THE GENUS *EREMAEOZETES* (ACARI: ORIBATIDA) ON THE GALÁPAGOS ISLANDS

BY Heinrich SCHATZ *

TAXONOMY, ECOLOGY, ACARI, ORIBATIDA, EREMAEOZETES, GALÁPAGOS ISLANDS

SUMMARY: Two species of Eremaeozetidae, found on the Galápagos Islands (Ecuador), are described and illustrated. *Eremaeozetes irenae* sp. nov. has been found on four islands of the Galápagos archipelago in arid habitats, while *E. darwini* sp. nov. occurs frequently in epiphytic moss and organic litter in the higher zones of different islands. Notes on the distribution and ecological preferences of these species are included. Juvenile instars of both species are described. This is the first time that immatures of *Eremaeozetes* species have been described.

TAXONOMIE, ÉCOLOGIE, ACARI, ORIBATIDA, EREMAEOZETES, ÎLES GALÁPAGOS

RESUMÉ: Deux espèces nouvelles d'Eremaeozetidae de l'archipel des Galápagos (Équateur) sont décrites et illustrées. *Eremaeozetes irenae* sp. nov. a été récolté dans les habitats arides sur quatre des îles de l'archipel ; *E. darwini* sp. nov. est récoltée fréquemment dans la litière organique et les mousses épiphytes des zones élevées de six îles. Des informations sur la répartition et les préférences écologiques de ces espèces sont fournies. Les stades juvéniles des deux espèces sont décrits. Il s'agit de la première description des stades juveniles du genre *Eremaeozetes*.

TAXONOMÍA, ECOLOGÍA, ACARI, ORIBATIDA, EREMAEOZETES, ISLAS GALÁPAGOS

RESUMEN: En este trabajo se describen e ilustran dos nuevas especies de la familia Eremaeozetidae provenientes de las Islas Galápagos (Ecuador). *Eremaeozetes irenae* sp. nov. fue encontrada en cuatro islas del archipiélago de Galápagos en zonas áridas, mientras que *E. darwini* sp. nov. se encontró frecuentemente sobre musgo epifítico y hojarazca en zonas de altura de seis islas. Notas sobre la distribución y preferencias ecológicas de las dos especies son incluidas. También se describen los estadios juveniles de las dos especies, siendo ésta la primera ocasión para el género *Eremaeozetes*.

INTRODUCTION

The genus *Eremaeozetes* was established by BERLESE (1913) and, until the present study, includes 28 described species from the Oriental, Ethiopian, Neotropical and Oceanian region. During four extended expeditions to the Galápagos Islands carried out by the author between 1982 and 1988 (SCHATZ & SCHATZ, 1988, SCHATZ, 1998) numerous samples of soil and organic litter were taken on all major islands and in different vegetation zones of the archipelago, supplemented by additional collections from other researchers. Included in this material were adults and immatures of two new species of *Eremaeozetes*,

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which represent the first records of Eremaeozetidae from the Galápagos Islands. A detailed description of the environmental setting of the Galápagos Islands was given recently by PORTER (1984) and SCHATZ (1998).

As in most other *Eremaeozetes* species, the specimens from the Galápagos Islands are covered by a thick layer of cerotegument. For a detailed study of the surface structures, the cerotegument was removed by transferring some specimens into a 10% KOH solution for about 24 h. The notogastral setal nomenclature (see Fig. 18) follows TRAVÉ *et al.* (1996).

Eremaeozetes irenae sp. nov.

(Figs. 1-16)

DIAGNOSIS: *Eremaeozetes irenae* sp. nov. differs from its congeners in the adult instar by following combination of characters: cerotegument forming well defined umbrella-like structures with rugose pattern around notogastral setae and notogastral lyrifissures, interlamellar apophysis present, notogaster with ridges, all notogastral and ventral setae setiform, and known distribution restricted to the Galápagos Islands. The new species differs from the similar species *E. lineatus* Mahunka, 1985 in shape of lamellae and curvature of the anterior notogastral margin, in position of lenticulus, in weak elevations around setae *lm*, and in larger size. Juvenile instars (protonymph to tritonymph) of plicate type, central part of notogaster with irregular longitudinal structure of wrinkles, with three pairs of large setae posterolateral on notogaster, setae h_3 twice the length of others.

ADULTS (Figs. 1-16): *Dimensions, colour, cerotegument* (Fig. 1): Size: females (n=13): 493 (470-510) × 271 (255-280) µm, males (n=13): 452 (440-470) × 240 (225-255) µm. Dorsal and ventral surface thickly covered with brown to dark brown cerotegument, forming rugose patterns. Only lenticulus and posterior part of the interlamellar area uncovered. Around notogastral setae (hardly visible when uncleaned) and notogastral lyrifissures cerotegument forming circular to elliptical umbrella-like layers with rugose pattern. Small to broad ribbons of cerotegument present along lateral edges of lamellae and prodorsum, lateral edges of notogaster, pedotecta and pteromorphae, around lenticulus and lyrifissures, as well as along notogastral and ventral ridges. After removal of cerotegument, notogastral and ventral surface appear light brown and reticulate, lamellae sulcate.

Prodorsum (Fig. 2): Length of prodorsum 150 µm (male) to 190 µm (female). Anterior part of prodorsum covered by large lamellae, rostrum can be seen by transparency, better in ventral view. Rostrum rounded, with a short but pointed apex dorsally (length 7-10 µm). Tutorium and terminating in a small cuspis, best visible in lateral view (Fig. 3). Lamellae long broad blades, cuspides reaching 20-30 µm anteriad of rostrum; anterior edges rounded with a small apex directed ventrad and mediad. Cuspides narrowly separated. Lateral edges of lamellae slightly converging, anterior part with a lateral depression each, formed by different layers of cerotegument. Posterior lateral parts of lamellae rounded; on each side separated by a longitudinal fissure from the rest of lamellae. Fissure only visible after removal of cerotegument. Cerotegument layers of lamellae rugose. After removal of cerotegument, on each cuspis a an indistinct medially thickened ridge dorsally, originating from the common base at the prodorsum and leading anteriad to lamellar seta, dorsal surface of lamellae sulcate with numerous fine, oblique grooves, leading anterolaterally from medial edge.

Rostral setae on small tubercles lateral of rostrum, short and setiform (length 6-8 µm), only visible in ventral or lateral view. Lamellar setae on inner margin of lamellae close to tip of cuspis, short and setiform (length 8 µm). No interlamellar setae or their insertions present. Bothridia large and directed laterad, sensillus with thin stalk and broadened head, slightly bent posteriad. Dorsal part of sensillus covered with small spicules. Total length of sensillus 80-90 µm, maximal width of head about 20 µm. An elevated ridge present between lamellae with a posteriad directed appendage, latter not reaching the anterior notogastral margin.

Notogaster (Fig. 2): Shape of notogaster oval. Anterior notogastral margin bent slightly in an even arch, not protruding anterior to the level of the bothridia. Prehumeral tecta large and semicircular, situated distally and posteriorly of bothridia; after

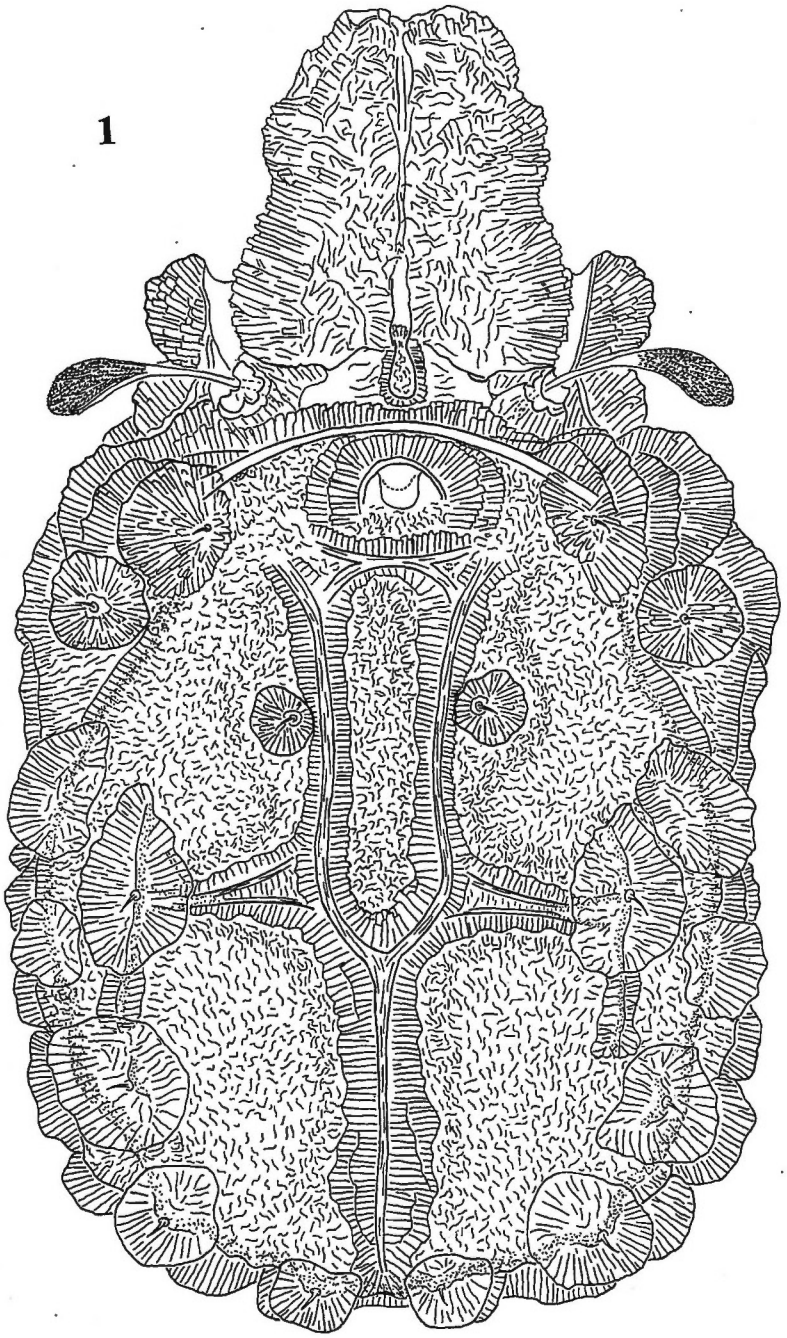
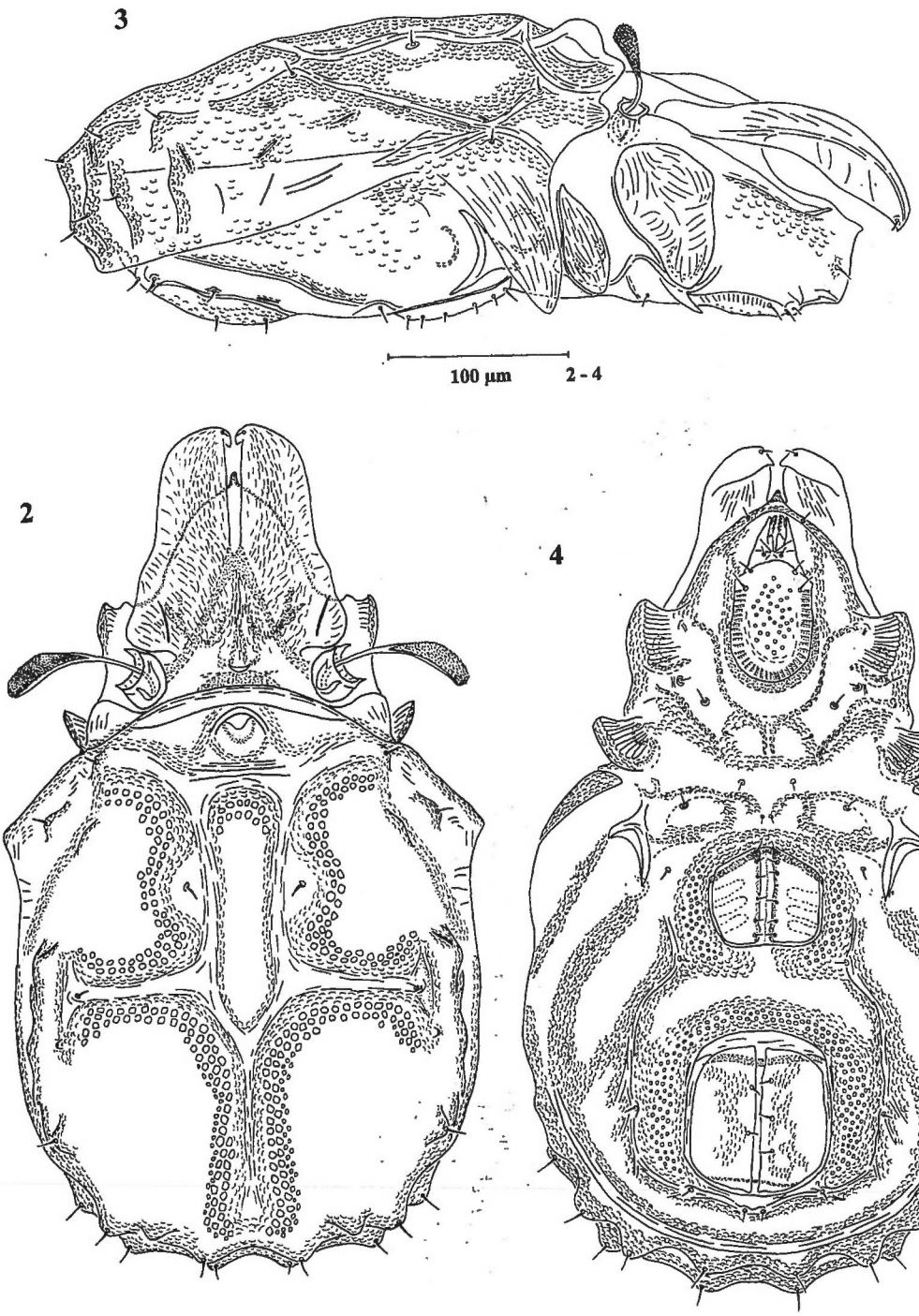
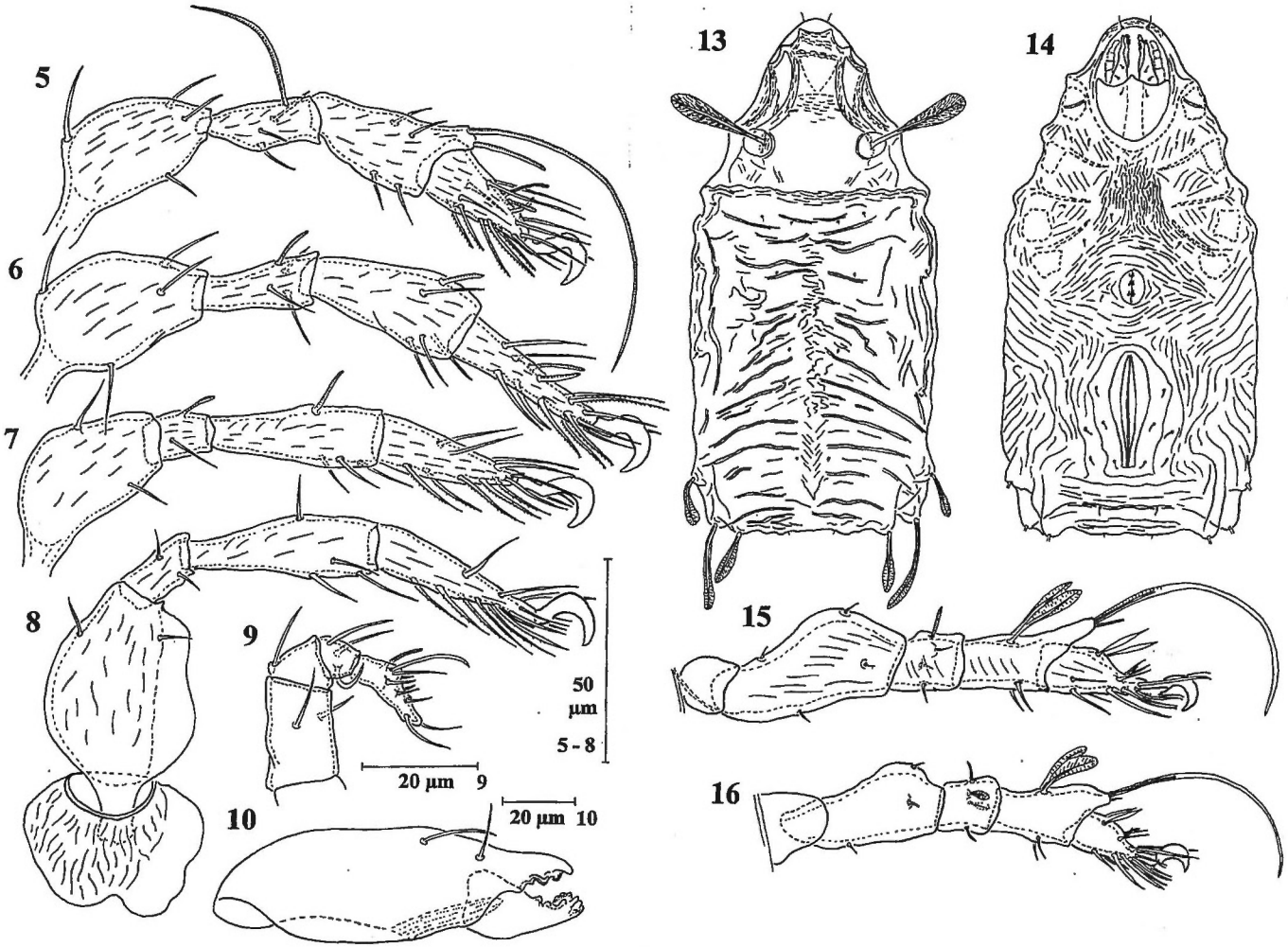


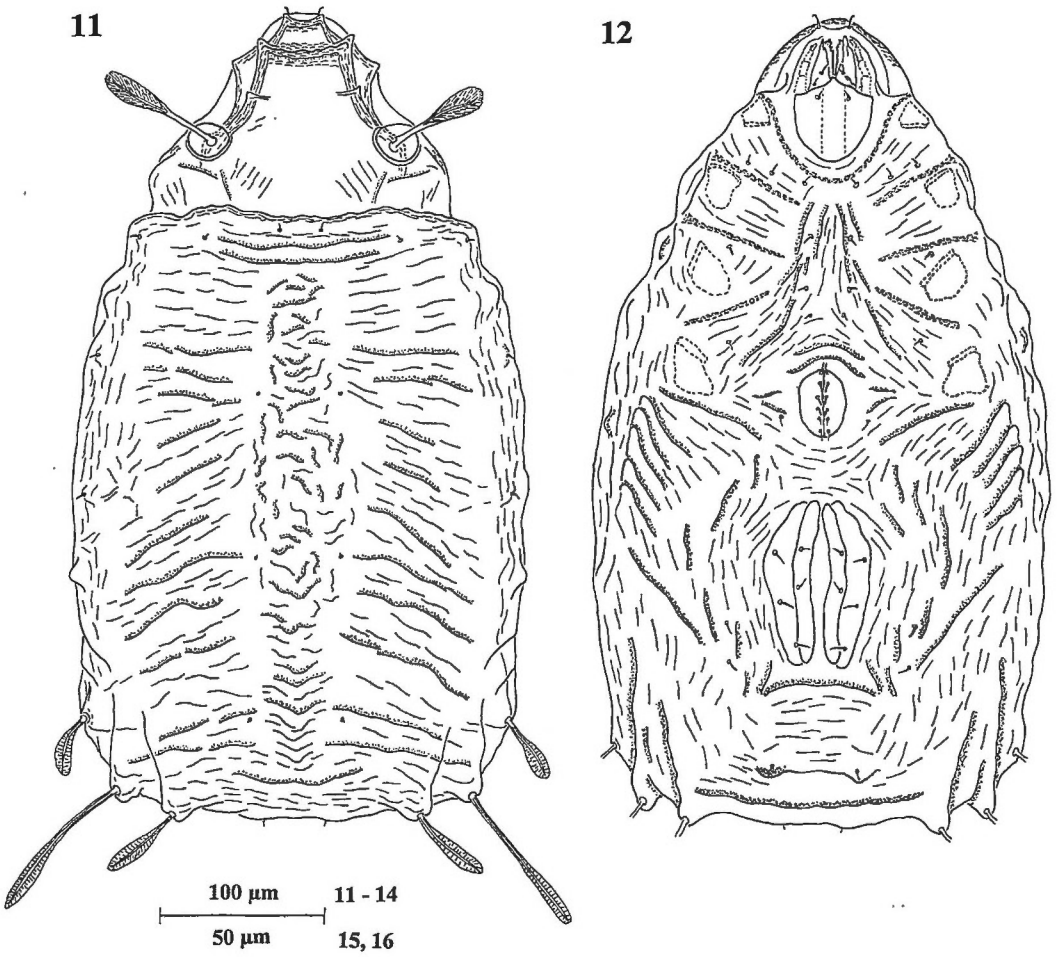
FIG. 1: *Eremaeozetes irenae* sp.nov., adult female with cerotegument, dorsal view.



FIGS. 2-4: *Eremaeozetes irenae* sp.nov., adult female, cerotegument removed:
2. —Dorsal view (notation of setae see Fig. 18). 3. —Lateral view. 4. —Ventral view.



FIGS. 5-10: *Eremaeozetes irenae* sp.nov., adult female, appendages in abaxial aspect:
5.—Leg I, trochanter removed. 6.—Leg II, trochanter removed. 7.—Leg III, trochanter removed. 8.—Leg IV. 9.—Pedipalp. 10.—Chelicera.
Figs. 13-16: *Eremaeozetes irenae* sp. nov., juvenile instars, all appendages in abaxial aspect:
13.—Protonymph, dorsal view. 14.—Protonymph, ventral view. 15.—Tritonymph, leg I. 16.—Protonymph, leg I.



FIGS. 11-12: *Eremaeozetes irenae* sp. nov., tritonymph: 11. — Dorsal view. 12. —Ventral view.

removal of cerotegument thin and smooth. Pteromorphae immovable, long and narrow blades, ventrally bent with rounded edges; proximal part reticulate, distal part longitudinally striated. Lenticulus situated about half of its diameter behind anterior margin of notogaster, bulging, with a well-defined semicircular anterior edge and a diffuse posterior one. Light spot of lenticulus elliptical to round, slightly broader anteriorly.

Several elevated ridges divide the surface of notogaster, also visible on the cerotegument surface: a central field formed by two longitudinal ridges and one anterior transverse ridge, four lateral ridges lead to setae c_2 and *lp* each, and a single ridge leads from the posteriorly converging longitudinal ridges toward the posterior edge of notogaster. Laterally, additional short longitudinal elevations present distally of setae *lp*. A removal of cerotegument, areas between the ridges appearing as semicircular depressions with reticulate surface.

Ten pairs of notogastral setae present, surrounded by umbrella-like layers of cerotegument. After removal of cerotegument, all notogastral setae thin and setiform (length 8-12 µm). Setae *lm* on weakly developed elevations lateral to the longitudinal median ridges, other notogastral setae on small or larger apophyses, posteromarginal rows h_1 — h_3 and p_1 — p_3 on large tubercles, giving an irregular shape to the posterior notogaster line. Lyrifissures *ia* situated medial to setae *la*, lyrifissures *im* between setae *lm* and *lp*, lyrifissures *ips* lateral and posterior to setae *lp*, lyrifissures *ih* lateral and anterior to setae h_3, and

lyrifissures *ip* medial to setae h_2. Latero-abdominal gland (*gla*) on small tubercles posterior to setae *lp*. Lyrifissures best visible in lateral view (Fig. 3).

Lateral aspect (Fig. 3): Pedotectum I large, forming a broad scale with striated surface, reaching dorsally to near bothridium, fixed posteriorly and ventrally of leg I. Pedotectum II a smaller scale, almost triangular, fixed posteriorly. Discidium large, with a ventral spine directed caudad. A roof-like thickening present posterior to pteromorph and dorsal to acetabulum IV.

Ventral region (Fig. 4): Subcapitulum diarthric, mentum large (65-70 × 37-45 µm), median part foveolate, laterally with radial creases. Subcapitular setae *h*, *m* and *a* spiniform, length 10-15 µm. Pedipalps (Fig. 9) with long femur and distally elongated tarsus, setal formula 0-2-1-3-9(1), setae *vt* on elongated part of the tarsus. Chelicerae (Fig. 10) long and narrow, size (n=5): 100 (95-105) × 36 (32-40) µm, setae *cha* 20-24 µm long, inserted near dorsal margin, smooth, directed anteriad, setae *chb* slightly shorter (length 15-20 µm), inserted abaxially directed anteriad to dorsad. Chelae with variable dentation, mostly with 3-4 teeth each (examined in population from Isla Isabela). Length of movable digit 30 µm (28-35 µm, n=5). Trägårdh's organ originating on ventral edge of each chelicera in adaxial position, forming a small process directed anterodorsad.

Apodemes I complete and fused medially, apodemes II and III as well as sejugal apodeme medially incomplete. Epimeral plates III medially surrounded by a ridge connecting the inner tip of the sejugal apodeme with apodeme III. Epimeral setal formula 3-1-1/2-2, setae *3a* usually absent, all setae setiform to spiniform and of different size (setae *1b*, *3b*, and *4a* 8-12 µm, others 3-5 µm), inserting on small plates.

Ventral side including genital and anal plates covered with rugose cerotegument, epimeral setae hardly visible under cerotegument. After cleaning, epimeral region and ventral plate punctulate to reticulate, genital plates punctulate, anal plates reticulate. Genital plates laterally surrounded by a sausage-like elevation, anal plates surrounded by a similar elevation laterally and anteriorly. Longitudinal ridges with small lateral extensions present lateral to aggenital setae as well as to adanal setae ad_3; ridges present also posterior of anal plates. Surface with reticulate pattern lateral resp. posterior to these ridges.

All anogenital setae setiform to spiniform. Genital plates with 6 pairs of setae, setae g_2 posteriad g_1, the anterior pair (g_1) situated on an anterior thickening of genital plate and longer (15 µm), directed anteriad, other genital setae shorter (6-8 µm), directed mediad; 1 pair of aggenital setae (length 5 µm). Mostly two pairs of anal setae present, length 6-8 µm. Number of anal setae varying individually, several specimens bearing different numbers of anal setae: 2 + 3, 2 + 1, or 3 + 3. Adanal setae on the ridges, setae ad_1 and ad_2 in postanal position, ad_3 lateroanal at midlevel of anal plates. Aggenital and adanal setae on small tubercles. Adanal lyrifissures *iad* in adanal position close to anterior half of anal plates.

Legs (Figs. 5-8): Length of legs moderate (25 to 50 % of body size), leg I (including claws) 110-140 µm, leg II 160-190 µm, leg III 150-180 µm, leg IV 220-240 µm. Uncleaned, dorsal margins partially covered with narrow ribbons of cerotegument. After removal of cerotegument, surface of legs with small furrows. All legs monodactylous with strong claws. Setal formula of legs (trochanter to tarsus, solenidia in parentheses): leg I 0-4 -3(1) -4(2) -16(2), leg II 0-4 -3(1) -4(1) -13(2), leg III 0-2 -1(1) -3(1) -13, leg IV 0-2 -2 -3(1) -13. Femur IV with a strong blade-like ventral keel, trochanter IV with a large ventral scale. Solenidion φ_1 on tibia I very long (90 µm), inserted on a large distal projection which also bears solenidion φ_2. On genu I solenidon σ relatively long (40-55 µm).

IMMATURES (Figs. 11-16): The immature stages of plicate ("plissée") type (TRAVÉ *et al.* 1996). Size — protonymphs (n=3) 340-360 × 180-195 µm, deutonymphs (n=2) 418-430 × 200-218 µm, tritonymphs (n=2) 450-480 × 255-270 µm. Colour light brown.

Tritonymph (Figs. 11, 12, 15): — *Prodorsum* (Fig. 11): Rostrum rounded. Anterior part of prodorsum centrally elevated, laterally with two paired curved ridges, leading from bothridia anteriad, and anteriorly connected by transverse ridges. Small cuspides present, not projecting beyond the rostrum. Rostral setae slightly lanceolate, length 15 µm, lamellar setae and interlamellar setae absent. Bothridia large and annular, sensillus lanceolate, length 75-90 µm, distal part dilated and covered with bristles forming an irregular network, maximal width 22 µm.

Gastronotic region (Fig. 11): Surface of hysterosomal dorsum plicate, wrinkles medially forming irregular longitudinal lines with an elevated tapering ridge posteriorly. Fifteen pairs of notogastral setae present, three pairs of posterolateral setae *lp*, h_3, h_2 on large apophyses, very large (length of *lp* 37-40 µm, h_3 80-90 µm, h_2 47-50 µm) and distally phylliform (width 12-14 µm), central setae c_1, c_2, *da*, *dm*, *dp* bacilliform and very small (length 1-2 µm), barely visible, setae *da*, *dm*, *dp* lateral to central wrinkled lines. Setae c_3, *la*, *lm*, h_1, p_1-p_3 setiform, slightly larger (length 5-6 µm), setae p_1-p_3 posterolateral to adanal plates, slightly lanceolate (length 7-8 µm) only visible in ventral view. Lateral part of notogaster with wrinkles. No pteromorphae nor pedotecta developed.

Ventral region (Fig. 12): Surface plicate. Chelicerae 90 × 37 µm. Epimeral setal formula 3-1-2-2, genito-anal setal formula 6-1-2-3, epimeral and genito-anal setae slightly lanceolate (length 8-10 µm), anterior genital setae longer.

Legs (Fig. 15): monodactylous with strong claws. Tarsus IV with 12 setae, setal formulae of other legs as in adults. Solenidion φ_1 on tibia I very long (95 µm). Setae on legs of different shape (phylliform — phy, slightly phylliform — sph, spiniform — spi, lanceolate — lanc, or setiform — others): leg I (Fig. 16) 0-4 -3(1) -4(2)(l′, l″ phy) -16(2), leg II 0-4 -3(1)(l′ sph) -4(1)(l′ ph, l″ spi) -13(2)(ft′, ft″ sph), leg III 0-2 -1(1)(v′ phy) -3(1)(ft′, ft″ lanc) -13, leg IV 0-2 -2 -3(1) -12.

Other instars (Figs. 13-14, 16): Prodorsum of protonymphs and deutonymphs as in tritonymphs. Hysterosomal dorsum elevated laterally, central part depressed. Arrangement of pleats as in tritonymphs. Both instars with 15 pairs of gastronotic setae, setae *lp*, h_3, h_2 large and dilated (protonymph *lp* 25-30 µm, h_3 55-65 µm, h_2 35-40 µm, width 8-12 µm, deutonymph *lp* 35 µm, h_3 36-42 µm, h_2 45 µm, width 12-14 µm), central setae almost invisible. Epimeral setal formula 3-1-1-2 in both instars, genito-anal setation: protonymph 3-1-0-3, deutonymph 5-1-2-3, setae of ventral region slightly lanceolate to spiniform, length 7-9 µm. Setation of legs (different shapes as in tritonymph) — protonymph: leg I (Fig. 16) 0-3 -2(1) -4(1)(l′, l″ phy) -14(2), leg II 0-4 -3(1)(l′ phy) -4(1)(l′ sph) -13(1), leg III 0-2 -1(1)(v′ phy) -2(1) -13(ft′. ft″ phy), leg IV 2-2(d phy) -2(d sph) -10(ft′ sph), deutonymph: leg I 0-4 -3(1)(l′, l″ sph) -4(2)(l′, l″ phy) -14(2), leg II 0-4 -3(1) -4(1)(l′, l″ phy) -13(2) (ft′, ft″ sph), leg III 0-2 -1(1)(v′ phy) -3(1) -13(ft′, ft″ phy), leg IV 2-2 -3(1) -12(ft′ lanc, pv′ phy). Distal projection on tibia I large in all instars, solenidion φ_1 very long (80 µm in protonymph, 90 µm in deutonymph).

SEXUAL DIMORPHISM, EGGS: The adults of *E. irenae* sp. nov. show two well-distinguishable size classes. Females larger, most of them bearing one or two large eggs. Dimensions of eggs (n=6) 90-225 × 50-100 µm, shape of eggs oval to elliptic, frequently kidney-shaped. Apart from adult size, no external sexual dimorphism could be observed.

ETYMOLOGY: The new species is gratefully dedicated to my wife, Dr. Irene Schatz, who took part on all trips and during all steps of this work.

MATERIAL EXAMINED: *Eremaeozetes irenae* sp. nov. is known from 33 specimens (26 adults, 7 juveniles) collected on four islands of the Galápagos archipelago (Fig. 17). No morphological differences between the populations on the different islands were observed. All specimens were collected in the lower zones of the islands in arid habitats. The species occurs in dry to moist, thin organic litter layer with humus under cactus, grass, among low shrubs and in open dry forests.

Specific collection data : Isla Pinta, southern part of the island, arid zone: open *Opuntia galapageia* forest, 140 m a.s.l., in dry cactus litter and humus (2 Apr. 1988: 1 female, 2 males); *Bursera graveolens* and *Croton scouleri* forest, 200 m, in dry leaf litter and humus under *Darwiniothamnus tenuifolius* (2 Apr. 1988: 1 male); pampa, 350 m, in dry grass and leaf litter with twigs (2 Apr. 1988: 1 female), near eastern crater, upper arid zone, 380 m, in dry leaf litter under *Macraea laricifolia* (31 Mar. 1988: 1 protonymph).

Isla Pinzón, arid zone: western part of Central Valley, open *Croton* forest, 270 m a.s.l., in moist organic litter and humus under *Lantana peduncularis* (30 Jan. 1987: 2 males); southern crater rim of main caldera, 310 m, *Scalesia incisa* shrubs, in moist leaf litter and wood under rock (31 Jan. 1987: 1 male); southern slope of the island, 300 m, open *Croton* forest with *Acacia macracantha* and *Prosopis juliflora*,

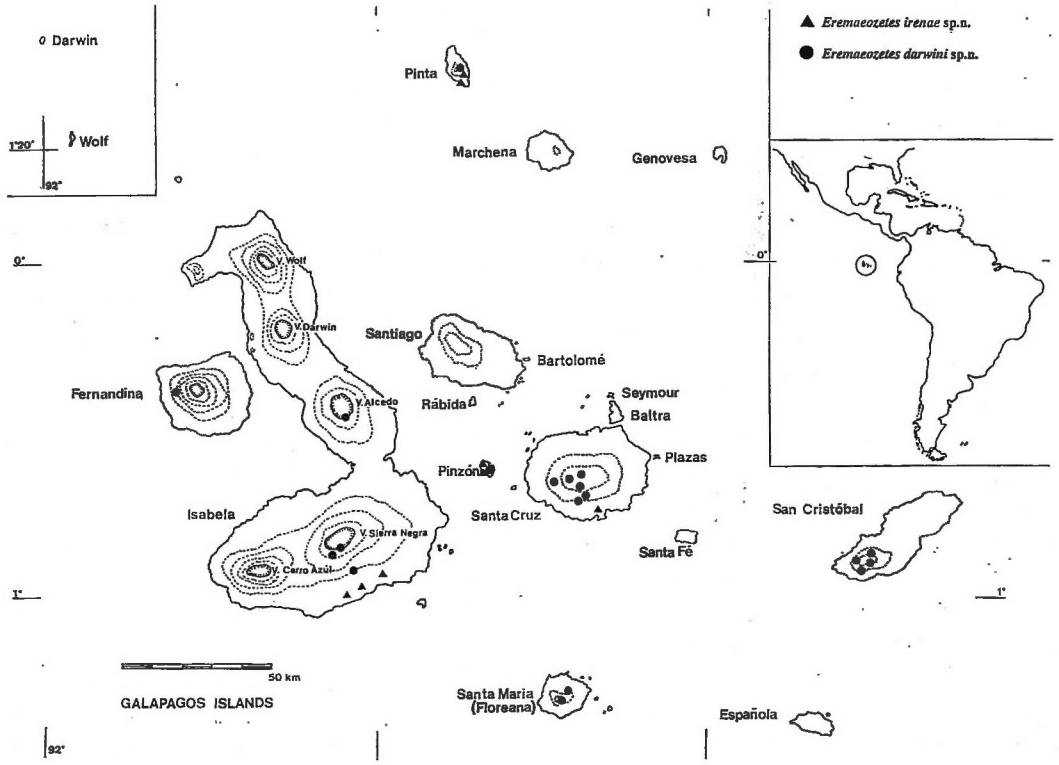


FIG. 17: Records of *Eremaeozetes* species from the Galápagos Islands.

in moist leaf litter with humus under *Alternanthera echinocephala* and *Commelina diffusa* (3 Feb. 1987: 1 female).

Isla Isabela, Volcano Sierra Negra, arid zone: 2 km north of Puerto Villamil, 10 m a.s.l., in moist decayed leaf litter under *Prosopis juliflora* (13 Feb. 1987: 1 female); 1 km west of Puerto Villamil, near "muro de las lagrimas", 30 m, in moist, decayed log under *Croton scouleri*, among *Heliotropium angiospermum* (8 Feb. 1987: 2 females); near Quinta Playa west of Puerto Villamil, 20 m, in moist, partially-decayed leaf litter under *Scalesia cordata* and *Pisonia floribunda* (8 Feb. 1987: 7 females, 7 males, 5 juveniles).

Isla Santa Cruz, near Charles Darwin Research Station, at "barranco" near station area, arid zone, dry leaf litter (Dec. 1981: 1 protonymph, coll. Y. Lubin).

The alcohol-preserved holotype (sample GAL 87-625: Ecuador, Galápagos Islands, 8 Feb. 1987; Isla Isabela, near Quinta Playa west of Puerto Villamil "type locality, 0°59′ S, 91°04′ W") and paratypes from the same habitat will be deposited in: Natural History Museum, Vienna, Austria. Paratypes in: author's collection, Innsbruck, Austria; Museum of Natural History, Budapest, Hungary; Universidad Católica, Quito, Ecuador.

REMARKS: *Eremaeozetes irenae* sp. nov. belongs to a group of species with longitudinal ridges on the notogaster. Similar longitudinal ridges with lateral extensions are also known from *E. machadoi* Mahunka, 1989 (notogastral ridges indistinct, central groove), *E. lineatus* Mahunka, 1985 (elevations around setae *lm* strongly developed), *E. dividipeltatus* Mahunka, 1985, *E. trifurcus* Wen, 1994 (notogastral ridges smaller and more angular), *E. araucana* Monetti *et al.*, 1994, *E. costulatus* Mahunka, 1977, *E. kurozumii* Aoki, 1994 and *E. tsavoensis* Mahunka, 1987 (three longitudinal ridges each).

The new species was compared with the paratype of *E. lineatus* Mahunka, 1985. It resembles *E. lineatus* in having a similar cerotegument structure around the notogastral setae and lyrifissures, the presence of an interlamellar apophysis, a similar structure of the notogastral ridges, and notogastral setae on elevations. However, there are numerous differences between the two species: The ribbons of cerotegument on lateral edges are only present in *E. irenae*, and the cerotegument structure around notogastral setae and lyrifissures is better developed and well defined. The anterior portions of lamellar cuspides are only slightly curved ventrally and are rounded without sharp apex in *E. lineatus*, the lamellar setae of this species are situated on small tubercles pointing anteriad, the rostrum is rounded without a dorsal apex, the anterior notogastral margin is strongly curved around the anterior part of the lenticulus, the notogastral setae *lm* are on stronger developed elevations which are surrounded by lateral apophyses of the notogastral ridges, the lateral and posterior apophyses bearing the notogastral setae are stronger developed, the reticulation of the notogaster is coarser, the mentum has two well-defined transverse rugae, and the sausage-like elevation around the genital and anal openings is lacking in *E. lineatus*.

This is the first time that juvenile instars of the genus *Eremaeozetes* are described. The similarity of the immatures to those of the genus *Scapheremaeus* (TRAVÉ & FERNANDEZ 1986) is remarkable and suggests a close relationship. The main difference between the juvenile instars of both taxa is the presence of three pairs of large posteriolateral notogastral setae in the immature of the *Eremaeozetes* species studied up to now. Some undescribed *Eremaeozetes* species collected in Central America show this character even in the adult stage (SCHATZ, unpublished). The small medial field of irregular longitudinal wrinkles in *E. irenae* might be connected to the presence of longitudinal ridges in adults.

Little information about sexuality in the *Eremaeozetes* species is available from the literature (MONETTI et al. 1994). In *E. irenae* sp. nov. the sexes differ morphologically in size (females up to 1.16 times larger than males). In several other species the body size range of the populations examined is so wide (largest specimens up to 1.2 times longer than the smallest, according to several species descriptions from literature) that the presence of both sexes differing in size may be assumed.

All *Eremaeozetes* species have a layer of cerotegument on the surface which can be quite well developed. In *E. irenae* additional layers of cerotegument around the notogastral setae and notogastral lyrifissures are formed in the same characteristic pattern in all adult specimens. Similar structures around setae and lyrifissures were only observed in *E. lineatus* Mahunka, 1985 (observed in the paratype).

ALBERTI & NORTON (1997) give an excellent overview on the porose integumental organs of oribatid mites. The most typical secretory areas are linked to well defined, discrete porose organs which are not only characteristic for the poronotic oribatids (octotaxic system), but occur also in several other oribatid taxa in different forms (ALBERTI *et al.* 1997).

According to NÜBEL-REIDELBACH and WOAS (1992) *Eremaeozetes* belongs to a basal evolutionary level of Higher Oribatida showing a mosaic distribution pattern of cepheid and pterogasterinid (poronotic) characters. For poronotic oribatids, NORTON & ALBERTI (1997) suggest that the maintenance of cuticular integrity by secretory layers could serve as a protection against desiccation. Most *Eremaeozetes* species were found in tropical moist or wet forests. However, a detailed analysis of the collecting records shows that several species occur in arboreal or exposed microhabitats with fluctuating moisture conditions and periodic desiccation. Several species inhabit thin organic litter and moss layers on rocks or trunks (*E. bituberculatus* Mahunka, 1983, *E. ephippiger* Balogh, 1968, *E. octomaculatus* Hammer, 1973, *E. roguini* Mahunka, 1998; *E. tsavoensis* Mahunka, 1987, *E. undulatus* Mahunka, 1985), fungus, bark, moss, and roots of epiphytes (*E. arboreus* Nübel-Reidelbach & Woas, 1992, *E. lineatus* Mahunka, 1985, *E. spathulatus* Balogh, 1968, *E. darwini* sp.nov.). Some species occur even in arid environments such as open coastland, dry forests or brush vegetation (*E. acutus* Covarrubias, 1967, *E. araucana* Monetti *et al.*, 1994, *E. kurozumii* Aoki, 1994, *E. maculosus* Mahunka, 1995).

Eremaeozetes darwini sp. nov.

(Figs. 18-27)

DIAGNOSIS: In the adult instar, *E. darwini* sp. nov. differs from its congeners by following combination of characters: rostral apex pointed, interlamellar apophysis absent, notogastral margin strongly arched anteriad with a medial angle, lenticulus situated directly behind anterior notogastral margin, notogastral surface reticulate without projecting fields or ridges, all notogastral and ventral setae setiform to spiniform, scale anteriad of genital plates present, legs monodactylous, and known distribution restricted to the Galápagos Islands. The species is very similar to *Eremaeozetes roguini* Mahunka, 1998, but it differs from that species in considerably larger size and in details of surface structure discussed below. Juvenile instars (protonymph to tritonymph) of plicate type, but without a separate medial band of different pattern, with three pairs of large setae of similar length posterolateral on hysterosomal dorsum.

ADULTS (Figs. 18-25): Dimensions, colour and cerotegument: Size (from different islands): females (n=23): 437 (420-460) × 240 (220-260) µm, males (n=17): 404 (380-430) × 219 (200-240) µm. Dorsal and ventral surface covered by irregular cerotegument layer, surface structures visible underneath. Colour medium brown. After removal of cerotegument, surface appears yellowish to light brown.

Prodorsum (Fig. 18): Anterior part of prodorsum covered by large lamellae, rostrum can be seen by transparency, better in ventral view. Rostrum rounded with a short and pointed apex dorsally (length 8-10 µm). Tutorium terminating in a small cuspis, best visible in lateral view (Fig. 19). Lamellae long and broad blades, cuspides reaching 20-25 µm anteriad of rostrum, with rounded anterior edges and with short and blunt apex curved ventrad. Cuspides narrowly separated. A dorsal thickening on each cuspis, originating from the common base at prodorsum and leading anteriad. Lateral edges of lamellae slightly converging. Dorsal surface of lamellae with numerous fine grooves forming a sulcate to rugose pattern.

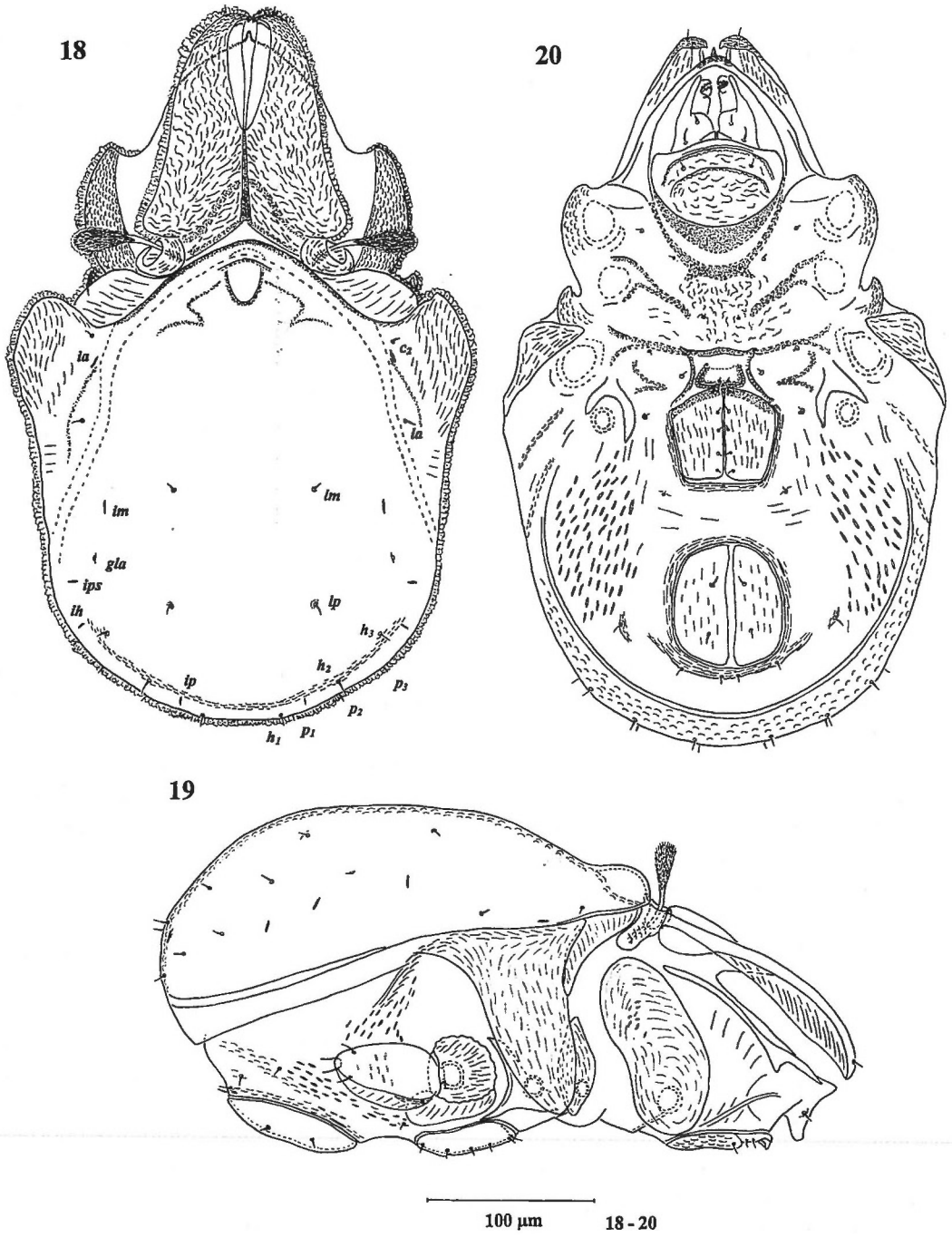
Lamellar setae (*le*) on small tubercles on anterior edges of lamellar cuspides, short (length 6-8 µm) and setiform, directed anteriad. Rostral setae (*ro*) also on small tubercles, short (5 µm) and spiniform, only visible in ventral view. No interlamellar setae or their insertions present. Bothridia large and directed laterad, sensillus with thin stalk and slightly broadened head, covered with small bristles, head darker when uncleaned. Total length of sensillus 70-80 µm, maximal width of head 12-17 µm. Medially between lamellae a slightly elevated median ridge present, pointing anteriad. No interlamellar apophysis present.

Notogaster (Fig. 18): Anterior notogastral margin projecting anteriad, forming angle median. Prehumeral tecta large, subquadrangular, laterally connected with the pteromorphae. Pteromorphae immovable, long and narrow blades, longitudinally striated, distally rounded and bent inwards toward pedotecta II. Lenticulus situated close to anterior notogastral margin, bulging. Light spot of lenticulus elongated, broadest anteriorly. Notogaster surface irregularly covered with thin cerotegument showing indistinctly the reticulate structure underneath (Fig. 24). After removal of cerotegument, polygonal fields and reticulate network with small foveolae visible (Fig. 25).

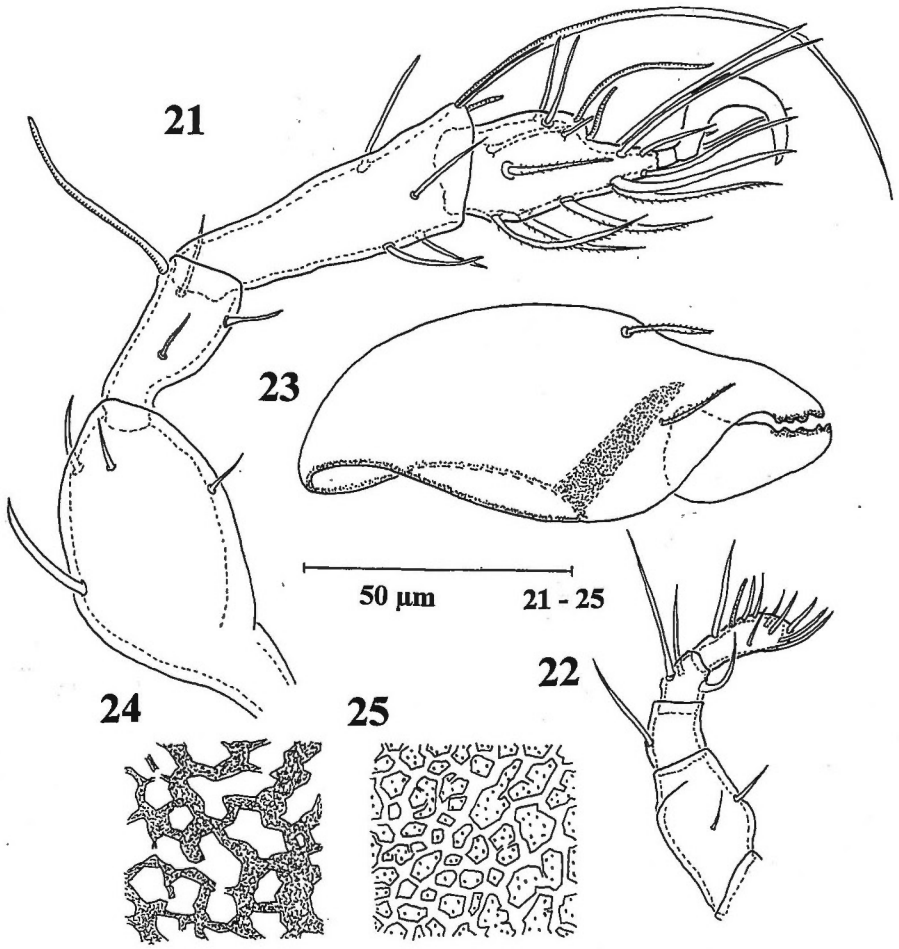
Ten pairs of notogastral setae present, length short to medium (5-10 µm), situated on small tubercles, anterior setae acuminate, posterior rows setiform. Lyrifissures *ia* situated between setae c_2 and *la*, lyrifissures *im* posterolateral to setae *lm*, directed longitudinally to diagonally, lyrifissures *ips* lateral to setae *lp*, lyrifissures *ih* lateral to setae h_3, and lyrifissures *ip* between setae h_1 and h_2. Latero-abdominal glands (*gla*) anterior to lyrifissure *ip*. Lyrifissures best visible in lateral view (Fig. 19).

Lateral aspect (Fig. 19): Pedotectum I large, forming a broad scale with striated to foveolate surface, fixed posteriorly and ventrally of leg I. Pedotectum II a smaller scale, almost round, fixed posteriorly. Discidium large, with a ventral spine directed caudad. A roof-like thickening present posterior to pteromorph and dorsal to acetabulum IV.

Gnathosoma (Fig. 20): Subcapitulum diarthric, mentum large (80 × 53-57 µm), surface reticulate to rugose, anteriorly with two transverse ridges. Subcapitular setae spiniform, setae *h* straight, length 7 µm, setae *m* curved distad, length 15 µm, setae *a* curved



FIGS. 18-20: *Eremaeozetes darwini* sp. nov., adult female: 18. —Dorsal view, margins with cerotegument. 19. —Lateral view, with trochanter and femur of leg IV. 20. —Ventral view.

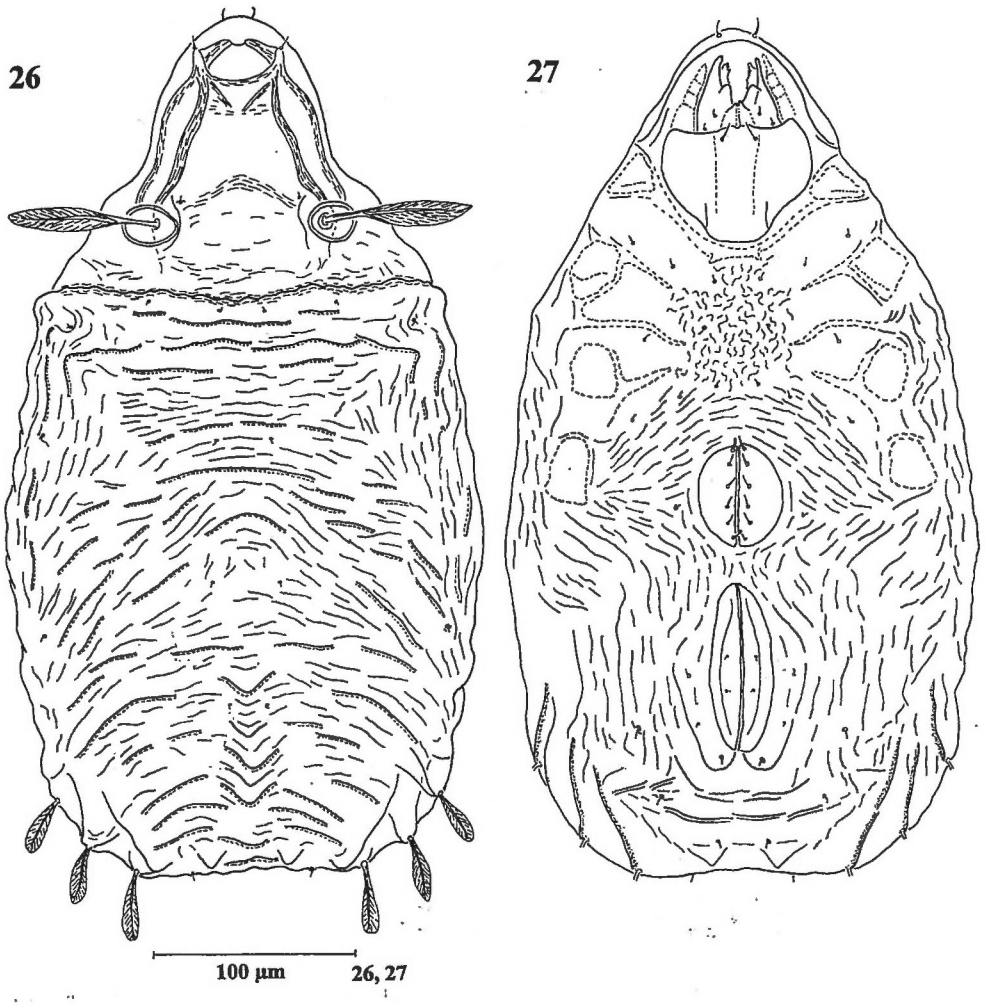


FIGS. 21-25: *Eremaeozetes darwini* sp. nov., adult female, all appendages in abaxial aspect: 21. —Leg I, trochanter removed. 22. —Pedipalp. 23. —Chelicera. 24. —Notogastral surface with cerotegument. 25. —Notogastral surface, cerotegument removed.

ventrad, length 7 µm. Palps (Fig. 22) with long femur and long tarsus, setal formula 0-2-1-3-9(1), seta *acm* on distal protrusion of the palptarsus. Chelicerae (Fig. 23) long, size (n=5): 95-97 × 42-47 µm, length of movable digit 29-34 µm. Setae *cha* inserted paraxially near dorsal margin, ciliate, directed anteriad, length 15 µm, setae *chb* inserted abaxially lateral to movable digit, also ciliate and directed anteriad, length 16 µm. Trägårdh's organ originating on ventral edge of each chelicera in adaxial position, forming a small process directed anterodorsad.

Epimeral and ventral plate reticulate to rugose, after removal of cerotegument central part of ventral plate finely punctulate, laterad of aggenital and adanal setae ad_3 a stronger reticulate to foveolate pattern. Genital and anal plates with a weakly reticulate to rugose surface, slightly elevated from the ventral plate, bases around genital and anal plates with rugae.

Apodemes I complete and fused medially, other apodemes medially incomplete. A well-developed sclerotized scale present anterior to genital plates, surrounded laterally and anteriorly by ridges, which seem to connect the sejugal apodemes medially and lead from the inner tip of each sejugal apodeme posteriad towards lateral edges of genital plates. Epimeral setal formula 3-1-2-2, spiniform (setae *1b*, *3a*, *3b*, and *4a* 5-6 µm, others 2-3 µm).



FIGS. 26-27: *Eremaeozetes darwini* sp. nov., tritonymph: 26. —Dorsal view. 27. —Ventral view.

Anogenital setae setiform to spiniform. Genital plates with 6 pairs of setae, setae g_2 laterad of g_1, both anterior setae situated on anterior thickening of genital plate, setae g_1 setiform and longer (15 µm) than other anogenital setae (5-8 µm); 1 pair of aggenital setae, 2 pairs of anal setae and 3 pairs of adanal setae present. Adanal setae ad_1 and ad_2 on a small ridge posterior to anal plates, ad_3 lateral to anal plates. Adanal lyrifissures *iad* in adanal position close to anterior third of anal plates.

Legs (Fig. 21): Legs of moderate length (35-50% of body size). All legs monodactylous with strong claws. Setal formula of legs (trochanter to tarsus, solenidia in parentheses): leg I (Fig. 21) 0-4 -3 (1) -4 (2) -16 (2), leg II 0-4 -3 (1) -4 (1) -13 (2), leg III 0-2 -1 (1) -3 (1) -13, leg IV 0-2 -2 -3 (1) -13. Femora II and III each with a ventral thickening, femur IV with a strong blade-like keel, trochanter IV with a large ventral scale. Dorsal setae on femora relatively long (15-22 µm), almost spiniform. On tibia I solenidion φ_1 very long (105-115 µm), inserted on a large distal projection which also bears solenidion φ_2, the latter short (length 10-12 µm). Solenidia ω_1 on tarsus I and σ on genu I relatively long (40 µm, resp. 45-50 µm).

IMMATURES (Figs. 26-27): The immature stages of plicate ("plissée") type (TRAVÉ *et al.* 1996). Size — protonymph (n=1): 310x160 µm, deutonymph (n=1): 350x195 µm, tritonymphs (n=4): 390-420 × 205-240 µm. Colour light brown.

Tritonymph (Figs. 26-27): *Prodorsum* (Fig. 26): Rostrum rounded. Anterior part of prodorsum covered by an elevated lamellar field, laterally with ridges leading from bothridia anteriad, posteriorly circumscribed by an indistinct anteriad arched ridge. Small cuspides present, not projecting beyond the rostrum. Rostral setae on small tubercles, slightly clavate, small (length 5 µm), lamellar setae on tip of cuspides, setiform (length 15 µm), interlamellar setae on posterior ridge medial to bothridia, setiform, very small (length 3-4 µm). Bothridia large and annular, sensillus lanceolate, length 70 µm, distal part dilated and covered with bristles, maximal width 15 µm.

Gastronotic region (Fig. 26): Surface of hysterosomal dorsum plicate, wrinkles anteriorly in transverse direction, posteriorly leading into two arches forming a tapering central elevation directed posteriad. Fifteen pairs of gastronotic setae present, three pairs of posterolateral setae *lp*, h_3, h_2 on apophyses, large (length 35 µm) and distally phylliform (width 8-12 µm), central setae c_1, c_2, *da*, *dm*, *dp* very small (length 2-3 µm), setae *dp* situated on posterior elevation, setae c_3, *la*, *lm*, *h1*, p_1-p_3 slightly larger (length 4-5 µm), setae p_1-p_3 posteriolateral to adanal area, not visible in dorsal view. Lateral part of gastronotic region with wrinkles. No pteromorphae nor pedotecta developed.

Ventral region (Fig. 27): Surface plicate. Apodemes leading into wrinkles medially. Epimeral setal formula 3-1-2-2, genito-anal setal formula 6-1-2-3, all setae minute.

Legs: monodactylous with strong claws. Tarsus IV with 12 setae, other setal formulae as in adults. All setae on legs setiform. Solenidion φ_1 on tibia I very long (80-85 µm).

Other instars: Prodorsum of protonymph and deutonymph as in tritonymph, sensillus smaller according to smaller body size (protonymph 50 µm, deutonymph 60 µm). Both instars with 15 pairs of gastronotic setae, setae *lp*, h_3, h_2 large and dilated. Setal row p_1-p_3 posterolateral to ventral plates. Setation of palps as in adults in nymphs. Epimeral setal formula: protonymph 3-1-1-2, deutonymph 3-1-2-2, genito-anal setation: protonymph 3-1-0-3, deutonymph 5-1-2-3. Setation of legs — protonymph: leg I 0-3 -2(1) -4(1) -14(2), leg II 0-4 -3(1) -4(1) -13(1), leg III 0-2 -1(1) -2(1) -13, leg IV 2-2 -2 -10, deutonymph: leg I 0-3 -3(1) -4(2) -14(2), leg II 0-4 -3(1) -4(1) -13(2), leg III 0-2 -1(1) -3(1) -13, leg IV 2-2 -3(1) -13. Distal projection on tibia I large in all nymphs, solenidion φ_1 very long (65 µm in protonymph, 80 µm in deutonymph).

SEXUAL DIMORPHISM, EGGS: As in *Eremaeozetes irenae* sp. nov., the adults of *E. darwini* sp. nov. show two well-distinguishable size classes. Females larger, most of them bearing two to three large eggs. Dimensions of eggs (n=10) 90-120 × 50-70 µm, shape of eggs oval to elliptic, surface granulate. Apart from adult size, no external sexual dimorphism could be observed.

MATERIAL EXAMINED: More than 200 specimens of *Eremaeozetes darwini* sp. nov. (211 adults, 8 juveniles) were found on 6 islands of the Galápagos archipelago (Fig. 17), but only in moister habitats in the higher zones of the islands above 250 m a.s.l. This species occurs mainly in epiphytic pads of moss and *Lycopodium*, in lichens on barks and rocks, and in fungus on bark, but was also found in leaf and fern litter on the ground as well as in grass and herb litter. No morphological differences between the populations on the different islands were observed. Specific collection data:

Isla Fernandina, western part, 600 m a.s.l., open *Croton scouleri* forest with *Pteridium aquilinum*, in litter under *Darwiniothamnus tenuifolius* and grass (7 May 1991: 1 adult, S. Abedrabbo-Randl leg.).

Isla Floreana, moist highland, Cerro Pajas, northwestern crater rim, 575 m a.s.l., *Psidium guajava* and *Zanthoxylum fagara* forest, in moist, epiphytic moss with roots and *Peperomia* from bark (19 Jan. 1987: 3 adults), near buccaneer caves at Cerro Asilo de la Paz, 340 m, in moist, well-decayed leaf litter with roots and humus under *Lantana camara* (17 Jan. 1987: 1 adult).

Isla Isabela, Volcano Alcedo, southern crater rim, elfin forest with *Psychotria rufipes* and *Tournefortia rufo-sericea*, 1040 m, in moist epiphytic moss and lichens (21 Mar. 1988: 2 samples with 3 adults). Volcano Sierra Negra, dense forest with *Scalesia cordata*,

Tournefortia pubescens and *Sapindus saponaria* above Quinta Playa ("La Trocha"), 250 m a.s.l., in moist to wet moss and fern litter with *Peperomia* sp. from a dead trunk (7 Feb. 1987: 1 adult), ibid., in moist moss and dead log from bark of *Sapindus* (1 adult), ibid., in moist moss with humus from roots under *Sapindus* (1 adult). Southern crater rim, open forest with *Psidium guajava* and *Sapindus saponaria*, 910-1000 m, in moist lichens and humus from rock (10 Feb. 1987: 1 adult), ibid., in moist to wet moss and lichens on bark (2 samples with 9 adults).

Isla Pinta, moist zone around summit at main crater, dense stand of ferns with *Polypodium* sp. and *Pteridium aquilinum*, 600 m a.s.l., in moist fern litter and humus under uppermost layer (soil temperature >40° C due to volanic activity) (1 Apr. 1988: 2 samples with 2 adults).

Isla San Cristobal, moist zone: around lake El Junco, 660 m a.s.l., dense forest with *Psidium guajava* and *Miconia robinsoniana,* in moist to wet, decayed leaf litter with moss and humus (29 Mar. 1985: 2 adults, 1 Jan. 1987: 2 samples with 6 adults, 1 Mar. 1992: 3 adults, S. Abedrabbo-Randl leg.), ibid., in moist to wet, well-decayed fern litter and humus under *Pteridium aquilinum* (28 Mar. 1985: 1 adult, 1 Jan. 1987: 5 adults), ibid., in moist rotten wood under *Psidium guajava* (1 adult), ibid., in hanging pads of moist epiphytic moss and *Lycopodium dichotomum* (1 Jan. 1987: 2 samples with 4 adults, 3 Jan. 1987: 2 samples with 12 adults), ibid., in dry to moist lichens on rocks (1 Jan. 1987: 2 samples with 21 adults), ibid., in dry to moist fungus on bark (1 adult); near small river southeast of lake El Junco, 640 m, in moist pads of epiphytic *Lycopodium dichotomum* on bough of *Psidium* (3 Jan. 1987: 10 adults), valley southeast of El Junco, 480-500 m, dense forest with *Miconia robinsoniana, Psidium guajava* and *Cyathea weatherbyana,* in moist to wet, well-decayed leaf litter and humus (2 Jan. 1987: 4 adults), ibid., in moist pads of epiphytic moss (1 adult). Pasture area "Poza colorada" northwest of lake El Junco, 560 m, in grass and herb litter (3 Jan. 1987: 1 adult), pasture area around lake El Junco, 660 m, in grass litter (1 Mar. 1992: 3 adults, 1 tritonymph, S. Abedrabbo-Randl leg.). Cerro San Joaquin, 700-740 m, small crevice under *Cyathea weatherbyana,* in moist to wet, well-decayed fern litter (30 Mar. 1985: 1 adult), ibid., in dry to moist hanging pads of moss and *Lycopodium* (3 adults), ibid., in dry to moist grass litter with roots (1 adult).

Isla Santa Cruz, moist zones: agricultural area above Bella Vista, 450 m a.s.l., in moist to wet moss under *Miconia robinsoniana* and *Pteridium aquilinum* (11 Sep. 1982: 4 adults), in dry to moist moss under *Psidium guajava* (10 Mar. 1985: 1 adult); around Media Luna, 570-600 m, dense stand of *Miconia robinsoniana* and *Pteridium aquilinum*, in moist leaf and fern litter with humus (6 Feb. 1985: 1 adult, 28 Feb. 1987: 5 samples with 50 adults, 6 Mar. 1987: 2 samples with 3 adults), ibid., in dry to moist moss under *Miconia* (6 Feb. 1985: 1 adult), ibid., in lichens on rock (6 Mar. 1987: 4 adults, 2 tritonymphs), ibid., in moist pads of moss from bough (3 adults), ibid., in dripping wet pad of *Sphagnum* (6 Feb. 1985: 1 adult); *Scalesia* zone around Los Gemelos, 590 m, dense forest with *Scalesia pedunculata, Zanthoxylum fagara, Psychotria rufipes*, and *Tournefortia rufo-sericea,* in moist, partially to well-decayed leaf litter with humus (8 Mar. 1987: 2 samples with 2 adults), ibid., in dry to moist, epiphytic moss and lichens (13 Jan. 1987: 2 samples with 4 adults, 8 Mar. 1987: 2 samples with 6 adults, 3 tritonymphs, 1 protonymph); near Cerro Crocker, 700 m, forest with *Scalesia pedunculata , Zanthoxylum fagara, Psychotria rufipes, Tournefortia rufo-sericea, Pteridium aquilinum*, and *Borreria laevis*, in moist, decayed leaf, fern and grass litter with moss and humus (8 Feb. 1985: 1 adult, 6 Mar. 1987: 2 samples with 2 adults), ibid., in dry to moist epiphytic pads of moss and *Lycopodium* from bark, boughs and dead trunks (8 Feb. 1985: 5 adults, 6 Mar. 1987: 5 samples with 15 adults and 1 deutonymph). Fern-sedge zone: around Puntudo, 750 m, in dry to moist fern litter under *Pteridium aquilinum* (10 Mar. 1985: 1 adult), in dry to moist moss and lichens from rock (6 Mar. 1987: 4 adults).

The alcohol-preserved holotype (type locality: sample GAL 87-G069: Ecuador, Galápagos Islands, 6 Mar. 1987; Isla Santa Cruz, *Scalesia* forest neat Cerro Crocker, 700 m a.s.l., moist *Lycopodium* pads on bough with roots and moss 0°37′ S, 90°′21 W) and paratypes will be deposited in: Natural History Museum, Vienna, Austria. Paratypes in: author's collection, Innsbruck, Austria; Museum of Natural History, Budapest, Hungary; Universidad Católica, Quito, Ecuador.

REMARKS: *Eremaeozetes darwini* sp. nov. is morphologically very similar to *E. roguini* Mahunka, 1998 and can be considered as a sister species. A comparison with the designated paratype of *E. roguini* as well as with material from Costa Rica was possible. The body length of the new species is about 1.3 times larger than in *E. roguini* (Table 1). Other differences between the two species concern mainly details of the surface structure: in *Eremaeozetes darwini* sp. nov. the formation of the rostral apex is more pointed, the lamellar cuspides bear a short and blunt apex, the length of prodorsal setae is longer, the ridges leading posteriad from the inner tips of the sejugal apodeme are thin, and the ventral plate is finely punctulate. In *Eremaeozetes roguini* Mahunka, 1998 the rostral apex is blunt, the lamellar cuspides are almost rounded without apex, the length of prodorsal setae is shorter (2-3 µm), the ridges posteriad from sejugal apodeme are thicker, and the ventral plate has indistinct rugae.

Eremaeozetes darwini sp.nov. belongs to a group of monodactylous species without projecting fields or ridges on the notogaster. This combination of characters is known from *E. acutus* Covarrubias, 1967, *E. roguini* Mahunka, 1998, *E. spathulatus* Balogh, 1968, and *E. undulatus* Mahunka, 1985. Other known species without notogastral ridges are *E. gracilis* Mahunka, 1985, *E. verai* Pérez-Iñigo & Sarasola, 1995 and *E. woelkei* Piffl, 1972, which are all tridactylous. The cerotegument layer of *E. darwini* sp. nov. is weakly developed compared with other species of the genus (see *E. irenae* sp. nov.).

A scale anteriad of the genital plates is also developed in some other *Eremaeozetes* species in different shape and size: a small scale with indistinct lateral sides is known from *E. lineatus* Mahunka, 1985 and *E. machadoi* Mahunka, 1989, a well developed triangular scale from *E. darwini* sp. nov., *E. reticulatus* Balogh 1958 and *E. roguini* Mahunka, 1998, a quadrangular scale from *E. acutus* Covarrubias, 1967 and *E. araucana* Monetti *et al.*, 1994, two semicircular lobes from *E. kurozumii* Aoki, 1994.

The assignment of the immature instars to *E. darwini* is proved by one specimen which was just eclosing from the tritonymph. The juvenile instars of *E. darwini* sp. nov. are similar to those of *E. irenae* sp. nov. (see above). Differences between the two species include the presence of the interlamellar setae in *E. darwini*, the posterolateral setae on the notogaster which are shorter and of similar length in *E. darwini*, but longer in *E. irenae*. The setae on the ventral region are shorter in *E. darwini*, and no setae on legs are dilated. The plicate structure of the hysterosomal dorsum is different.

The interlamellar setae in most *Eremaeozetes* adults are not visible (MONETTI *et al.* 1994). In several

TABLE 1: Size of *Eremaeozetes roguini* Mahunka, 1998 from different sites in the northern Neotropical region and *E. darwini* sp. nov. (all measurements in µm):

	Eremaeozetes roguini Mahunka, 1998			*E. darwini* n. sp.
Record	St. Lucia L. Antilles [1]	La Selva Costa Rica [2]	Cocos Island [2]	Galápagos Islands
Females: n =	2	12	1	23
length: mean		342	380	437
range	346-367	(330-360)		(420-460)
width: mean		191	225	240
range	205-226 [3]	(180-205)		(220-260)
Males: n =		9		17
length: mean		308		404
range		(290-322)		(380-430)
width: mean		170		219
range		(165-177)		(200-240)

[1]) Data from MAHUNKA (1998). — [2]) Unpublished records. — [3]) The measurements of width by MAHUNKA cover the broadest part of the notogaster at the level of the pteromorphae; the other measurements of width were taken immediately behind the pteromorphae to avoid mistakes due to differently bent pteromorphs.

descriptions interlamellar setae are not mentioned or explicitly mentioned as being absent. In some species insertions of interlamellar setae are present, mostly medial to the bothridia (*E. gracilis* Mahunka, 1985, *E. octomaculatus* Hammer, 1973) or on the base of the lamellae (*E. lineatus* Mahunka, 1985). Only the adults of *E. costulatus* Mahunka, 1977, *E. maculosus* Mahunka, 1995 and *E. trifurcus* Wen, 1994 bear interlamellar setae. The presence of interlamellar setae in juvenile instars of *E. darwini* sp. nov. and their loss in the adult instar is noteworthy.

Zoogeographical and Ecological Remarks

Both *Eremaeozetes* species collected on the Galápagos Islands appear to be restricted to the islands and can be considered as endemic. Both species are closest related to species known from Central America (*E. irenae* sp. nov. — E. *lineatus* Mahunka, 1985; *E. darwini* sp. nov. — *E. roguini* Mahunka, 1998). It can be assumed that the ancestors of both species have reached the Galápagos Islands from Central or South America. *Eremaeozetes roguini* Mahunka, 1998 was also found by the author on Cocos Island situated between Galápagos and the Central American mainland. The isolated populations on the Galápagos Islands evolved larger body size in both species.

The distribution pattern on the Galápagos Islands (Fig. 17) shows a common occurrence of both species on several islands. However, they are ecologically separated: *Eremaeozetes irenae* sp. nov. is restricted to arid habitats and might be derived from ancestors preadapted to desiccation, *E. darwini* sp. nov. was found exclusively in moister habitats at higher elevations of the islands and seems to have derived from a different ancestral population.

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