

**FIRST RECORD OF THE SPIDER MITE PREDATOR, *STETHORUS TRIDENS* GORDON
(COLEOPTERA: COCCINELLIDAE) PREYING UPON THE RED AVOCADO MITE,
OLIGONYCHUS YOTHERSI MCGREGOR (ACARI: TETRANYCHIDAE)**

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RESUMEN

Este estudio es el primer registro del depredador de ácaros, *Stethorus tridens* Gordon (Coleoptera: Coccinellidae) depredando la araña roja, *Oligonychus yotheresi* McGregor (Acari: Tetranychidae). Se provee información actualizada sobre la distribución geográfica de *S. tridens* y los ácaros que depreda; una diagnosis del macho de *S. tridens* con fotografías en color de las características diagnósticas importantes y sus hábitos de depredación sobre *O. yotheresi*.

Palabras clave: coccinélidos, diagnóstico de especie, hábitos de predación, registros de distribución, hospederos.

SUMMARY

The present study is the first record of the spider mite predator, *Stethorus tridens* Gordon (Coleoptera: Coccinellidae) preying upon the red avocado mite, *Oligonychus yotheresi* McGregor (Acari: Tetranychidae). Information on the current known distribution of *S. tridens* and the mite species that it preys; a diagnosis of the male *S. tridens* with color photographs of important diagnostic features and its predatory behavior on *O. yotheresi* is provided.

Key words: ladybird beetle, species diagnosis, feeding habit, distribution records, hosts.

INTRODUCTION

Coccinellids are active predators of other insects, especially aphids, scale insects and psyllids. The only coccinellids specialized in preying on mites (mainly Tetranychidae) are those belonging to the tribe Stethorini, of the subfamily Scymninae (González 2006). According to Biddinger et al. (2009) the tribe Stethorini has about 90 species in two genera: *Stethorus* and *Parastethorus*. The tribe Stethorini is cosmopolitan, and its members

have been found on avocados, bananas, cassava, citrus, corn, cotton, nuts, papaya, strawberries, stone fruit, tea, vegetables, ornamental plants, meadows and forest trees (Biddinger et al. 2009). In Colombia, studies on the predatory activity of ladybird beetles have been few. In the municipality of Mosquera, in the State of Cundinamarca, Colombia, Pérez et al. (2008) studied the effect of a biological pesticide on some parameters of the predator population of *Delphastus quinculus* Gordon (as *D. pusillus*). In

another study, García et al. (2005) studied the life table of *D. quinculus* when fed with the whitefly *Trialeurodes vaporariorum* (Hemiptera: Aleyrodidae).

While collecting specimens of the red avocado mite, *Oligonychus yothersi* McGregor, the first author found specimens of a small predatory coccinellid feeding on them. This coccinellid species was identified as *Stethorus tridens* Gordon (Coleoptera: Coccinellidae) and is the first record of the species feeding on *O. yothersi*. Here we diagnose the male *S. tridens* and provide information on its distribution and predatory habit on *O. yothersi*.

MATERIALS AND METHODS

Material studied. *Stethorus tridens* Gordon. **Colombia:** Valle del Cauca, Palmira, Corporación Colombiana de Investigación Agropecuaria (CORPOICA), Centro de Investigación Palmira, 03°30'55.3"N, 76°18'56"W, 1070 m.s.n.m, 4.viii.2010, coll. J. C. Reyes Bello and R. López, ex found feeding on different growth stages of the red avocado mite, *Oligonychus yothersi* (McGregor) on leaves of avocado, *Persea americana* Mill. Var. Lorena, 5 specimens (♂♂). All material deposited at Colección Guillermo González, Santiago, Chile.

Extraction of genitalia and species identification. The abdomen of the coccinellids were extracted by softening the insect in hot water and then macerated in a 10% KOH solution; genitalia was separated under the microscope using insect pins and slide-mounted in glycerin on a glass slide in order to photograph the important morphological features; once studied, the genitalia were put into micro vials filled with glycerin and attached to the insect pin with the specimen from which it was extracted (González et al. 2008). Only male specimens were dissected. The beetle was identified as *Stethorus tridens* Gordon, using the taxonomic keys by Gordon and Chapin (1983).

The avocado red mite, *Oligonychus yothersi* McGregor (Acari: Tetranychidae) was kindly identified by Dr. Nora Mesa (Universidad Nacional de Colombia, Palmira campus).

RESULTS

Adult *S. tridens* were observed feeding on all stages of development of *O. yothersi*, including eggs (Figure 1A), quiescent stages (Figure 1B) and adults (Figure 1C). The mandibles of coccinellids are massive, wide and sickle shaped (Poorani 2008). *Stethorus tridens* makes a small incision on its prey with its mandibles and then proceeds to suck its contents (Figure 1B).



Figure 1. *Stethorus tridens* (Gordon), male. A, preying upon eggs of *O. yothersi*; B, preying upon quiescent stage of *O. yothersi*. Notice mite destituted of its contents. C, preying upon adult female *O. yothersi*. Photos by J. Reyes.

The larvae of predatory species are generally also predacious, and in several species, the mandibles of the larvae have a deep groove along the inner surface, which is used to inject digestive juices into the victim and to suck out juices in cycles

until the victim is entirely dry; the prey's empty exoskeleton is then abandoned by the larva (Ślipiński 2010).

Diagnosis. *Stethorus tridens* is small, about 1.3 mm (Figures 2H & I); its body is grossly punctuated with abundant pilosity (Figures 2A-F), a characteristic shared with other species in the genus. The legs are yellow except for the 5/6 basal portion of the femora which are dark (Figure 3G); postcoxal lines are entire and short, characteristic

of the genus (Figures 2G, 3D). The male genitalia (Figures 3A-C & E) of *S. tridens* have a characteristic pair of membranous lateral projections at the basal lobe (Figure 3F). The abdominal lines are enclosed in a semicircle and reach about $\frac{1}{2}$ of the first ventrite (Figure 3D).

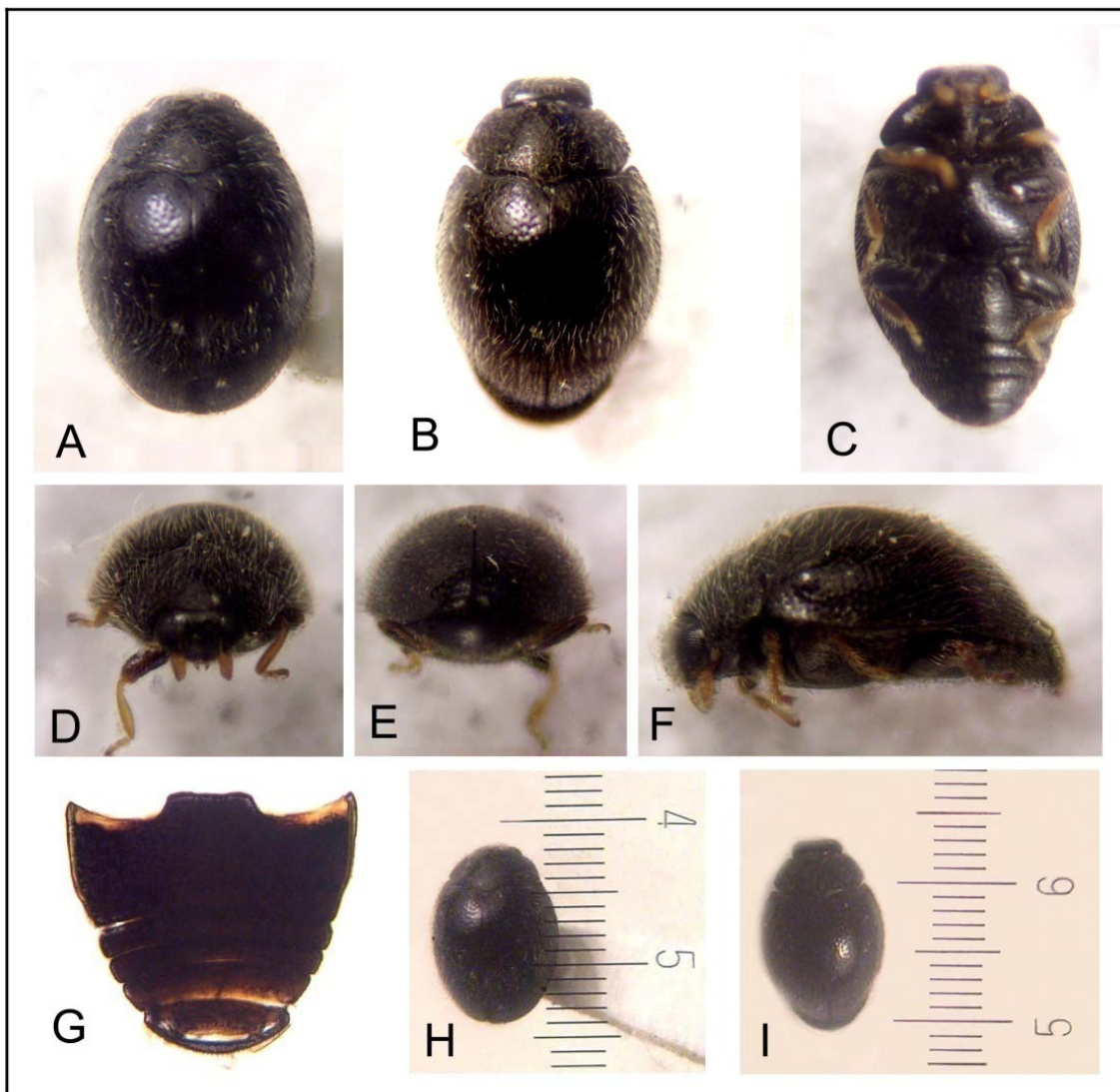


Figure 2. *Stethorus tridens* (Gordon), male. A-F, Habitus; G, abdomen; H, I, specimens showing relative size. Photos by G. González.

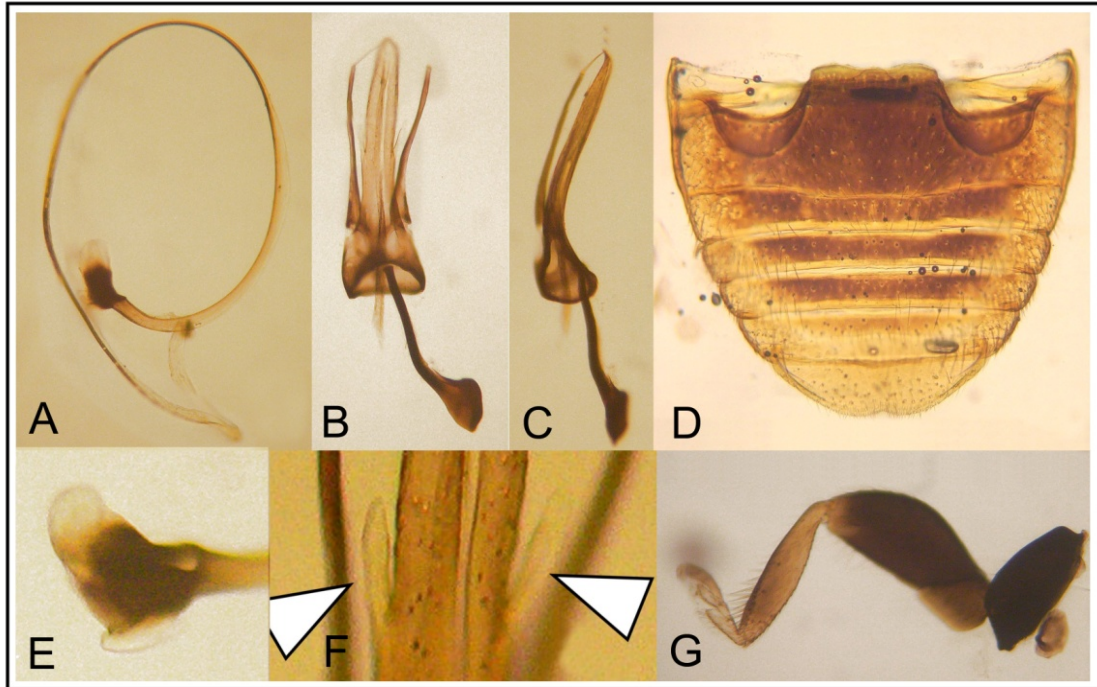


Figure 3. *Stethorus tridens* (Gordon), male dissection. A, siphon; B, C, ventral and lateral view of tegmen; D, abdomen (cleared); E, basal capsule; F, close-up of lateral projections of the basal lobe; G, anterior leg. Photos by G. González.

Distribution. In the present study, we found the species in Palmira, Valle del Cauca, but the species have already been reported from Colombia. *Stethorus tridens* is a New World species that is distributed in Peru (Tumbes, Lambayeque, Huanuco, Lima), Brazil (Recife), Honduras, Mexico and Puerto Rico (Gordon & Chapin 1983, González & Vandenberg 2007). In the original description of *S. tridens*, Gordon (1982) reported the species as occurring in Colombia in the following localities: Anolaima (Cundinamarca); Armero (Tolima); Cali (Valle del Cauca); Espinal, (Tolima); Rio Frio (Magdalena); and Santa Fé de Antioquia (Antioquia).

Known prey mite species of *S. tridens*. *Stethorus tridens* has been reported preying on various mite species including *Panonychus citri* (McGregor), *Tetranychus cinnabarinus* (Boisduval), *T. evansi* Baker & Pritchard, and *T. urticae* Koch (Gordon

& Chapin 1983). The present study is the first record of *S. tridens* preying upon *O. yothersi*.

DISCUSSION

As natural enemies of *O. yothersi* associated with avocado in the central zone of Chile, the closely related species *Stethorus histrio* Chazeau (Coleoptera: Coccinellidae) and *Oligota pygmaea* Solier (Coleoptera: Staphylinidae) have been reported as density dependent predators of mites (Vargas & Rodriguez 2008). Both beetles are capable of lowering down the populations of the pest when they reach medium to high population densities by feeding on different stages of the mite; and these two predators are considered the most important mortality factors of *O. yothersi* (Vargas & Rodriguez 2008).

Studies on the predatory activity of *S. tridens* on *Tetranychus evansi* Baker & Pritchard (Acari: Tetranychidae) have indicated that *S. tridens* is a promising predator of this mite (e.g., Fiaboe et al. 2007; Britto et al. 2009). The potential of *S. tridens* as a biological control agent of *O. yothersi* and other species of mite pests in Colombia should be evaluated in the future.

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