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A new species of *Eutarsopolipus* (Acari: Podapolipidae) from Costa Rican *Pasimachus* spp. (Coleoptera: Carabidae)

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(With 6 figures)

Abstract

Eutarsopolipus ochoai n. sp. (Acari: Podapolipidae) is described from the Costa Rican beetles, *Pasimachus rotundipennis* and *P. intermedius* (Coleoptera: Carabidae) and is compared with five species known from North America.

In the process of examining large numbers of insects in the Entomology Museum of the University of Georgia, podapolipid mites were found at wing bases and the dorsal surface of the abdomens of carabid beetles. Additional mites were removed from Costa Rican carabid beetles obtained from the U.S. National Museum of Natural History. Mites in the family Podapolipidae (Acari: Heterostigmata) are all parasites of insects. The genus *Eutarsopolipus* is restricted to Carabidae (Coleoptera) and occurs worldwide. The genus was erected by Berlese for *Eutarsopolipus lagenaeformis* Berlese, 1913. More than 30 species have been discovered, most of them described by Regenfuss (1968, 1974) from European carabid beetles. *Eutarsopolipus* spp. from North America include *E. latus* Regenfuss, 1974, *E. inermis* Regenfuss, 1974, *E. regenfussi* Husband and Swihart, 1984, and *E. porteri* Husband, 1993. *E. crassisetus* Regenfuss, 1968 has been introduced from Europe. No *Eutarsopolipus* spp. have been described form Central or South America although the genus is known to occur in both regions.

The purpose of this paper is to describe *Eutarsopolipus ochoai*, new species, collected from *Pasimachus rotundipennis* Chevr. and *P. intermedius* Chaud. (Coleoptera: Carabidae) found in Puntarenas Prov., Costa

Rica and to compare *E. ochoai* with the other 5 species known from the Western Hemisphere.

Measurements were taken with the aid of a Wild microscope and drawing tube with a stage micrometer. All measurements are in micrometers. Terminology is based on Lindquist (1986).

Family Podapolipidae Ewing, 1922
Genus *Eutarsopolipus* Berlese, 1913

Eutarsopolipus ochoai sp. n.

DERIVATIO NOMINIS. This species is named for the Costa Rican acarologist, Ronald Ochoa, in recognition of his stimulus for the study of Podapolipidae in Central America.

FEMALE (Figs 1, 2). Gnathosoma length 55-60, width 47-55. Palp length 14-18; cheliceral stylets 57-67, pharynx width 12-17, dorsal gnathosomal setae 20-29, ventral setae 20-25. Stigmata inconspicuous. Idiosoma: length 300 (newly molted)-580, width 238-320. Prodorsal plate length 90, width 178; setae v_1 18-23, v_2 14-18, sc_1 vestigial, sc_2 70, setae situated close to posterior margin of prodorsal plate. Distance between setae v_2 greater than distance between setae v_1; v_2 lateral to a line connecting v_1 and sc_2 Plate C length 62-77, width 268-320; length *vs.* width ratio 4.0- 4.4: 1. Setae c_1 5-6, c_2 6-8. Plates *D*, *EF*, *H* not clear; setae *d* 4-8, setae *f* 7-8. Venter with apodemes 1, 2 slightly developed, apodeme 2 not meeting sternal apodeme medially; sternal apodeme usually not extending beyond level of apodemes 2. Coxal setae *1a* 3-5, 1 of 6 specimens with left *1b* 1; *2a* 4-5, 1 of 6 specimens with left *2b* 3; setae *1a* situated posterior to the level of junction of apodemes 1 and at a distance from apodeme 1 of 6-8 times the diameter of setal sockets. Distance between setae *2a* much greater than the distance between setae *1a*; setae *2a* nearer sternal apodeme than trochanters II. Coxal setae *3a* and *3b* 3-5, thin. Legs: leg setation as in Table 1. Ambulacrum I with a terminal stout claw, ambulacrum II, III with moderate claws. Single tarsus I spine, 2 terminal spines on each of tarsi II, III. Tarsus I solenidion *omega* 5-7; tarsus II solenidion *omega* 4-5. Tibia I solenidion *phi* 8-9, seta *k* 3-6. Tibial I, II, III setae *d* 32-38, 20-31 and 14-24 respectively. Tarsus I setae *p'* and *u"* clear on some specimens.

Table 1. Setae on legs of *Eutarsopolipus ochoai* n. sp.

	Leg I				Leg II				Leg III			
	F	G	Ti	Ta	F	G	Ti	Ta	F	G	Ti	Ta
Female												
Setae (sol./spines)	3	2	7	10	0	1	4	8	0	1	4	7
Solenidia	0	0	1	1	0	0	0	1	0	0	0	0
Male												
Setae (sol./spines)	1	0	7	10	0	0	4	8	0	0	4	7
Solenidia	0	0	1	1	0	0	0	1	0	0	0	0
Larval Female												
Setae (sol./spines)	3	2	7	9	0	1	4	7	0	1	4	5
Solenidia	0	0	1	1	0	0	0	1	0	0	0	0

MALE (Figs 3, 4). Gnathosoma: length 33-45, width 30-46, palps 10-12; cheliceral stylets 25-31, pharynx width 7-8, dorsal setae 8-13, ventral setae 6-9. Idiosoma: length 180-222, width 132-206. Prodorsal plate length 81, width 134; setae v_1 13-20, v_2 9-12, setae sc_1 vestigial, setae sc_2 35-62. Distance between setae v_2 greater than distance between setae v_1; setae v_2 lateral to a line connecting setae v_1 and sc_2. Plates *C* and *D* fused, setae c_1 2-5, c_2 5-8, *d* 5-8 and *f* 5-7. Plate *EF* length 25-29, width 50-63. Plate *H/Ps* length 32-39, width 35-39, setae h_1, h_2 vestigial. Venter with apodemes 1, 2 and sternal apodeme conspicuous but apodemes 2 and the continuing portion of the anterior sternal apodeme weakly sclerotized; coxae III separated medially. Setae *1a* 3-4, *2a* 2-4, *3a* thick 2-3, *3b* thick 3. Legs: leg setation as in Table 1. Ambulacrum with 1 straight claw, ambulacra II, III with weak claws. Single tarsal I spine, 2 terminal spines on each of tarsi II, III. Tarsus I solenidion *omega* 5, tarsus II solenidion *omega* 3-5; tibia I solenidion *phi* 7-8, seta *k* 2. Tarsal setae *p'* and *u'* clear in some specimens.

LARVA (Figs 5, 6). Gnathosoma length 37-43, width 34-38, palps 12; cheliceral stylets 40-49, pharynx width 8-10, dorsal setae 20-26, ventral setae 10-15. Idiosoma: length 206-217, width 152-170. Prodorsal plate narrow anteriorly, setae v_1 22-27, v_2 12-17, sc_1 vestigial, sc_2 100. Distance between setae v_2 greater than distance between setae v_1; setae v_2 lateral to a line connecting setae v_1 and setae sc_2. Plates *C*, *D* fused anteromedially, setae c_1 6-7, c_2 8-10, setae *d* 10-14. Setae c_1 and c_2 situated nearly in a straight line on the anterior 1/3 of plate *C*. Plate *EF* oval, length 23-40, width 55-63, setae *f* 8-12. Plate *H* length 28-30, width 30-33; setae h_1 80-145, h_2 1-2, distance between setae h_1 2, distance between setae h_2 10-13. Venter with apodemes 1, 2 and sternal apodeme conspicuous but weakly sclerotized. Setae *1a* 4-5, *2a* 3-5, *3a* 2-5 and *3b* 3-5, all thin. Legs: leg

setation as in Table 1. Ambulacrum I with 2 moderate claws, ambulacra II, III with small claws. Single tarsus I seta *s* spinous 5-7, two terminal tarsi II, III spines 5-8. Tarsus I and II solenidia *omega* 4-5, solenidion *phi* 6-8, adjacent seta *k* 2-3. Setae *tc'* 9-10, *tc"* 10-11.

HOST AND LOCALITY. Holotype female: from Solomon on Rio Coton, Puntarenas Prov., Costa Rica from under elytra of *Pasimachus rotundipennis* (Carabidae) collected by J. N. Baird, 19 Feb. 1965. Deposited in the Zoological Museum, Hamburg (ZMH), Germany (Reg. No. A30/85; 630). Location of host beetle unknown. Paratypes: 2 females, 2 males, 4 larval females with same host, locality collector and Reg. No. as holotype, deposited in ZMH; 6 females, 6 males and 6 larval females from *P. intermedius*, Las Cruces, Puntarenas Prov., Costa Rica, 18 Feb. 1970, collected by M. Kzsctarab, host beetle in U.S.N.M.N.H. (RWH 18270-1). One paratype, each stage, deposited in ZMH (Reg. No. A50/94) and Instituto Nacional Biodiversidad (INBio), Heredia, Costa Rica. Two paratypes, each stage, deposited in the U. S. National Museum of Natural History, Washington, D.C. and the Acarological Collection, Adrian College, Adrian, MI, U.S.A.

REMARKS. Regenfuss (1968) divided *Eutarsopolipus* into seven groups. The *acanthomus* group is characterized by females with vestigial setae v_1, v_2, with genu III seta *l'*, strong claw on leg I and no claws on ambulacra II, III. The North American species, *E. crassisetus* (introduced), and *E. porteri* fit in this group. *E. inermis* fits in the *pterostichi* group as modified by Regenfuss (1974): v_1, v_2 evident, no genu III seta, male genital capsule bluntly conical, larval setae h_2 long and widely separated, stigma of female inconspicuous, small setae *l'* and *d* on femur I and short solenidia *omega* on tarsi I, II. *E. latus* and *E. regenfussi* fit in the *E. desani* group as described by Regenfuss (1974): v_1, v_2 evident, no genu III seta, genital capsule longer than wide and concave laterally. *E. ochoai* fits in none of the seven groups described by Regenfuss and must be considered an eighth group: females with long setae v_1, v_2 and sc_2, femur I seta *l'* short, with genu III seta *l'*, with moderate claws on legs II, III, inconspicuous stigma, minute h_1, h_2 setae, male genital capsule about as long as wide and slightly biconcave, larval female setae h_2 minute.

Only *E. crassiceps* Regenfuss, 1974 from India and *E. ochoai* sp. n. have females with cheliceral stylets which exceed 60 µm. Most species of *Eutarsopolipus* have females with cheliceral stylets in the range of 30 to 50. It is also rare for larval female *Eutarsopolipus* to have setae h_2 reduced to vestiges. Tibial and tarsal setal patterns are the same in males and females but larval females have fewer tarsal setae. Males lack genual setae on legs I, II, III while larval and adult females have genual setae. Males also lack tibia I setae *l'* and *v'*. Both setae are present in the other stages. Along with the usual 8 setae observed on tarsus I (Lindquist, 1986), *p'* and *u"* are clear in some adult females and males. Likewise on tarsus II, in addition to the six setae described by Lindquist (1986), setae *pv'*, *pv"* and *p'* or *u"* are clear

on some specimens. These observations were confirmed by Dastych (personal communication, 1994). Larval female *E. pseudopus* Regenfuss, 1974, from Guadalcanal Island, have the same number of setae on legs I, II as are found in *E. ochoai* sp. n.. However, male and adult female *E. ochoai* sp. n. have more tarsal setae.

It is difficult to separate larval and female stages of another ectoparasitic podapolipid mite from carabid beetles, *Dorsipes*, from *Eutarsopolipus*. The single American species of *Dorsipes*, *D. evarthrusi* Husband and Rack, 1991 has femoral II and III seta *l'* in all stages. This seta is missing in American *Eutarsopolipus* spp.

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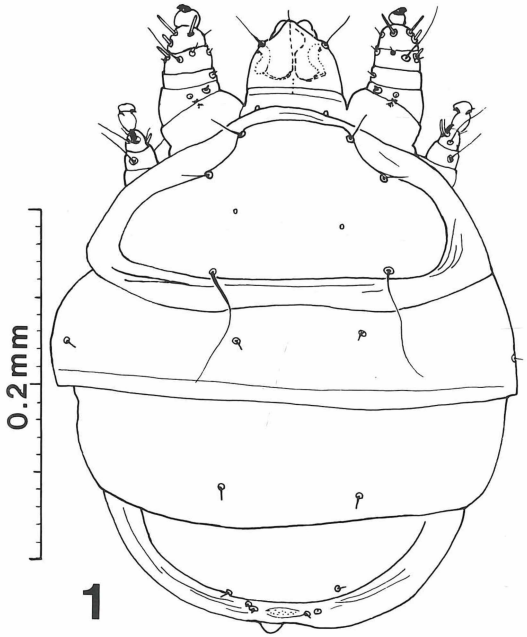
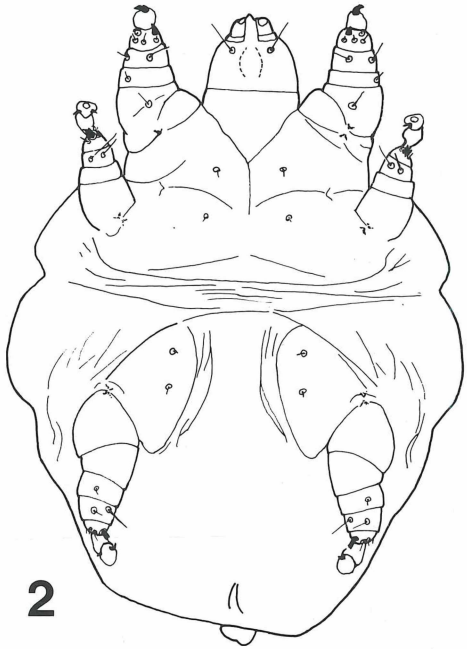
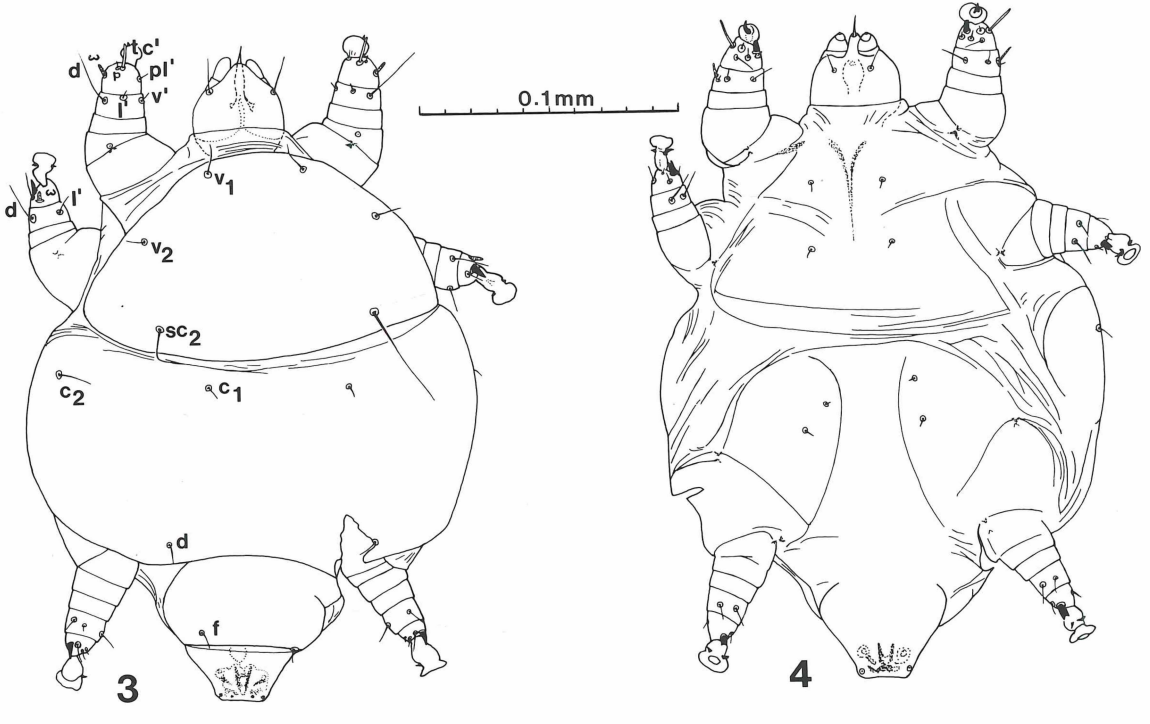
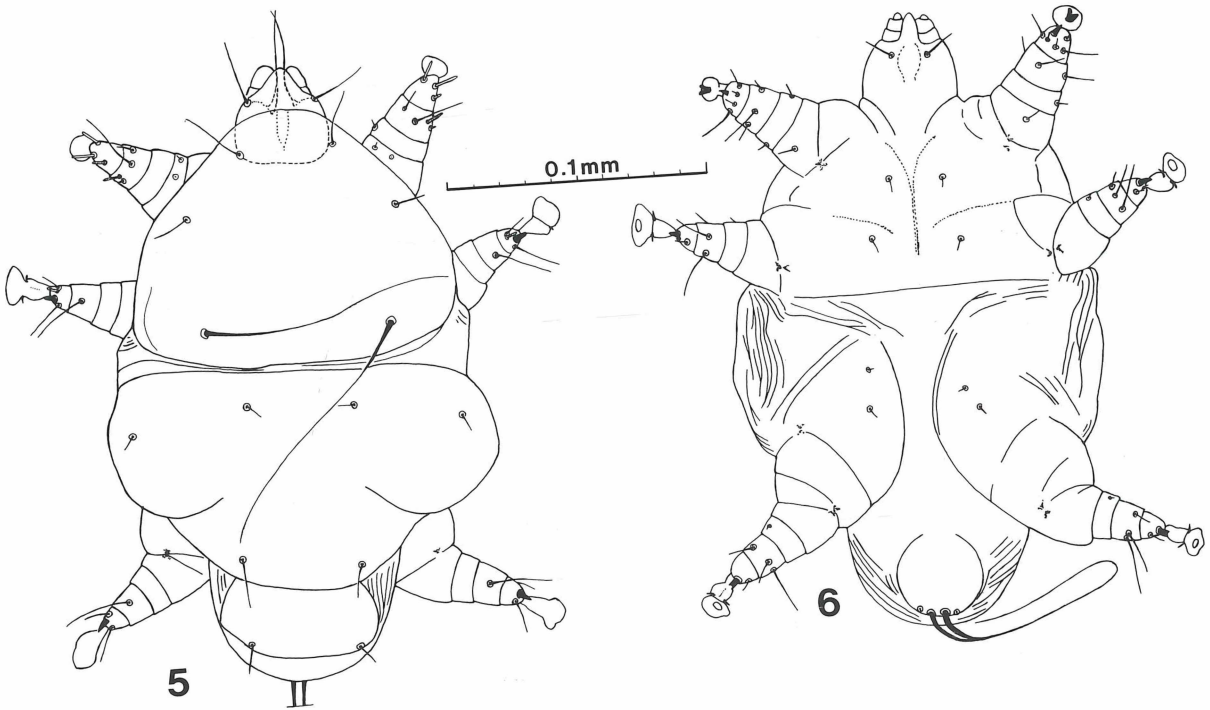




Figs 1, 2: *Eutarsopolipus ochoai* n. sp., 1- adult female, dorsal aspect; 2- adult female, ventral aspect.



Figs 3, 4: *Eutarsopolipus ochoai* n. sp., 3- male, dorsal aspect; 4- male ventral aspect.



Figs 5, 6: *Eutarsopolipus ochoai* n. sp., 5- larval female, dorsal aspect; 6- larval female, ventral aspect.

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