N O T E

Histiostomatid Mites (Histiostomatidae: Astigmata: Acarina) from Female Reproductives of the Red Imported Fire Ant (Hymenoptera: Formicidae)[1]

Igor M. Sokolov, Yuliya Y. Sokolova and James R. Fuxa[2]

Department of Entomology, Louisiana Agricultural Experiment Station, Louisiana State University Agricultural Center, Baton Rouge, LA 70803-1710 USA

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In May 2002, a live infestation of mites was found in a colony of red imported fire ants, *Solenopsis invicta* Buren, that had just been extracted from a field near St. Joseph, LA. No mites were found in 12 other colonies obtained from St. Joseph or from a site near Baton Rouge, LA. No mites were discovered in food debris or ant cadavers from the infested colony.

Mites infested predominantly dealate females; only a few were found on alate females, and none were on other castes. More than 100 minor and 30 major workers and 13 dealate and 24 alate females were examined. Among the 37 female fire ants examined, 85.7% of dealate females and 13.0% of alate females were infested (Fig. 1). Mites were predominantly on abdomens of dealate females, grouped mainly along the distal edges of the fourth to the seventh abdominal segments on both the ventral and dorsal surfaces. Only in heavy infestations were a few mites attached to legs (femurs) and to thoraxes. The average number of mites per ant varied: 23.6 mites (SD = 36.35, range 1-127) for dealate females, and 1.0 (SD = 0, no range) for alates.

All of the mites were nonfeeding deutonymphs (second nymphal instar or hypopus); no other instars or adults were discovered. The deutonymphs were small compared to hypopi of other known species (Hughes and Jackson 1958, Virg. J. Sci., 9: 5-198): average length (20 specimens), 124.4 µm (range 115.5-132.9); average width, 115.5 µm (range 106.6-124.2); length/width ratio, 1.08 (range 1.00-1.17). The mites were identified (OConnor 1982, *In* S. Parker [ed.], pp. 146-169, Synopsis and classification of living organisms. II. McGraw-Hill Book Company, New York) as members of order Acariformes, suborder Astigmata, Family Histiostomatidae, genus *Histiostoma* Kramer (Fig. 2A), based on the following characteristics (Hughes and Jackson 1958, Virg. J. Sci., 9: 5-198, with their abbreviations): (1) suctorial plate with 3 pairs of suctorial discs (pd 1—pd 3) and the median disc (pd 1) larger than other plate

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[2]Address inquiries (email: jfuxa@lsu.edu).

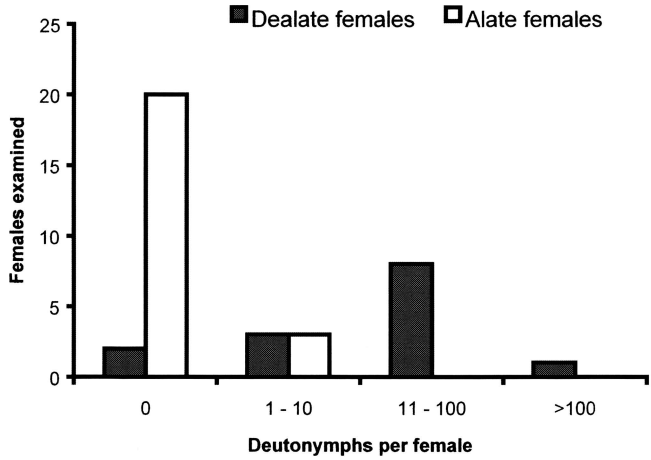

Fig. 1. Distribution of *Histiostoma* sp. deutonymphs among reproductive females of red imported fire ant.

discs (Fig. 2B); (2) leg IV without spoon-shaped terminal tarsal seta; (3) coxae I and III with discs (di 1 and di 2) (Fig. 2C, 2D); (4) fore legs with simple, non-divided claws (Fig. 2E). Deutonymphs of this mite differ from all known species of *Histiostoma* by their small size and by several important characters of chaetotaxy: (1) absence of minute pp2 and short pp1 setae (less than the length of genu II) on short gnathosoma (Fig. 2F); (2) small spine-shaped seta g 3 and very long seta ta4 (longer than half of tarsus I and longer than the cluster of setae ta1-ta3) on leg I (Fig. 2G). The discovered mite might represent a new species, but the lack of representatives of the adult stage does not allow us to make an adequate description.

Literature analysis revealed many records of association of mites with different ant species (Eickwort 1990, Annu. Rev. Entomol. 35: 469-488; Hölldobler and Wilson 1990, The Ants. The Belknap Press of Harvard University Press, Cambridge, MA), but only a few of them involved red imported fire ant (Wojcik 1990, *In* Vander Meer R. K. et al., [eds.], Pp. 329-344, Applied Myrmecology. A World Perspective. Westview Press, Boulder, San Francisco, & Oxford). The following families of Acarina have included inquilines of *Solenopsis* spp.: Gamasidae (Collins and Markin 1971, Ann. Entomol. Soc. Amer. 64: 1376-1380), Laelapidae (Hölldobler 1928, Biologisches Zentralblatt. 48: 129-142; Hermann et al. 1970, Proc. La. Acad. Sci. 33: 13-18; Hunter and Costa 1971, J. Georgia Entomol. Soc. 6: 51-53; Hunter and Farrier 1975, Acarologia 17: 595-623; 1976, Acarologia 18: 20-50), Trachytidae (Hermann et al. 1970), Uropodidae (Collins and Markin 1971, Hermann et al. 1970), Scutacaridae (=Disparipedidae) (Collins and Markin 1971, Travis 1941, Florida Entomol. 24: 15-22), and Acaridae (Collins and Markin 1971). Nonfeeding deutonymphs of *Histiostoma* attached to fire ant females were observed previously but were not described (Williams 1980, Semi annual report of research conducted on imported fire ants. USDA Report 80 [2], Gainesville, FL, and Gulfport, MS). The interaction of this mite with fire ants probably is phoretic, which is characteristic for most mites collected on red imported fire ant individuals (Wojcik 1990, *In* Vander Meer R. K. et al., [eds.], pp. 329-344,

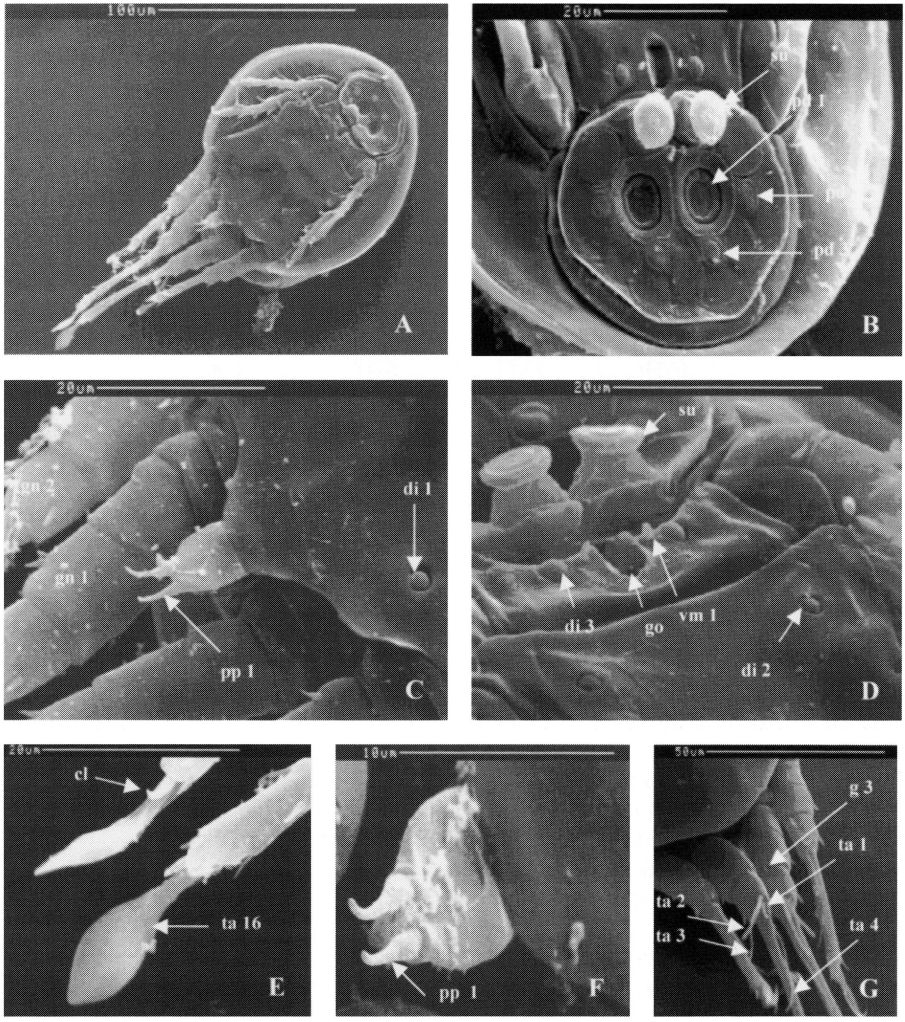

Fig. 2. Scanning electron micrographs of *Histiostoma* sp. deutonymphs: A. Ventral view of deutonymph; B. Suctorial plate (su - suckers; pd1 - pd3 - plate discs); C. Gnatosoma and foreparts of propodosoma (gn1 and gn2 - genu on leg1 and II, respectively; pp1 - setae on gnathosoma; di1 - coxal disc on coxae 1); D. Metapodosoma (di2 and di3 - coxal discs on coxa III and coxa IV, respectively; go - "genital opening"; su - functional suckers; vm1 - minute seta); E. Distal part of tarsus I (cl - nondivided claw; ta16 - spoon-shaped seta); F. Front-ventral view of gnathosoma (pp1 - setae; setae pp2 are absent); G. Dorsal view of forelegs (g 3 - small spine-shaped seta on genu I; ta 1 - ta 4 - setae on tarsus I). Nomenclature is according to Hughes and Jackson (1958, Virg. J. Sci., 9: 5-198).

Applied Myrmecology. A World Perspective. Westview Press, Boulder, San Francisco, & Oxford).

Representatives of the family Histiostomatidae are characterized by specific modification of the gnatosoma for filter feeding and by parthenogenesis. The first adaptation enables histiostomatid mites to occupy microniches with microorganism-rich water films in which they feed; the second permits them to quickly colonize new habitats, with a single female deutonymph capable of establishing a colony (OConnor 1982, Annu. Rev. Entomol. 27: 385-409). Astigmatid mites are mostly fungivorous in soil habitats (Curl 1988, CRC Critical Reviews in Plant Sciences 7: 175-196; Walter and Kaplan 1990, Pedobiologia 34: 281-286).

In view of the fact that mites were found on dealate females, they might have promise as vectors to introduce fungal pathogens for microbial control of red imported fire ant. Histiostomatid mites can be cultivated in a laboratory (Phillipsen and Coppel 1977, J. Kansas Entomol. Soc. 50: 496-502; Walter and Kaplan 1990), and they often are host-specific (Phillipsen and Coppel 1977; Eickwort 1979, Annu. Rev. Entomol. 35: 469-488; OConnor 1982). A question for further research about the mites' potential as vectors is whether they are susceptible to any fungal pathogens of *S. invicta.*

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