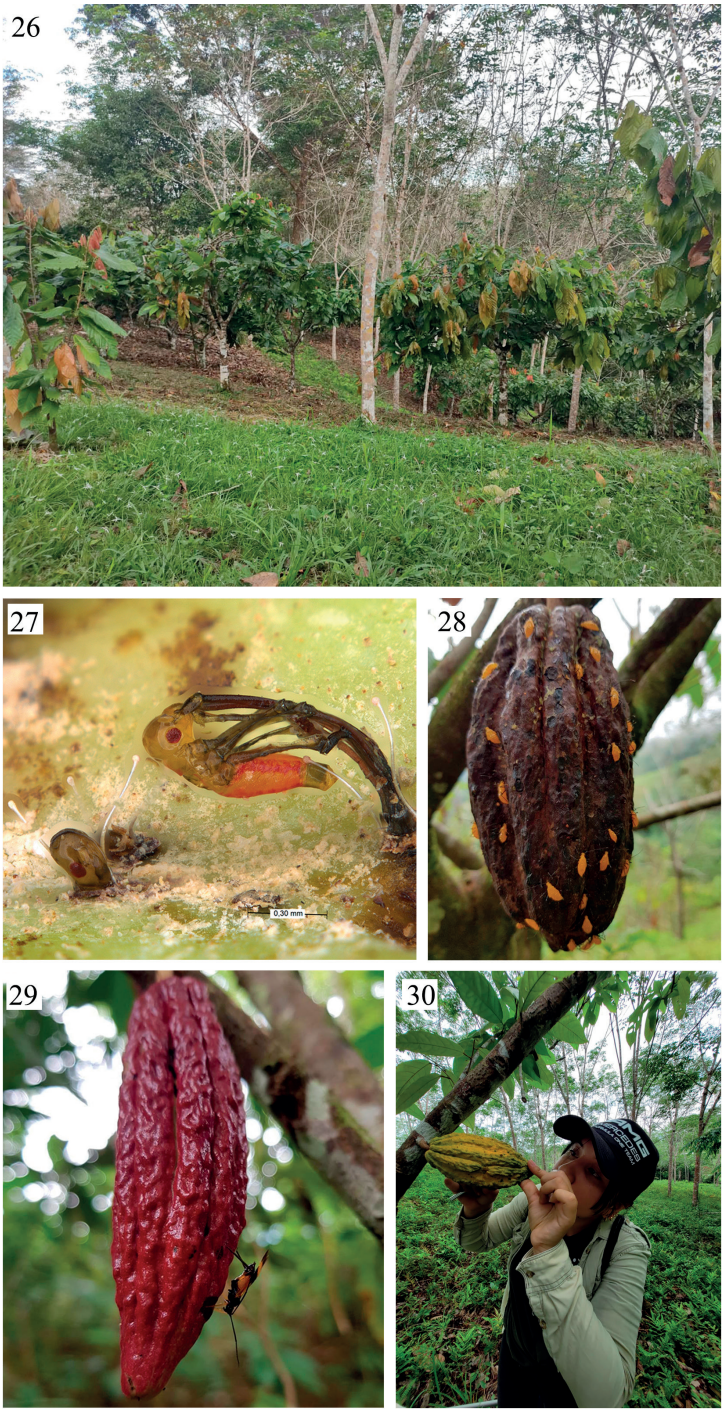
Distribution. Twelve species of *Uscanoidea* have been recorded worldwide: Argentina (4), Bermuda (1), Brazil (3), China (5), Jamaica (1), Panama (1), and United States of America (1) (De Santis 1979, 1989; Noyes 2022) (Fig. 24). *Uscanoidea ricoi*, sp. nov., is recorded from 23 localities in Colombia (Caquetá and Huila departments) (Fig. 25). Those localities are between 293 and 1,250 meters of altitude.

Habitat. Specimens of *Uscanoidea ricoi*, sp. nov., were collected in cocoa plantations intermixed within assortments of abundant vegetation (Fig. 26). In the region,

Figures 21–23. *Uscanoidea ricoi* sp. nov. emerging from *Monalonion dissimulatum* eggs **21** egg of *Monalonion dissimulatum* **22** egg of *Monalonion dissimulatum* with the emerging parasitoid *Uscanoidea ricoi* sp. nov. **23** egg of *M. dissimulatum* with exit hole of *U. ricoi* sp. nov.; eh – exit hole.



Figures 24, 25. Geographical distribution of *Uscanoidea* **24** all described *Uscanoidea* species **25** detail distribution of *Uscanoidea ricoi* sp. nov., in Colombia.



Figures 26–30. Habitat and host of *Uscanoidea ricoi* sp. nov. **26** cocoa plantations in agroforestry system **27** eggs at the moment of emergence of the nymphs of *Monalonion dissimulatum* **28** nymphs of *M. dissimulatum* host feeding on cocoa pod **29** adult of *M. dissimulatum* feeding on cocoa pod **30** collection of cocoa pods with *M. dissimulatum* eggs parasitized.

at least four types of traditional agroforestry systems for cocoa are recognized (1- complex diversified multistrata, 2- low diversity with regular trees, 3- low diversity with clustered trees, and 4- high density of Musaceae), depending on the diversity of the associated trees (Suárez et al. 2018). In the traditional cocoa agroforestry arrangements in Caquetá and Huila departments, plant species such as *Albizia guachapele* (Kunth) Dugand (Fabaceae), *Cariniana pyriformis* Miers (Lecythidaceae), *Cedrela odorata* L. (Meliaceae), *Citrus* spp. (Rutaceae), *Coffea arabica* L. (Rubiaceae), *Cordia alliodora* (Ruiz & Pav.) Oken (Cordiaceae), *Erythrina poeppigiana* (Walp.) O.F. Cook (Fabaceae), *Eugenia stipitata* McVaugh (Myrtaceae), *Hevea brasiliensis* (Willd. ex A. Juss.) Müll. Arg. (Euphorbiaceae), *Inga* spp. (Fabaceae), *Leucaena leucocephala* (Lam.) de Wit (Fabaceae), and *Theobroma grandiflorum* (Willd. ex Spreng.) K. Schum. (Malvaceae) are the most common trees and shrubs. Also, the diversity of associated herbs is high in the cacao plantations and *Musa* spp. (Musaceae) are commonly found there.

Most cocoa agroecosystems border on the introduced grasses *Brachiaria decumbens* Stapf (Poaceae) and *B. humidicola* (Rendle) Scheweick or border other agroecosystems such as *Saccharum officinarum* L. (Poaceae), *H. brasiliensis*, *C. arabica*, *Erythroxylum coca* Lam. (Erythroxylaceae) and *Musa paradisiaca* L. (Musaceae) or border stubble, secondary forests and primary forests. Extensive livestock production systems predominate in the region and there are high rates of deforestation.

Discussion

The genus *Uscanoidea* was described by Girault (1911) as follows: "A genus allied with and resembling *Uscana* Girault and *Uscanella* Girault but differing from the former in having a pointed conic-ovate abdomen which is longer than the thorax, in bearing a shorter somewhat swollen and compact 2-jointed antennal club and in lacking a ring-joint in the antennae; from the latter genus it is practically similar in the form of the antennae, but differs in the absence of the ring-joint, in the short marginal cilia of the fore wing, the more distinct and denser discal ciliation, the shorter marginal and stigmal veins and the longer, more pointed abdomen". Doutt and Viggiani (1968) revised the type material of both mentioned genera and made corrections to the original description. The distinction of *Uscanoidea* from *Uscana* was based mostly on the club number segments (3 in *Uscanoidea* and 4 in *Uscana*) and the length of the ovipositor (long in *Uscanoidea* and short in *Uscana*). After the type species *U. nigriventris* Girault, 2 new species from China were included in *Uscanoidea* (Lin 1994). The author defines both genera as having a 4-segmented club, but *Uscana* with "forewing moderately rounded, marginal vein slender and straight; 4 segments of club distinctly separated" and *Uscanoidea* with "forewing greatly broad and nearly truncate apically, marginal vein not very slender, usually with cluster of setae, club segmentation irregular and oblique, segmented differently in different view". Pinto (2006) extends the limits of the genus including species with "male and female antennal club 5-segmented" and "propodeal disc and metanotum usually subequal in length". The same author synonymizes the genus *Gnorimogramma* De Santis (1972) under *Uscanoidea*. The diagnosis of the latter genus by Pinto (2006)

includes in *Uscanoidea* only species having antenna with 2 anelli and 5 asymmetrical club segments; most of the other characteristics appear mostly of specific and not generic value. Consequently, at present, the genus *Uscanoidea sensu* Pinto remains a complex of heterogeneous species without a common identity. Particularly marked are the variations of the antennal shape shown in the known species included in the genus, which need further studies to confirm the present assessment of *Uscanoidea*. It is a matter of fact that the morphological differences between *Uscanoidea* and *Uscana* still remain uncertain. However, biologically the two genera are different, the known hosts of *Uscanoidea* are Hemiptera and of *Uscana* are Coleoptera (Bruchidae) (Fursov 1995).

Unfortunately, the type and syntype material of *U. nigriventris* are in very poor condition (Doutt and Viggiani 1968; Pinto 2006) and for other species, few specimens are available for advanced morphological and molecular studies. Of the 12 species at present included in *Uscanoidea*, 3 species, *U. aduncata* (Lin 1994), *U. aliciae* (De Santis 1972), *U. oviclavata* (Lin 1994) show funicular segments; the others 9 have no funicle. Among the latter, the type of the genus, *A. nigriventris* (Girault 1911), *U. hastata* (De Santis 1997), *U. ovata* Lin (1994) and *U. parviclavata* (De Santis 1997) have a short and long club. The new species *U. ricoi* is included in the group of *Uscanoidea* with a conic-ovate club, namely *U. acuminata* (Lin, 1994), *U. apiclavata* Lin (1994), *U. iperterebrata* Viggiani (1992), *U. marilandica* (Girault 1918) and *U. silvestrii* Viggiani (1992). Among the latter species, *U. ricoi* appears most allied to *U. apiclavata*, but is distinguishable for having female antennal scape longer (4× in *U. ricoi*; 3× in *U. apiclavata*), club C5 longer (4–5× in *U. ricoi*, 3× in *U. apiclavata*), and male with C5 shorter than in female (subequal in *U. apiclavata*); genitalia shorter (4.1× as long as wide in *U. ricoi*, 5.5× in *U. apiclavata*), slightly enlarged in the middle and not parallel sided; without ventral setae.

For the majority of the *Uscanoidea* species, biological data are lacking. However, what is known is that *U. aliciae* was reared from eggs of *Mahanarva* (*Ipiranga*) *rubicunda* (=*Mahanarva rubicunda indentata*) (Walker) (Hemiptera: Cercopidae) (De Santis 1972), both *U. parviclavata* and *U. silvestrii* were reared from eggs of *Campylenchia hastata* (Fabricius) (Hemiptera: Membracidae), and *U. silvestrii* was reared from eggs of an unidentified membracid (De Santis 1997). Lastly, Pinto (2006) included leafhoppers (Cicadellidae, Hemiptera) as hosts of *Uscanoidea*.

Key to identification for the known species of *Uscanoidea* of the world

1	Antenna with funicle and club	**2**
–	Antenna without funicle	**4**
2(1)	Club elongate, 4.0× as long as wide; genitalia tubular, 4.0× as long as wide, with distal half very narrow	***U. aliciae***
–	Club ovate, less than 2.0× as long as wide	**3**
3(2)	Genitalia with basal half ovate, with ventral medial keel and chelate structures	***U. aduncatum***
–	Genitalia tubular with a large anterodorsal aperture and with two ventral setae	***U. oviclavata***

4(1)	Ovipositor longer than metasoma	**5**
–	Ovipositor not longer than metasoma	**6**
5(4)	Ovipositor base at level of mesocoxae	***U. silvestrii***
–	Ovipositor base at level of tegula	***U. iperterebrata***
6(4)	Fore wing fringe with longest setae as long as discal setae	**7**
–	Fore wing fringe with longest setae longer than discal setae	**8**
7(6)	Club 2.3× as long as wide; fore wing length/width ratio 5.0×	***U. hastata***
–	Club 1.7× as long as wide; fore wing length/width ratio 4.5×	***U. parviclavata***
8(6)	Fore wing infumate from base to level of stigma vein level	***U. ovata***
–	Fore wing hyaline	**9**
9(8)	Club at least 3.0× as long as wide	**10**
–	Club at most 2.0× as long as wide	***U. nigriventris***
10(9)	Female club with maximum length of C5 2.0× width	***U. acuminata***
–	Female club C5 at least 3.0× as long as wide	**11**
11(10)	Fore wing length/width ratio greater than 1.6	***U. marilandica***
–	Fore wing length/width ratio at most 1.6	**12**
12(11)	Female club segment C5 as long as in the male; genitalia tubular, parallel sided, 3.0× as long as wide, with two ventral setae	***U. apiclavata***
–	Female club segment C5 longer than in the male; genitalia tubular but not parallel sided, 4.4× as long as wide, without ventral setae	***U. ricoi***

Comments

The high anthropogenic pressure on natural ecosystems leads to cocoa agroforestry systems becoming the vegetation coverage that provides suitable habitats and food for different groups of insects. In a sampling carried out at the Matapollos farm located in El Doncello, Caquetá, 40 cocoa pods with *Monalonion dissimulatum* eggs were collected. From each pod, between 15 to 25 *M. dissimulatum* eggs were obtained, for a total of 719 eggs. The percentage of parasitoidism of *U. ricoi*, sp. nov., in *M. dissimulatum* eggs reached 87,9%. Therefore, it seems that cocoa in agroforestry system plantations ensures natural biological control of this phytophagous insect.

The parasitoid wasp *U. ricoi*, sp. nov., shows high potential as a biological agent against *M. dissimulatum* in cocoa plantations (Figs 27–29) since individuals have been found in different localities, agroforestry associations, and elevations, besides having a high percentage of the host eggs killed. In the future, new searches for *U. ricoi*, sp. nov., should be carried out in other localities in the Neotropical region (Fig. 30). Furthermore, studies of the biology and ecology of the parasitoid should be performed as a baseline for designing biological control management practices of the phytophagous insect pest *M. dissimulatum* in cocoa plantations.

This work corresponds to the first record, arguably the second record, of the plant bug parasitoid of *M. dissimulatum*. Moncayo (1957) recorded *Prophanurus* (=*Telenomus*) *bodkini* (Hymenoptera: Scelionidae) as an egg parasitoid of *M. dissimulatum*.

Prophanurus (=*Telenomus*) *bodkini* is incorrect as a taxonomic identity. Even so, during all these years in Colombia this incorrect information continues to be cited. We did an exhaustive search around the information included in Vélez (1997), to be able to make this statement. We even visited the entomological collection where Dr. Vélez worked and there is no evidence of this.

In Latin America, other *Monalonion* species harm crops of economic importance. Among others, *M. velezangeli* is a polyphagous pest insect in plantations of *Coffea arabica* L. (Rubiaceae), *Eucalyptus grandis* W. Hill (Myrtaceae), *Mangifera indica* L. (Anacardiaceae), *Persea americana* Mill. (Lauraceae), *Psidium guajaba* L. (Myrtaceae), and *Rubus glaucus* Benth. (Rosaceae) (Torres et al. 2012; Ocampo et al. 2018). Exhaustive searches for *Uscanoidea* parasitoids for different *Monalonion* species should be conducted.

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