

**A NEW SPECIES OF *EUSTIGMAEUS*
(ACARI: PROSTIGMATA: STIGMAEIDAE) FROM
KAUA'I ISLAND, HAWAIIAN ISLANDS¹**

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Abstract. *Eustigmaeus kauaiensis*, n. sp., is described from specimens collected from moss growing on a hau tree (*Hibiscus tiliaceus* L.) on Kaua'i Island, Hawaiian Islands.

Soil and litter material collected from the island of Kaua'i by one of us (MLG) in 1980 contained 3 species of *Eustigmaeus*: *E. segnis* (Koch, 1836), *E. sp. nr segnis*, and *E. sp. nr parviseta* (Goff 1983). From Kure Atoll in the Northwestern Hawaiian Islands, Goff (1983) reported *E. segnis* from soil and litter samples. The above records were given under the genus *Ledermuelleria* Oudemans, 1923, which is a junior synonym of *Eustigmaeus* Berlese, 1910 (Wood 1973). With the description of the new taxon below, the number of species of *Eustigmaeus* in the Hawaiian Islands is raised to 4. The only other stigmatid mite reported from the Hawaiian Islands is *Agistemus terminalis* (Quayle, 1912), collected from various plants on the islands of Hawai'i, Maui, and O'ahu (Garrett & Haramoto 1967).

The holotype and allotype are in the B.P. Bishop Museum, Honolulu, Hawai'i (BPBM), and paratypes are there and in the collections of the U.S. National Museum of Natural History, the Acarology Laboratory, University of Hawaii at Manoa, and U. Gerson's private collection. Terminology follows Grandjean (1944), Summers & Price (1961), Gerson (1972), and Wood (1973). All measurements (in micrometres) were taken of 10 specimens of each sex; holotype and allotype data and paratype ranges are noted in the description. The length of the idiosoma was measured from the anterior margin of the propodosomal plate to the tip of the posterior margin of the opisthosoma; the width was measured at the humeral sulcus. Intersetal distances are indicated as *ae-ae*, *ae-be*, etc.

***Eustigmaeus kauaiensis* Swift, Gerson & Goff, new species**

Fig. 1-4

Description of species. ♀ (ranges of holotype and 9 paratypes given in parentheses). Length of idiosoma 332 (312-359); width 294 (270-294). *Dorsum.* Dorsal plates sclerotized. Dimples

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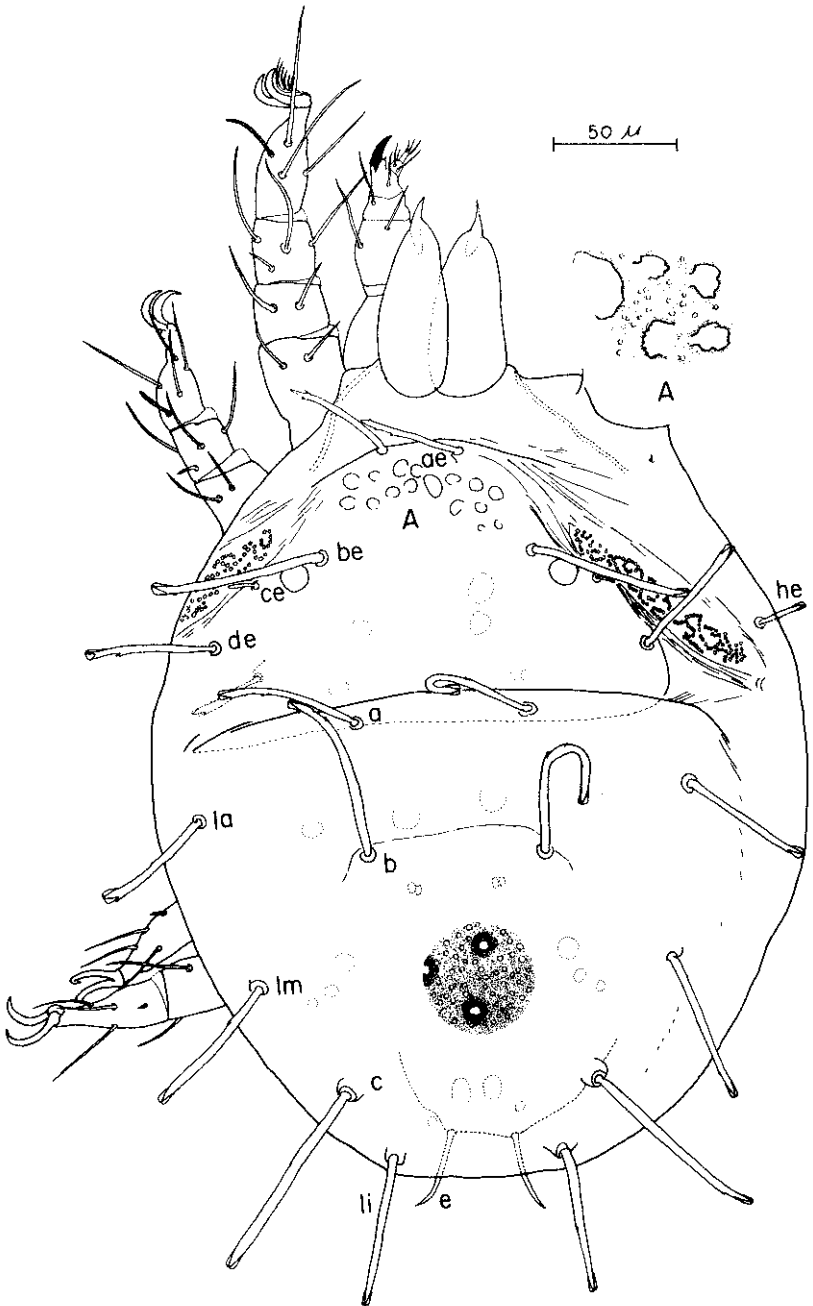


FIG. 1. *Eustigmaeus kauaiensis*, dorsal aspect of ♀. A, irregularly shaped dimples on median anterior propodosoma.

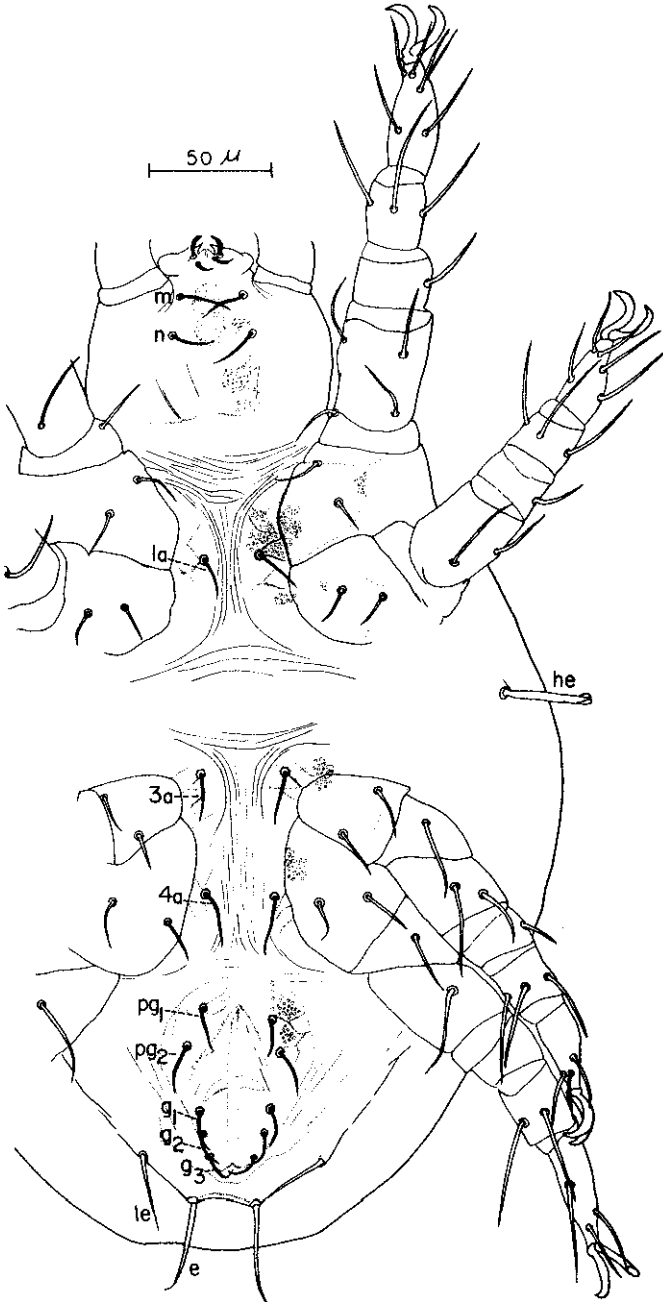


FIG. 2. *Eustigmaeus kauaiensis*, ventral aspect of ♀.

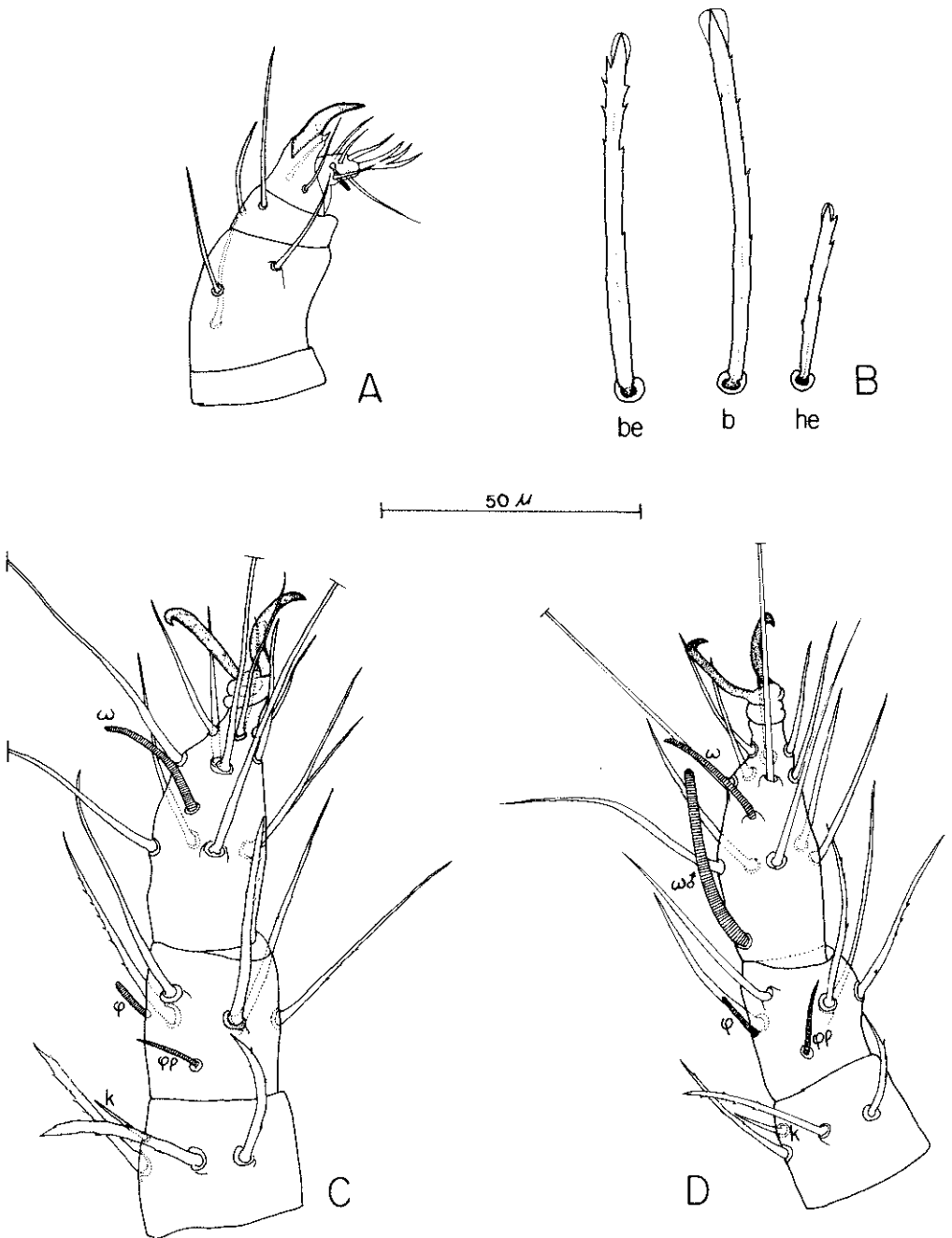


FIG. 3. *Eustigmaeus kauaiensis*: A, palpus of ♀; B, dorsal setae of ♀, C, distal segments of leg I of ♀, empodium omitted; D, distal segments of leg I of ♂, empodium omitted.

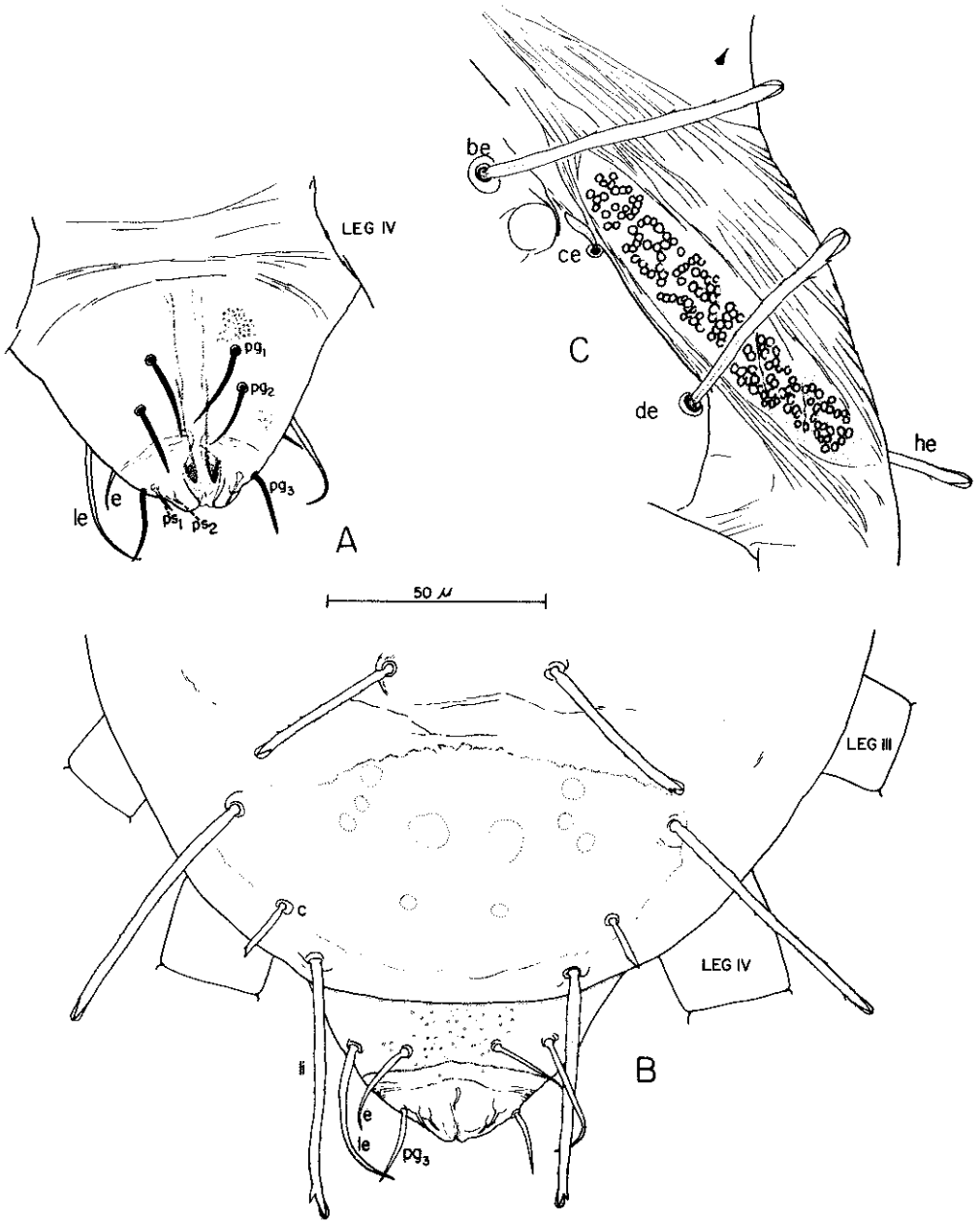


FIG. 4. *Eustigmaeus kauaiensis*: A, ventral aspect of δ opisthosoma; B, dorsal aspect of δ , showing divided hysterosoma and diminutive seta *c*; C, ♀ callosity.

prominent, oval or nearly round, distances between dimples greater than their diameters, small in central areas of propodosoma and hysterosoma, ca. 3–5× larger in anterior median propodosoma between setae *ae-ae*, *be-be* (Fig. 1A), the rest slightly enlarged toward idiosomal margin. Enlarged dimples in propodosoma clustered, irregularly shaped, numbering 13 to 17. Surface plating between dimples with fine punctations (Fig. 1), hexagonal reticulum evident where dorsal plates become thin near pleural region. Single callosity, substantially large, elongated, 94 (85–98) long, on pleural region separate from idiosomal plate, positioned over coxae II between eye and seta *de*, with shallow, round dimples, some arranged like strung beads on central area of plate (Fig. 4C). One to 3 large pairs of anomalous fossettes on central propodosoma, 2 small pairs in transverse row, less discernible, on posterior propodosoma between setae *de-de*; fossettes on hysterosoma as shown in Fig. 1. One pair of eyes, located between setae *be* and *ce*, slightly closer to *be*, diameter (12) ca. equal to length of adjacent seta *ce* (12). Thirteen pairs of dorsal setae (including ventrally displaced *he*, *le*, *e*), rodlike with few minute spinules, occasionally with 1 or 2 pronounced barbs distally; terminal hyaline sheath present, not extending past tip of setal core (Fig. 3B); setae *e* and *le* acicular. Most specimens with less discernible hyaline sheaths on setae *ae* and *ce*. Measurements and distances as follows: *ae* 54 (47–60); *be* 71 (65–79); *ce* 12 (9–12); *de* 54 (50–62); *he* 35 (32–42); *a* 62 (59–74); *b* 76 (68–82); *c* 88 (74–88); *la* 57 (53–63); *lm* 71 (62–74); *li* 67 (62–71); *e* 40 (38–44); *le* 32 (29–35); *ae-ae* 29 (24–31); *be-be* 91 (79–91); *ce-ce* 141 (138–153); *de-de* 197 (179–197); *a-a* 79 (68–85); *b-b* 75 (63–78); *c-c* 104 (100–115); *la-la* 218 (197–218); *lm-lm* 173 (156–179); *li-li* 74 (62–74); *e-e* 40 (38–44); *le-le* 32 (29–35). Venter (Fig. 2). Setae *1a*, *3a*, and *4a* hairlike, located on endocoxal plates between coxae I, III and IV, respectively. Endocoxal plates finely punctate and faintly reticulate, distinctly separated medially. Coxal bases densely punctate. Paragenital plate finely punctate, bearing 2 pairs of subequal paragenital setae; anogenital plate finely punctate, finely reticulate, bearing 3 pairs of subequal genital setae, inserted equidistant from each other on plate. Measurements and distances as follows: *1a* 18 (15–18); *3a* 18 (12–18); *4a* 24 (21–26); *pg1* 18 (16–18); *pg2* 18 (16–18); *pg1-pg2* 15 (12–18); *g1* 18 (15–21); *g2* 16 (15–21); *g3* 16 (15–21). *Gnathosoma*. Length (from base of fused coxae to tip of tibial claws) 112 (88–138). Coxae with dense fine punctation; trochanter narrow, ringlike; femur bearing 3 setae; genu 2 setae; tibia 2 setae, inserted on either side of segment, tibial claw distinct, as long as segment, with small accessory claw. Tarsus cylindrical with apical, trifid, stalked sensillum, 6 additional setae (including rodlike solenidion located ventrally) (Fig. 3A). Chelicera with fine, dense punctation, measuring 88 (85–103) long (*t*), stylettes (*s*) 21 (19–32); ratio (*t/s*) = 4.2 (3.2–4.5). Subcapitular setae *m* (16) and *n* (17) subequal, *m-m* = *n-n*. Legs. All 6-segmented, terminating in a pair of strong claws and an empodial shaft bearing 3 pairs of aciculate hairs, apical pair longest. Coxae I and II approximated, separated from approximated coxae III and IV. Lengths (from base of coxa to tips of claws) as follows: leg I 191 (171–194); leg II 156 (147–182); leg III 162 (159–171); leg IV 184 (176–194). Number of setae (specialized setae given in parentheses) on legs I–IV as follows: trochanters 1-1-1-1; femora 6-5-3-2; genua 4(κ)-4(κ)-1-1; tibiae 7(ϕ , $\phi\rho$)-6($\phi\rho$)-6($\phi\rho$)-6($\phi\rho$); tarsi 14(ω)-10(ω)-8(ω)-7(ω). Solenidion ω present on all tarsi; ω I long (26) (Fig. 3C), curved outwards; ω I > ω II > ω III > ω IV. ϕ present on tibia I, absent on tibiae II–IV; $\phi\rho$ I longer than $\phi\rho$ II– $\phi\rho$ IV; κ I approximately equal to κ II. Strong dorsal and lateral setae on podomeres, some sparsely barbed, ventral setae smoother.

♂. General features of setae and dorsal ornamentation as in ♀, except for less pronounced cluster of dimples on anterior median propodosoma, smaller size, and diminutive setae *c* (Fig. 4B). Hysterosoma transversely divided (Fig. 4B). Suranal region more posterior than in ♀. Pleural callosity 55, shorter than in ♀. Venter of opisthosoma with 3 pairs of ventral setae, 2 pairs approximated, 3rd pair on posterior idiosomal margin (Fig. 4A). Two pairs of small

tubercles, each bearing a minute seta (equivalent to Grandjean's *ps1*, *ps2*) present on posterior margin of idiosoma, slightly dorsad of 3rd pair of paragenital setae. Aedeagus a slender shaft 45 (45-59), posterior ½ enclosed in a broad sclerotized sheath, terminating in a pair of elongated, thickened, sclerotized, clawlike appendages (Fig. 4A). All tarsi with an additional basal solenidion ($\omega\delta$), long ($\omega\delta$ I 35, ω I 20), and reaching base of seta *tc* (Fig. 3D). Measurements and distances as follows: idiosoma 212 (201-229); with gnathosoma 319 (299-341); width 187 (176-198); *ae* 39 (34-46); *be* 47 (41-50); *ce* 4 (4-8); *de* 43 (36-44); *he* 29 (22-29); *a* 34 (30-38); *b* 41 (30-41); *c* 14 (12-18); *la* 39 (36-44); *lm* 62 (50-66); *li* 55 (48-59); *e* 20 (15-21); *le* 31 (28-33); *ae-ae* 21 (18-26); *be-be* 63 (59-65); *ce-ce* 100 (97-103); *de-de* 132 (125-135); *a-a* 62 (56-63); *b-b* 36 (34-39); *c-c* 70 (64-74); *la-la* 132 (130-137); *lm-lm* 93 (93-98); *li-li* 54 (51-59); *e-e* 19 (18-24); *le-le* 40 (39-48); leg I 169 (155-173); leg II 132 (121-138); leg III 132 (123-135); leg IV 150 (137-162); chelicera (t) 78 (68-78); stylet (s) 21 (18-22); ratio (t/s) 3.7 (3.5-3.7).

Type data. Holotype ♀ (BPBM 13,430), allotype ♂ (BPBM), 27 paratypes (13♀, 14♂), HAWAIIAN IS: Kaua'i I: Kapaa, moss on hau tree (*Hibiscus tiliaceus* L.), 1 m above ground, 26.IX.1980 (M.L. Goff).

Remarks. *Eustigmaeus kauaiensis* is similar to *E. schusteri* Summers & Price, 1961, and *E. etruscus* Berlese, 1910, in details of leg chaetotaxy and distribution, in lengths of dorsal setae, and by their males carrying a reduced dorsomedian seta *c*. *Eustigmaeus kauaiensis* may be readily distinguished from these species by the presence of enlarged, irregularly shaped dimples clustered in the median anterior propodosoma and by having a pair of elongated, somewhat flattened callosities on the pleural region between the eye and seta *de* (*E. schusteri* and *E. etruscus* have round or oval slightly raised callosities located between setae *ce* and *de*).

The species name is based on the type-locality.

LITERATURE CITED

- Garrett, L.E. & F.H. Haramoto. 1967. A catalog of Hawaiian Acarina. *Proc. Hawaii. Entomol. Soc.* **19**(3): 351-414.
- Gerson, U. 1972. A redescription of *Ledermuelleria frigida* Habeeb (Acarina: Prostigmata: Stigmaeidae). *Acta Arachnol.* **24**: 15-28.
- Goff, M.L. 1983. Notes and exhibitions. *Proc. Hawaii. Entomol. Soc.* **24**(2-3): 173, 176.
- Grandjean, F. 1944. Observations sur les acariens de la famille des Stigmaeidae. *Arch. Sci. Phys. Nat.* **26**: 103-31.
- Summers, F.M. & D.W. Price. 1961. New and redescribed species of *Ledermuelleria* from North America (Acarina: Stigmaeidae). *Hilgardia* **31**: 369-87.
- Wood, T.G. 1973. Revision of Stigmaeidae (Acari: Prostigmata) in the Berlese Collection. *Acarologia* **15**(1): 76-95.