New Genus and Two New Species of Melicharini from Venezuela (Acari: Mesostigmata: Ascidae)

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ABSTRACT Adult males and females of a new genus, Xanthippe gen. nov., and two new species of the tribe Melicharini, family Ascidae, are described. These mites apparently feed on pollen or nectar in inflorescences of a palm, Socratea exorrhiza (Mart.) H. A. Wendl., and possibly have a phoretic association with beetles of the genus Mystrops Erichson (Nitidulidae), the major pollinators of this plant.

KEY WORDS Ascidae, flower mites, phoresy

In this article, we describe a new genus and two new species of Neotropical ascid mites associated with inflorescences of the palm Socratea exorrhiza (Mart.) H. A. Wendl. We describe these taxa to make names available for future phylogenetic and ecological studies on this group of mites, which is increasingly a focus of research among both systematists and ecologists. The new genus, Xanthippe gen. nov., is a member of the tribe Melicharini (as diagnosed by Lindquist & Evans 1965) (Mesostigmata: Ascidae). On the basis of phylogenetic studies (which will be presented in detail in a separate article), Xanthippe appears to be most closely related to the genera Rhinoseius Baker & Yunker, 1964, and Tropicoseius Baker & Yunker, 1964. Adults of all three genera lack setae z3 on the podonotal region, and they share the presence of lateral incisions on the dorsal shield and the enlargement of seta av1 on femur II in males. Adult Xanthippe also resemble adult Rhinoseius in the structure of the male inseminating apparatus and shape of the corniculi on the gnathosoma. The unique combination of characters listed below, however, validates their generic distinctiveness among the Melicharini.

Henderson (1985) first mentioned the mites described in this article in a study of the pollination biology of the palm Socratea exorrhiza. The specimens we have examined are from a fluid collection of floral material that Henderson made in Venezuela in connection with his published study. The same vial contained not only flowers and mites, but also nearly 200 beetles. The beetles are principally two to three species of Mystrops Erichson (Nitidulidae), which Henderson (1985) believes to be the principal pollinator of Socratea exorrhiza, but the collection also contained some specimens of Curculionidae and Staphylinidae. (Henderson [1985] provides tentative generic identifications for some of these beetles.) J. B. Kethley (personal communication to A. Henderson in Henderson [1985]) suggested a possible phoretic relationship between the mites and beetles. Kethley suspected the association to be similar to the relationship with hummingbirds characteristic of mites of the genera Rhinoseius and Tropicoseius and certain species of Proctolaelaps Berlese, 1923 (see Colwell & Naeem 1994 and references therein).

Inspection of the beetles collected from S. exorrhiza, however, revealed no mites attached to the insects, either to their appendages or under their elytra. Nevertheless, phoresy on beetles seems the most likely means by which these mites colonize the flowers of this plant. Socratea is monoecious, flowering for only two nights. The female flowers are open only the first night and the male flowers only the second night. Both beetles and mites appear simultaneously on the female flowers shortly after anthesis on the first night (A. Henderson, personal communication). Neither birds nor bats have been observed feeding on inflorescences of S. exorrhiza. Numerous small flies and bees visit the inflorescences, but do so only during the daytime following female anthesis, within hours after the nocturnal opening of the flowers and their colonization by beetles and mites (Henderson 1985).

The structure of the feeding apparatus of the mites, with their shortened cheliceral digits and reduced dentition, seems to exclude the possibility of predatory habits and indicates that mites of the new genus may feed on the palm pollen or nectar, much as do those of the related taxa Rhinoseius and Tropicoseius (Dobkin 1984, Heyneman et al. 1991) and flower-dwelling Proctolaelaps (Colwell 1995, Paciorek et al. 1995).

Materials and Methods

Systematic observations, measurements, and illustrations were made using a Zeiss compound mi-
croscope equipped with a differential interference contrast optical system and a drawing tube. Measurements were taken with a stage-calibrated eye-piece micrometer and are expressed as ranges of micrometers. Dorsal shield length measurements were taken as midline length from the anterior margin between setae j1 to the caudal margin between setae j5. Dorsal shield width measurements were taken at the level (indicated for each sex) where the podonotal part of the dorsal shield was the widest. Corresponding setae were measured on both sides of the body, and when their length differed both values were recorded. Length of the spermatodactyl indicates the distance from the base of the movable chela to the apex of the spermatodactyl. Setal notation for the idiosoma is based on Lindquist & Evans (1965) and for legs on Evans (1963). All specimens were mounted individually in Hoyer’s medium and ringed with GLPT insulating varnish (GC Electronics, Rockford, IL). The holotype and a number of paratypes of each new species are deposited in the Canadian National Collection of Insects and Arachnids, Centre for Land and Biological Resources Research, Agriculture Canada, Ottawa; additional paratypes are deposited in the Department of Ecology and Evolutionary Biology, University of Connecticut, Storrs, and Institut Royal des Sciences Naturelles de Belgique, Brussels.

**Xanthippe, New Genus**

**Type Species.** *Xanthippe clavisetosa*, new species.

**Diagnosis.** Dorsal shield of adults of both sexes with deep lateral incisions; setae z3 absent; either some marginal (r-R) setae on shield or all these setae on soft cuticle. Endopodal plates of male beside coxae III-IV united anteriorly with sternogential shield; those of female free; female with a pair of presternal plates and with first pair of sternal setae (st1) on soft cuticle in front of sternal shield. Ventral and anal shields in male separate; metapodal plates of male either free or fused with ventral shield; hyaline anterior part of female genital shield rounded; genital setae st5 inserted on genital shield in female; paragenital setae and ventral shield absent in female; anal shield in both sexes small. Both sexes with anterior margin of tectum smoothly rounded; deutosternum with 7 equally wide rows of denticles, 6th and 7th rows connected to anterior rows; movable chela of chelicera with one tooth; fixed digit of chelicera of male with one subapical tooth, that of female with 3 subapical teeth, with pils dentilis modified into hyaline lobe; spermatodactyl simple, short, directed ventrad or posterovertrud. Seta pd2 missing from tibia III. Leg II of male with several enlarged spine-like setae, including at least av1 and pd2 on femur, av1 on genu, and av1, av2, av3 on tarsus.

**Male. Dorsum.** Dorsal shield with lateral incisions reaching almost the level of setae z6 between setae s6 and S1, not connected by transverse suture; shield smooth or with ornamentation restricted to opisthonotal region; setae z3 absent; of marginal setae, at least r2-r3 on shield, opisthonotal R setae usually on soft cuticle, or less frequently, some on shield; j1 always longer than j5; peritremes reaching or slightly surpassing level of setae r2. Most of dorsal setae slightly constricted at bases; Z5 sometimes modified, club-like.

**Venter.** Sterngenital shield not modified, with 5 pairs of sternal setae and 3 pairs of pores; endopodal plates united anteriorly with sternogential shield; no paragenital setae. Ventral shield never fused with anal shield, either large, transverse, with 6 pairs of setae, and fused with metapodal plates, or strongly reduced, with 2–3 pairs of setae, and metapodal plates free. Anal shield roughly subcircular. Ornamentation of shields on venter usually restricted to reticula on vental and anal shields, but sometimes sternogential shield distinctly reticulated as well.

**Gnathosoma.** Tectum short, anterior margin smoothly rounded. Deutosternum with 7 rows of equally, moderately wide denticles; all rows connected; caputular setae slightly shorter than anterior rostral pair; corniculi with their inner margins divergent; al on palpfemur, and a1l and a12 on palpgenu unmodified; apotele on palptarsus two-finned. Fixed digit of chelicera unidentate; pils dentilis modified into hyaline lobe; movable chela with one tooth; spermatodactyl short and simple, directed ventrad or posterovertrud.

**Legs.** Coxae I without denticles. Leg II not appreciably stouter than remaining pairs; seta ac1 on femur somewhat enlarged, spine-like; genu and tibia with setae av1 thicker then rest of setae; av1–av3 on tarsus modified, with enlarged, bulbous bases; all setae always shorter than width of their respective articles. Setation of genua of legs I, II, III, IV, respectively, 13-11-9-9; that of tibia: 13-10-8-10 (seta pl2 missing from tibia III).

**Female. Dorsum.** Dorsal shield with distinct lateral incisions almost reaching level of setae z6, never connected by transverse suture; z3 absent; marginal setae r and R setae usually on soft cuticle, sometimes r2-r3 and R3 on shield; dorsal setae short, subequal. Setae j1 always longer than j5; Z5 not modified in shape.

**Venter.** Anterior part of sternal shield reduced, first pair of sternal setae (st1) on soft cuticle in front of shield, accompanied by a pair of small presternal platelets; third pair of sternal setae (st3) either on shield or on soft cuticle. Genital shield with anterior margin of hyaline part rounded; posterior margin of shield either broadly rounded or somewhat angular; genital setae st5 inserted on genital shield in female. Endopodal plates between coxae III and IV free. Anal shield small, about as wide as posterior margin of genital shield, roughly circular, with paraanal, and postanal setae; metapodal plates very small; 13–14 pairs of setae on opisthoventral region (Iv1–Iv5, Zv1–Zv5, St2–St6, Zs1–Zs5, Zs6–Zs8, Zs9–Zs11).
UR1-UR2; some of these setae may be missing from one or both sides of the opisthoventral region). Inseminating apparatus indiscernible, not obviously sclerotized.

*Gnathosoma.* Tectum usually shorter than that of male, smoothly convex. Corniculi more slender than for male, inner margins parallel; fixed digit of chelicera tridentate and with pilus dentilis modified into hyaline lobe; movable chela with one tooth, and with mucronate process ventrally.

*Legs.* As in male except for lack of modified setae on leg II.

**Etymology.** This new genus bears the name of the wife of the Greek philosopher, Socrates, for whom the host genus *Socrates* is named.

**Species Included.** *Xanthippe clavisetosa* sp. nov. and *Xanthippe hendsenii* sp. nov.

**Differential Remarks.** This new genus clearly belongs to Melicharini, as diagnosed by Lindquist & Evans (1965). Within the known Melicharini, *Xanthippe* is probably most closely related to *Rhinoseius* sensu Lindquist and Evans 1965, based on the shared derived structure of the chelicera, which lacks multiple dentition on its basal part. Based on results of a cladistic analysis (P. N. & R.K.C., unpublished data), however, we believe that *Rhinoseius* sensu Lindquist and Evans, although undoubtedly a monophyletic lineage, should be divided into two genera, corresponding to the genera *Rhinoseius* and *Tropicoseius* as originally described by Baker and Yunker (1964).

*Xanthippe* can be distinguished from *Rhinoseius* (as originally described) by the following combination of character states: (1) endopodal plates united anteriorly with the sternogential shield beside coxae III–IV in males (absent or free in *Rhinoseius*); (2) setae *pl2* present on tibia IV (absent in *Rhinoseius*); (3) sternal setae *st1* on soft cuticle in front of the sternal shield, accompanied by a pair of presternal plates in females (setae *st1* on shield in *Rhinoseius*); (4) anterior margin of the female genital shield rounded (truncated or incised in *Rhinoseius*); (5) podonotal setae *s6* present in both sexes (absent in *Rhinoseius*); and (6) most of dorsal setae slightly constricted at bases (not constricted in *Rhinoseius*).

*Xanthippe* differs from *Tropicoseius* Baker & Yunker, 1964 (as originally described) in the following combination of character states: (1) seta *pl2* missing from tibia III; (2) setae *pt1* and *pt2* on tarsus II not modified in male (knob- or spine-like in *Tropicoseius*); (3) no modified setae on tarsus III in male (*av2* always, and *pt1* and *av3* usually knob-like in *Tropicoseius*); (4) male spermatodactyl directed ventrad or posterovertrard (anterior in *Tropicoseius*); (5) movable chela of chelicerae in both sexes unidentate (edentate in *Tropicoseius*); and (6) inner margins of corniculi in male divergent (convergent or parallel in *Tropicoseius*). The following characters are tentatively (pending further, more detailed cladistic analyses of Melicharini) regarded as autapomorphic for the new genus:

1. movable chela of chelicera with one prominent tooth; (2) anterior part of female sternal shield reduced so that setae *st1* on soft cuticle, accompanied by small platelets; and (3) setae *av1-av3* on tarsus II in male with enlarged, bulbous bases.

*Xanthippe clavisetosa,* New Species

(Figs. 1–9)

**Diagnosis.** Dorsal shield of both sexes with reticulate ornamentation present only on opisthonal region, and with setae usually subequal and comparatively short (about half as long as distance between adjacent setal insertions); setae *Z5* of male club-shaped, noticeably dilated at apices; all remaining setae in both sexes slightly dilated in central region of each seta; female with posterior setae *J4, Z4, S5* as short as *J5*. Male with separate large, transverse ventral shield and smaller, subcircular anal shield, both shields distinctly reticulate; no separate metapodal plates. Second leg of male only slightly enlarged, with setae *av1-av3* on tarsus having enlarged, bulbous bases. Sternal, genital and anal shields of female distinctly reticulate; setae *st1* on soft cuticle in front of sternal shield, sometimes also *st3* on soft cuticle behind shield; posterior margin of genital shield broadly rounded. Peritremes in both sexes reaching level of setae *r2*.

**Male.** Dorsal shield 390–410 μm long, 210–220 μm wide (measured at level of setae *s3*; 10 specimens), with lateral incisions almost reaching level of setae *s6*; reticulation in opisthonal region only, becoming more distinct towards posterior end of shield (Fig. 1). Dorsal shield with 32–35 pairs of smooth, centrally dilated setae, including 17–19 pairs of podonotal and 15–16 pairs on opisthonal regions; marginal setae *r2, r3,* and *R3* either on soft cuticle or on dorsal shield, other marginals on soft cuticle. Most dorsal setae of similar lengths (13–19 μm); *z3* absent; *Z5* distinctly thicker and longer (38–42 μm) than remaining dorsal setae, club-like, with noticeably dilated apices.

Tritosternum typical for Melicharini, with trapzoidal base and slender, tapering pilose laciniae. Sternoteginal shield with 5 pairs of setae and 3 pairs of pores; posterior aspect of shield with distinct elongate reticula. Ventral and anal shields separate; ventral shield large, 3 times as wide as long, distinctly reticulate, with setae *Jv1, Jv2, Zv1-Zv3 and Sv2* on shield; anal shield smaller, subcircular, distinctly reticulate; no separate metapodal plates, these overrun by ventral shield (Fig. 2). All ventral setae short, subequal in length (10–11 μm). Peritremes extending anteriad to level of setae *r2*.

**Gnathosoma** with tectum broadly rounded apically, with smooth margin (Fig. 6). Fixed digit of chelicera unidentate; movable chela with short (100–110 μm), straight spermatodactyl directed posterovertrard (Fig. 8). Deutosternum with 7 transverse rows of denticles, all connected, multidenticate, none widened. Rostral setae simple, slender, all pairs of almost equal length; capitular...
setae slender, simple. Corniculi slender, their inner margins divergent; internal malae extending to tip of corniculi (Fig. 7).

Leg II only slightly stouter than remaining pairs, weakly incurved ventrally between femur and tarsus; femur with seta av1 stout, spine-like; genu and to lesser extent tibia with seta av1 stouter than rest of their setae; tarsus with setae av1-av3 modified, having enlarged, bulbous bases (Fig. 5). Coxa I without rows of denticles. Leg setation as noted for genus.

**Female.** Dorsal shield 460–478 μm long, 240–245 μm wide (measured at level of setae s4; 10 specimens), with distinct, narrow lateral incisions between setae s6 and S1 extending nearly to level of setae z6, reticulation present only in opisthontal region, becoming more distinct towards posterior end of shield (Fig. 3). Dorsal shield with 32 pairs of smooth, medially dilated setae, including 17 pairs on podonotal and 15 pairs on opisthontal regions; marginal r, R and submarginal UR setae on soft cuticle laterally; dorsal setae collectively subequal (24–29 μm), except distinctly shorter setae j3, J4, J5, Z4, and S5 (6–8 μm), and longer Z5 (35–40 μm).

Tritosternum as in male. Sternal shield sometimes with only st2 and 2 pairs of pores, setae st1 on soft cuticle in front of shield, st4, third pair of sternal pores, and usually st3 on soft cuticle behind shield; sternal shield distinctly reticulate over most of surface; endopodal plates discernible. Genital shield distinctly reticulate, slightly widened behind genital setae, with broadly rounded posterior margin. Metapodal plates small, approximately 12 μm long, 6 μm wide. Anal shield roughly trapezoidal in outline, distinctly reticulate; postanal seta only slightly longer than paraanal setae (Fig. 4). Fourteen pairs of opisthogastric setae on soft cuticle around anal shield, all similarly short (7–9 μm). Inseminating apparatus not discernible.

Tectum with anterior margin smoothly rounded, sometimes less pronounced than that of male. Fixed digit of chelicera tridentate, movable chela unidentate; ventral mucro short, not surpassing half of movable chela (Fig. 9). Corniculi more slender than in male; their inner margins parallel. Leg chaetotaxy as in male, except leg II not thickened or incurred, lacking modified setae.

**Etymology.** The specific name clavisetosa reflects the presence of a pair of modified, club-like setae caudally on the dorsal shield in males.

**Material Examined.** VENEZUELA, Territorio Federal Amazonas, Departamento Río Negro, mouth of Cañon Grande on the Río Mawarinuma, Cerro de la Nebina Expedition’s base camp (00° 50’ N; 66° 10’ W), elevation 140 m, from inflorescences of the palm Socratea exorrhiza (Arecaceae), along with numerous adult Mystrops spp. (Coleoptera, Nitidulidae) as well as several individuals of Curculionidae and Staphylinidae, 28 February 1984, collection of Andrew Henderson—13 males.
21 females (including holotype male and allotype female).

**Xanthippe hendersoni**, New Species
(Figs. 10–17)

**Diagnosis.** Dorsal shield of both sexes with no discernible ornamentation and with setae generally subequal and moderately short (approximately two-thirds as long as distance between adjacent setal insertions); setae $Z5$ of male longer than remaining dorsal setae, otherwise not modified; all dorsal setae in both sexes slightly dilated in the central region of each seta; female with posterior setae $J4$, $Z4$, $S5$ twice as long as $J5$. Male with separate transverse ventral shield, often strongly reduced, and subcircular anal shield; both shields distinctly reticulate; metapodal plates either separated or fused with ventral shield. Second leg of male not noticeably enlarged, with setae $av1$-$av3$ on tarsus having enlarged, bulbous bases. Genital and anal shields of female weakly ornamented; sternal shield lacking ornamentation; setae $st1$ on soft cuticle in front of sternal shield; posterior margin of genital shield angular. Peritremes in both sexes reaching or surpassing level of setae $s2$.

**Male.** Dorsal shield 402–420 μm long, 222–246 μm wide (measured at level of setae $s3$; 3 specimens), with lateral incisions reaching nearly to level of setae $z6$; dorsal shield smooth, with no reticulation discernible (Fig. 10). Dorsal shield with 41–42 pairs of smooth, centrally dilated setae, including 22 pairs on podonotal and 19–20 on opisthonotal regions; marginal setae $r2$-$r6$ and $R2$-$R4$ on dorsal shield. Most dorsal setae of similar lengths (22–33 μm), except for $J3$ distinctly shorter (6–7 μm); $z3$ absent; $Z5$ distinctly longer (75 μm) than remaining dorsal setae, but otherwise not modified; $J5$ very short (5–6 μm).

Tritosternum typical for Melicharini, with short, trapezoidal base and slender, tapering, pilose laciniae. Sterngenital shield with 5 pairs of setae and 3 pairs of pores; posterior part of shield with faint longitudinal ornamentation. Ventral and anal shields separate; ventral shield either large and fused with metapodal plates, or reduced to various degrees; in the latter case metapodal plates free; setae $Jv1$ and $Zv1$ always on shield; $Jv2$ and $Zv2$ either on soft cuticle or on shield, depending on degree of its reduction; reticulation of shield distinct; anal shield subcircular, distinctly reticulate (Fig. 11). All ventral setae short, subequal in length

Figs. 3 and 4. X. clavisetosa gen. et sp. nov., female: 3, idiosomal dorsum; 4, idiosomal venter.
Figs. 5–9. *X. clavisetosa* gen. et sp. nov.: 5, leg II, excluding pretarsus, posterolateral view, male; 6, tectum, male; 7, venter of gnathosoma, male; 8, chelicera, lateral (antiaxial) view, female; 9, chelicera, lateral (antiaxial) view.
Figs. 10 and 11. *X. hendersoni* gen. et sp. nov., male: 10, idiosomal dorsum; 11, idiosomal venter.

(10–12 μm). Peritremes extending anteriad to level between setae *r2* and *s2*.

Gnathosoma with tectum broadly rounded apically, with smooth margin (Fig. 14). Fixed digit of chelicera bidentate; movable chela unidentate, with short (64–66 μm), straight spermatodactyl, directed ventrad (Fig. 16). Deutosternum with 7 transverse rows of denticles; all connected, multidenticulate, none widened. Rostral setae simple, slender, all pairs of almost equal length; capitular setae slender, simple. Corniculi slender, slightly divergent; internal malae slightly exceeding tips of corniculi (Fig. 15).

Leg II not appreciably stouter than remaining pairs, weakly incurved ventrally between femur and tarsus; femur with seta *av1* spine-like, but not greatly enlarged; genu with seta *av1* only slightly stouter than rest of setae; tarsus with setae *av1-av3* modified, having enlarged, bulbous bases (Fig. 17). Coxa I without rows of denticles. Leg setation as noted for genus.

**Female.** Dorsal shield 414–420 μm long, 240–258 μm wide (measured at level of setae *s4*; 10 specimens), with distinct, narrow lateral incisions between setae *s6* and *S1* extending nearly to level of setae *z6*; reticulation very weak, restricted to anterolateral regions of shield (Fig. 12). Dorsal shield with 32 pairs of smooth, medially dilated setae, including 17 pairs on podonotal and 15 pairs on opisthonal regions; marginal *r*, *R* and *UR* setae usually on soft cuticle laterally, but sometimes *r2-r3* and *R3* on dorsal shield; dorsal setae collectively subequal (18–24 μm), except distinctly shorter setae *j3* and *J5* (8–9 μm), and longer *Z5* (33–36 μm).

Tritosternum as in male. Sternal shield with only *st2* and *st3*, and 2 pairs of pores, setae *st1* on soft cuticle in front of shield, *st4* and third pair of sternal pores on soft cuticle behind shield; sternal shield with no reticulation; endopodal plates discernible. Genital shield with distinct longitudinal ornamentation; slightly widened behind genital setae, its posterior margin angular. Metapodal plates small, ≈15 μm long, 9 μm wide. Anal shield roughly circular, usually with distinct reticulation; postanal seta only slightly longer than paraanal setae. Thirteen to 14 pairs of opisthogastric setae on soft cuticle around anal shield, all setae similarly short (Fig. 13). Inseminating apparatus not discernible.

Tectum with anterior margin smoothly rounded, shorter than that of male. Fixed digit of chelicera
tridentate, movable chela unidentate; ventral micro short, not surpassing half of movable chela. Corniculi more slender than in male; their inner margins parallel.

Leg chaetotaxy as in male, except leg II not thickened or incurved, and lacking modified setae.

Etymology. Named in honor of the collector, a prominent palm systematist and pollination biologist, Andrew Henderson.

Material Examined. VENEZUELA, Territorio Federal Amazonas, Departamento Rio Negro, mouth of Cañon Grande on the Río Mawarinuma, Cerro de la Neblina Expedition’s base camp (00°50' N; 66°10' W), elevation 140 m, from inflorescences of the palm Socratea exorrhiza (Areaceae), along with numerous adult Mystrops spp. (Coleoptera, Nitidulidae) as well as several individuals of Curculionidae and Staphylinidae, 28 February 1984, coll. Andrew Henderson—4 males, 171 females (including holotype male and allotype female).

Remarks. Two biological features of our current knowledge of Xanthippe deserve comment. First, the two known species of the genus were collected in substantial numbers from the same inflorescence of the same host plant species (Socratea exorrhiza) (A. Henderson, personal communication). If, as we suppose, these mites feed on the pollen and nectar of their host plant, like hummingbird flower mites (Rhinoseius, Tropicoseius, and hummingbird-affiliated Proctolaelaps), then the cooccurrence of two very closely related, congeneric mite species in the same host species is quite unusual for mites in this ecological role. Although particular species of the three hummingbird flower mite genera routinely cooccur in particular host plant species, typically the species that share a host are noncongeners (most frequently a Tropicoseius species and a Proctolaelaps species) (Colwell 1986a, 1986b). Unless one of the two Xanthippe species normally breeds in a different host plant (for which we have no evidence), then patterns of host affiliation in this genus may be unlike the patterns typical of hummingbird flower mites.

The second unusual feature becomes apparent upon comparing the sex ratio of the two Xanthippe species. At least in Henderson’s collections, X. clavisetosa has an approximately unbiased sex ratio (60% females, 21 females out of 34 total). In contrast, X. hendersoni has an extremely female-biased sex ratio (98% females, 171 females out of 175 total). Among hummingbird flower mites, approx-
imately unbiased sex ratios are typical of species that breed in large inflorescence-based groups (which tend to live in host-plant species with large flowers or many open flowers per inflorescence), whereas extreme female bias is common among species that have very small breeding groups (generally in host-plant species with a few small flowers per inflorescence) (Wilson & Colwell 1981, Colwell & Naeem 1994). In the collections we have studied from *Socratea exorrhiza*, which bears inflorescences with hundreds of flowers simultaneously in bloom, both *Xanthippe* species are extremely abundant (hundreds or thousands of individuals per inflorescence). Thus, if the selective processes that operate on sex ratio in hummingbird flower mites operate in *Xanthippe*, we are left with the suggestion that *X. hendersoni* typically lives in smaller groups in a different host plant.

Obviously, further field study of mites of the genus *Xanthippe* and their host plants are needed to test this hypothesis. On the basis of the conservative nature of host affiliations among lineages of hummingbird flower mites (P. N. & R.K.C., unpublished data), we suggest the best place to look for additional *Xanthippe* species is in palm flowers.

Acknowledgments

We are indebted to A. Henderson (The New York Botanical Garden, Bronx) for providing the specimens of mites on which this study is based. We also thank E. E. Lindquist (Centre for Land & Biological Resources Research, Agriculture Canada, Ottawa) for valuable criticism and comments on the manuscript.

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Received for publication 19 September 1994; accepted 15 November 1994.