

The Species of *Fahrenholzia* Kellogg and Ferris from Spiny Pocket Mice (Anoplura: Hoplopleuridae)¹

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ABSTRACT

The seven species of *Fahrenholzia* which occur on mice of the subfamily Heteromyinae (spiny pocket mice) are described and illustrated. Three new species are included: *ehrlichi*, from *Liomys irroratus* subspecies; *fairchildi*, from *Liomys sulzini* subspecies, *L. adpersus*,

and *Heteromys desmarestianus*; and *hertigi*, from *H. desmarestianus*. The description of the genus *Fahrenholzia* is revised, based on characters found in the new species.

There are eight described species of *Fahrenholzia* Kellogg and Ferris, all occurring on members of the sciuriform family Heteromyidae (pocket mice). Four of the described forms are found on mice of the entirely North American subfamilies Dipodominae and Perognathinae. The hosts of the remaining four *Fahrenholzia* are all species of Heteromyinae (spiny pocket mice), a subfamily whose members occur in the southwestern United States, Mexico, Central America, and northern South America.

The review of *Fahrenholzia* species found in the United States by Stojanovich and Pratt (1961), has well-executed drawings of certain diagnostic structures of the four louse species found on *Perognathus* and *Dipodomys* (*F. pinnata* Kellogg and Ferris,

reducta Ferris, *tribulosa* Ferris, and *zacatecae* Ferris) plus a workable key, and this group is not considered in the present paper.

The four described species in the heteromyine-infesting group are *microcephala* Ferris, *ferrisi* Werneck, *schavartzi* Werneck, and *texana* Stojanovich and Pratt. *F. ferrisi* was described by Werneck from specimens included in the type series of *microcephala* and taken from *Heteromys goldmani*. *F. texana*, from *Liomys irroratus texensis*, is also represented in the *microcephala* type series, as is a new species described in this paper. Records and figures in Stojanovich and Pratt (1961), attributed to *microcephala*, are of the new species.

I have studied collections from the following sources: Panama and the Canal Zone (Malaria Control and Survey Branch, Fort Clayton, Canal Zone, directed by Majors Robert Altman and Vernon Tip-

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ton); Guatemala (Louis de la Torre); Trinidad (T. H. C. Aitken); and Colombia (P. Hershkovitz). As well, I have seen all the named *Fahrenholzia* specimens in the Ferris collection at Stanford University, British Museum (Natural History), and the United States National Museum.

The collections from Guatemala, Panama and the Canal Zone, Trinidad, and Colombia have added many examples of heteromyine-infesting *Fahrenholzia* to our museum collections and revealed the existence of two undescribed species from Central America, bringing the total of known *Fahrenholzia* species to eleven. The discovery of *F. texana* and the two new Central American species make necessary a revised description of the genus *Fahrenholzia*.

For convenience, the species discussed here will be referred to as members of the "microcephala group."

I am grateful to Dr. R. L. Wenzel, Chicago Natural History Museum; Dr. J. F. Gates Clarke, United States National Museum; Dr. Paul Ehrlich, Stanford University; and Majors Tipton and Altman, for the opportunity to study the collections under their care.

Genus *Fahrenholzia* Kellogg and Ferris

Fahrenholzia Kellogg and Ferris, 1915, Anoplura and Mallophaga of North American Mammals, Stanford Univ. Publ., Univ. Series (no volume number), 6: 32. Type of genus: *Fahrenholzia pinnata* K. & F., 1915, by original designation.

DESCRIPTION.—Head usually not narrowed at juncture to thorax. Antennae not sexually dimorphic, at times segments 3-5 more-or-less coalesced; in one known species these segments completely coalesced. Anterior legs small with slender claw which may be apically bifurcate; middle and posterior legs much larger, subequal in size, often with toothlike projection at outer basal angle of tarsus, claws large, not flattened. Paratergal plates on varying number of abdominal segments, always on segments 2-4. Paratergal plates of segment 2 divided into two plates, one lying on dorsum, one on venter, the ventral plate with apically free portion. (Ferris (1951) suggests that one of these plates may represent the plate of segment 1.) Paratergal plates on segments 3-4 with apical angles free from body. Plates lacking free apical angles may occur as far posteriorly as segment 8. Abdomen membranous except for usual dorsal and ventral plates of terminal and genital segments, plus, at times, a narrow, dorsal, longitudinal plate on second segment. One row of stout, flattened setae on each segment both dorsally and ventrally. Spiracles present on segments 3-8. Usual lateral pair of long setae present on each side of segment 8, but lacking on segment 7 in adult. Thoracic sternal plate strongly developed, at times divided into two parts.

Fahrenholzia microcephala Ferris

(Figs. 1-4, 28, 35)

Fahrenholzia microcephala Ferris, 1922, Contributions toward a monograph of the sucking lice, 2(3): 161, figs. 106, 107 (*partim*). Ferris, 1951, The sucking lice,

p. 174 (*partim*), Werneck, 1952, Rev. Brasil. Biol. 12(1): 69 (*partim*).

TYPE DATA.—Male holotype, female allotype, two female paratypes from *Liomys pictus obscurus* (F.A.C. 11099) (as *Heteromys*), San Carlos, Veracruz, Mexico. The holotype was figured by Ferris (1922). The type series of *microcephala* is in the Ferris collection at the Stanford University Natural History Museum.

The paratypes from *Heteromys goldmani* (U.S.N.M. 14353) were described by Werneck (1952) as a new species, *Ferrisi*. Paratypes from *Liomys irroratus canis* (U.S.N.M. 91883), *L. i. jaliscoensis* (U.S.N.M. 34131), and 2♀ from *Liomys i. texensis* (as *L. texensis*) (U.S.N.M. 29943) are *ehrlichi*, new species, described in this paper. The one ♂ paratype from *L. i. texensis* is *texana* Stojanovich and Pratt.

SPECIMENS EXAMINED.—The type series.

DIAGNOSIS.—*F. microcephala* is distinguished from all *Fahrenholzia* species except *ehrlichi*, n. sp., in that the first antennal segment has a sharply defined, pointed tooth on the dorsal surface (fig. 28), and the thorax dorsolaterally has rounded, semimembranous, wrinkled expansions set off by convex sclerotized ribs (fig. 1). It is separable in both sexes from *ehrlichi* in that the shorter apical seta on paratergal plate II is very short, not reaching the tip of the apical lobe of this plate. Male *microcephala* differs from *ehrlichi* in having the median posterior process of the basal plate attached to the basal plate and narrowest apically (fig. 3). Female *microcephala* differs from *ehrlichi* in having the anterior, oblique margins of the genital plate obviously more than twice as long as the anterolateral margins of the setigerous lobes of the eighth segment ("gonopods") (fig. 35).

DESCRIPTION.—**MALE** (fig. 4): *Head* (fig. 28, ♀) broader than long, broadest portion at juncture with thorax. First antennal segment with a dorsal tooth; segments 3-5 not coalesced. *Thorax* broader than head, and longer. Lateral margins dorsally with expanded, wrinkled, semimembranous areas on meso- and metathorax. (These areas not shown by Ferris (1922).) Thoracic sternal plate as in fig. 2, *Legs*. Middle and posterior legs with toothlike projection at outer, basal angle of tarsus. Claw of first leg not bifurcate apically. *Abdomen* with setation as shown in figure. Second segment dorsally with narrow, longitudinal plate which has one small seta inserted on each side, near anterior apex, this plate not expanded posteriorly, none of setae in horizontal row of second tergite with bases inserted on the plate. Paratergal plates present on segments 2-4. Paratergal plate II with two apical setae on dorsal detached portion, one very long, other small, not extending to tip of apical lobe. Two small setae laterally on segment 2, between the parts of the paratergal plate. Ventral detached portion of plate II lacking setae, subapically with overlying flaplike secondary lobe. Plate III with two apical setae, one of these long, other less than length of plate; produced into two apical lobes, the ventral one truncate, the dorsal one acutely rounded. Plate

IV lacking setae, narrowly rounded to acute apically. *Aedeagus* (fig. 3) with basal plate truncate anteriorly, slightly expanded posteriorly, with posterolateral arms embracing parameres for almost half their length; posteromedian extension narrowing apically, joined to basal plate. Pseudopenis a short, straight rod with posterior end slightly trifoliate.

FEMALE (fig. 1): Closely resembles male except for genital segments (fig. 35). Genital plate almost twice as long as broad, not including posterior fibriate apex, broadest about at center, angled here so that entire structure is elongate-diamond shaped, with all angles rounded; margins below middle weakly sinuate. Lateral setigerous lobes of eighth segment opposite lower half of genital plate, with three short posterolateral setae. Anterolateral margins of setigerous lobes less than half as long as anterior oblique margins of genital plate.

LENGTH.—Male, 1.1 mm.; female, 1.3 mm.

Fahrenholzia ehrlichi, new species

(Figs. 5-9, 29, 36)

Fahrenholzia microcephala Ferris, 1922, Contributions toward a monograph of the sucking lice, 2(3): 161, (*partim*, some of records and fig. 107E). Ferris, 1951, The sucking lice, p. 174 (*partim*). Werneck, 1952, Rev. Brasil. Biol. 12(1): 69 (*partim*). Stojanovich and Pratt, 1961, Ann. Ent. Soc. Amer. 54(5): pl. 2 (*err. det.*).

TYPE DATA.—Male holotype, female allotype, one male and three female paratypes from *Liomys irroratus canis* (U.S.N.M. 91883), Valparaiso, Zacatecas, Mexico. (The holotype, allotype, and one paratype female are mounted on one slide. The allotype is the female with all legs present.) Three female paratypes from *L. i. jaliscoensis* (U.S.N.M. 34131), Atamejac, Jalisco, Mexico. Two female paratypes from *L. i. texensis* (U.S.N.M. 29943), Brownsville, Texas. (All the above specimens were paratypes of *microcephala* Ferris.) One female paratype from *L. i. alleni* (U.S.N.M. 120169), Acotlan, Jalisco, Mexico. One male, seven female paratypes from *Liomys irroratus* ssp., collected in Mexico, 1940, by S. Benson, at Encarnación de Diaz, Jalisco (5♀♀), and Matamoros, Tamaulipas (1♂ 2♀♀).

Holotype, allotype and two female paratypes deposited in the collections of the United States National Museum. One male, two female paratypes with data as the holotype are in the collections of the British Museum (Natural History). Remaining paratypes are in the Ferris collection, Stanford University Natural History Museum.

DIAGNOSIS.—Separable from all *Fahrenholzia* species except *microcephala* in that the first antennal segment has a dorsal tooth in both sexes (fig. 29) and semimembranous, wrinkled expansions are present dorsally on the meso- and metathorax (fig. 5). Both sexes separable from *microcephala* in that the smaller of the two apical setae on paratergal plate II is much longer than the apical lobe of the same plate. Male *ehrlichi* differs from *microcephala* in that the posteromedian extension of the basal plate of the

aedeagus is not attached to the basal plate and is broadest apically (fig. 7). Female *ehrlichi* differs in that the anterolateral margins of the genital plate are no more than twice as long as the lateral oblique margins of the setigerous lobes of the eighth segment ("gonopods") (fig. 36).

DESCRIPTION.—**MALE** (fig. 8): *Head* (fig. 29, ♀) about as broad as long, shorter than thorax, dorsal setae minute. Antennae with segments definite, not coalesced; dorsally first antennal segment has a tooth. *Thorax* about as long as broad, dorsally meso- and metathorax with lateral, rounded, wrinkled, semi-membranous expansions enclosed medially by sclerotized bands. Thoracic sternal plate (fig. 6, ♀) rounded-truncate anteriorly, expanded posteriorly, posterior apex rounded. *Legs*. Middle and posterior legs with toothlike projection at outer basal angle of tarsus. Claw of first leg not bifurcate at tip. *Abdomen*. Second tergite with narrow longitudinal plate lacking small lateromarginal setae on the plate, though one small seta present off each side of plate; plate not expanded posteriorly. Paratergal plates present on second through fourth segments. Dorsal part of plate II with two apical setae, smaller one extending well beyond apex of apical lobe; ventral portion of plate rectangular with overlying sub-apical rounded lobe. Two small setae laterally on segment 2, between the parts of the paratergal plate. Plate III with two apical lobes, dorsal one acute, ventral one truncate; with two apical setae, one very long, other equal to length of plate. Plate IV elongate, narrowly rounded posteroapically, no apical setae. Setation of abdomen as shown in figure. *Aedeagus* (figs. 7 and 9) with basal plate rounded antero-apically, broadly expanded posteriorly with long posterolateral arms which embrace parameres for almost half their length; median posterior extension of basal plate completely separate, narrow anteriorly, expanded posteriorly. Parameres differing in shape, apparently according to whether the specimen has been flattened (compare figs. 7 and 9), roughly triangular, outer posterior apex talon-shaped or bluntly rounded, inner posterior apex irregularly truncate. Pseudopenis broader posteriorly than anteriorly, posterior apex of irregular shape.

FEMALE (fig. 5) as in male except for genital segments (fig. 36). Genital plate quadrate, with posterior angle extended into narrow, apically fringed process. Lateral setigerous lobes of eighth segment triangular, with three small setae on apicomarginal margin. Lateral oblique margins of the setigerous lobes more than half length of anterolateral margins of genital plate.

LENGTH.—Male, 1.15 mm.; female, 1.5 mm.

This species is dedicated to Dr. Paul R. Ehrlich, of Stanford University, in recognition of his many and diverse services to the science of taxonomy.

Fahrenholzia ferrisi Werneck

(Figs. 10-13, 30, 37)

Fahrenholzia microcephala Ferris, 1922, Contributions

toward a monograph of the sucking lice, 2(3): 161 (partim). Ferris, 1951, The sucking lice, p. 174 (partim).
Fahrenholzia ferrisi Werneck, 1952, Rev. Brasil. Biol. 12(1): 73, fig. 7.

TYPE DATA.—Selection of a lectotype male is necessary since neither of the males in the type series was so labelled, although Werneck referred to the "holotype" male in the original description. I have selected the male mounted together with a female, and have labelled the slide "lectotype ♂." Male lectotype, one male and three female paratypes from *Heteromys goldmani* (U.S.N.M. 14353), Achotal, Veracruz, Mexico. These specimens were included in the type series of *microcephala* Ferris.

Lectotype and paratypes are in the collections of the Stanford University Natural History Museum.

SPECIMENS EXAMINED.—The types plus five males and nine females from *Heteromys* sp. (C.N.H.M. 73602-03), 5 mi. E. Mataquecuintla, Dept. Jalapa, Guatemala, and *Heteromys* sp. (C.N.H.M. 73599-600), 1½ mi NW, Esquipulas, Dept. Chiquimula, Guatemala.

DIAGNOSIS.—Separable in both sexes from *microcephala* and *chrichti*, n. sp., in lacking a sharply defined dorsal tooth on the first antennal segment (fig. 30). Distinct from *texana*, *fairchildi*, n. sp., and *hertigi*, n. sp., in having a toothlike projection at the outer basal angle of the median and posterior tarsi, and in that the ventral apical lobe of paratergal plate III (of the third abdominal segment) is truncate (fig. 10). Differs from *schwartzii* in that the lateral post-antennal margins of the head have a strong sclerotized area which is continued as a dark horizontal band on to the ventral surface of the head (fig. 30). Further separable in the male from *schwartzii* in that the posterior median process of the aedeagal basal plate is as broad apically as basally, and the basal plate has its posterolateral arms extending almost the entire length of the parameres (fig. 12). Female further separable from *schwartzii* in that the genital plate has the lateral margins evenly convex (fig. 37).

DESCRIPTION.—**MALE** (fig. 13): *Head* (fig. 30, ♀) broader than long, dorsally with eight to ten small, rather stout setae; lateral postantennal head margin with strong sclerotized area which is continued on to the ventral head surface as a dark, horizontal band. Antennal segments rather clearly delineated, lacking pointed tooth on first antennal segment. *Thorax* broader than head, longer than broad, thoracic sternal plate as in fig. 11. *Legs*. Median and posterior pairs with toothlike projection on outer basal angle of tarsus, claw of first leg not bifurcate apically. *Abdomen*. Longitudinal plate of second tergite expanded posteriorly and some or all of setae in horizontal row of second tergite inserted on this expansion. Paratergal plates on segments 2-4, dorsal portion of paratergal plate II with two apical setae, one of them very long, other shorter than or as long as plate proper, ventral portion of plate II rectangular, no setae. Two medium-sized setae laterally on segment

2, between parts of paratergal plate. Plate III with two apical lobes, ventral one truncate, dorsal one acute; with two apical setae, one very long, other about as long as plate. Plate IV elongate, narrowly rounded posteriorly, lacking setae. Setation of abdomen as shown in figure. *Aedeagus* (fig. 12). Basal plate narrow anteriorly, with heavily sclerotized lateral margins, expanded posteriorly with long lateral arms extending almost as far posterior as parameres, median posterior process of basal plate large, rounded, filling area between parameres, posteriorly excised in center of margin. Parameres boomerang-shaped, bent at right angle just posterior to tip of lateral arm of basal plate, apparently joined medially. Pseudopenis broad basally, narrowing abruptly to rounded rodlike apex. **FEMALE** (fig. 10): As male except for genital segments (fig. 37). *Genital plate* rounded anteriorly, lateral margins convex, broadest posteriorly. Lateral setigerous lobes of eighth segment set well anterior and lateral to posterior apex of genital plate, longest in the horizontal plane, bearing three short setae on posterior margin.

Fahrenholzia schwartzii Werneck

(Figs. 14-17, 31, 38)

Fahrenholzia schwartzii Werneck, 1952, Rev. Brasil. Biol. 12(1): 70, figs. 1-6.

TYPE DATA.—Male holotype, female allotype, one male and four female paratypes from *Heteromys anomolus anomolus*, Campamento Rafael Rangel, Sierra Maestra, State of Aragua, Venezuela. Also included in the type series: one male, seven females, and three nymphs from the type host and locality.

The types are in the collections of the Instituto Oswaldo Cruz, Rio de Janeiro.

SPECIMENS EXAMINED.—Many males and females, all from *Heteromys anomolus*, Rio Grande Forest and other localities in Trinidad, and a single female, probably this species, from *Heteromys anomolus*, Caracolito, Magdalena, Colombia.

DIAGNOSIS.—Separable from *microcephala* and *chrichti*, n. sp., in that *schwartzii* lacks a sharply defined dorsal tooth on the first antennal segment (fig. 31). Separable from *texana*, *fairchildi*, n. sp., and *hertigi*, n. sp., in having a toothlike projection at outer basal angle of second and third tarsi, and in that the ventral apical angle of paratergal plate III (of the third abdominal segment) is truncate (fig. 14). Nearest *ferrisi*, but distinct in both sexes in that the lateral postantennal head margins lack a heavily sclerotized area and horizontal band extending on to the ventral surface of the head (fig. 31). Further separable from *ferrisi* in the male in that *schwartzii* has the lateral posterior arms of the basal plate of the aedeagus much shorter than the parameres and the median process of the basal plate narrowing apically (fig. 16). Further separable in the female from *ferrisi* in that the lateral margins of the genital plate are angled, with the margins somewhat concave anterior to this angle (fig. 38).

DESCRIPTION.—**MALE** (fig. 17): *Head* (fig. 31, ♀)

about as long as broad, dorsal setae very small, antennal segments 3-5 only partially coalesced. Lacking dorsal tooth on first antennal segment. *Thorax* longer than broad, broader than head. Thoracic sternal plate as in fig. 15. *Legs*. Middle and posterior pairs with toothlike projection at outer basal angle of tarsus. Claw of first leg not apically bifurcate. *Abdomen* with dorsal longitudinal plate of segment 2 broadened posteriorly, at times bases of setae of horizontal row on segment 2 inserted on this plate. Paratergal plates present on segments 2-4. Paratergal plate II with dorsal portion bearing two apical setae, one long, other shorter than length of plate, ventral portion rounded apically. Two rather small setae laterally on segment 2, between parts of paratergal plate. Paratergal plate III with posteroapical margin bilobed, ventral lobe truncate, dorsal lobe acute, with two apical setae, one long, other shorter or about same length as plate. Setation of abdomen as shown in figure. *Aedeagus* (fig. 16). Basal plate truncate anteriorly, slightly broadened posteriorly with short lateral extensions fitting over insertions of parameres; medio-posteriorly expanded into large rounded posteromedian process which fills space between parameres and posteroapically bears two small rounded protuberances. Parameres angulate, short, pseudopenis triangular, with posteroapical angle truncate.

FEMALE (fig. 14): As male except for genital segments (fig. 38). *Genital plate* narrowly rounded anteriorly, broadest before the posterior margin, which is sclerotized to varying degree; medially just anterior to posterior margin with small ring-shaped sclerotized area; posterior margin spiculated. Lateral setigerous lobes of eighth segment placed anterior to posterior margin of genital plate, longest in a horizontal direction, bearing 3 small setae on posterior margin.

LENGTH.—Male, 0.93 mm.; female, 1.2 mm.

Fahrenholzia fairchildi, new species

(Figs. 18-21, 32, 39)

TYPE DATA.—Male holotype, female allotype, 10 male and 8 female paratypes from *Heteromys desmarestianus*, Santa Fe, Republic of Panama, 13 February 1952, Malaria Control and Survey Branch collectors, No. 3060 (host determined by C. H. Handley of U.S.N.M.). One male, one female, paratypes from *H. desmarestianus*, Fort Kobbe, Panama Canal Zone, 19 January 1955, No. 356. Four female paratypes from *Liomys alpersus*, Fort Kobbe, and Summit Road, Canal Zone, Nos. 1644 and 3381, collected by the Malaria Control and Survey Branch (host determined by C. H. Handley of U.S.N.M.). The following were collected in various localities in Guatemala during 1951-52 by Louis de la Torre: Ten male, five female, paratypes from *L. s. salvini*, Univ. of Michigan Nos. 99369 and 99370. Seven male, eleven female, paratypes from *Liomys* sp., C.N.H.M. Nos. 73572, 73581-82, 73584-89, 73595.

Holotype and allotype deposited in the collections of the United States National Museum. All Guate-

malan specimens are from the Chicago Natural History Museum.

Probably *fairchildi*, n. sp., occurs normally on both *Liomys* and *Heteromys* species. Good series of *fairchildi* were taken from mice belonging to both genera, and the possibility of mechanical contamination during the collecting process seems remote. Two or more physiologically disparate species of lice could exist, each on a particular host species, but I have not been able to find any constant morphological differences among the specimens at hand.

Interestingly, both *fairchildi*, n. sp., and *hertigi*, n. sp., have been taken from *Heteromys desmarestianus*. Although uncommon in the Anoplura, there are examples of two members of the same genus of lice occurring on the same host species, and amongst the *Fahrenholzia*, *chrichti* and *texana* may be taken from the same host. There is no reason to believe the records given here could not reflect a natural situation.

DIAGNOSIS.—Separable from all the *microcephala*-like species except *hertigi*, n. sp., and *texana*, in that paratergal plate III (of the third abdominal segment) has the ventral apical angle sharply rounded or acute, and the second and third pairs of legs lack a toothlike process on the outer basal angle of the tarsus (fig. 18). Separable from *hertigi*, n. sp., in both sexes in that antennal segments 3-5 are not completely coalesced (fig. 32), the thorax is obviously broader than the head, and the thoracic sternal plate does not have a small anterior detached portion. Distinct from *texana* in both sexes in that the paratergal plates are much larger, plate III is as long as plate II, and the claws of the posterior pair of legs are almost as long as the head is wide. In the male, *fairchildi* differs from *texana* in that the posteromedian process of the aedeagal basal plate is attached to the basal plate, the parameres lack toothlike posterior projections, and the pseudopenis is apically acutely rounded (fig. 20). In the female, *fairchildi* is separable from *texana* in that the lateral setigerous lobes of the eighth segment are oval and longest in the longitudinal axis of the body (fig. 39).

DESCRIPTION.—**MALE** (fig. 19): *Head* (fig. 32, ♀) about as long as broad, lateral postantennal margin medially with heavy sclerotization which is continued as a darkened band on to ventral surface. Antennal segments 3-5, particularly 4-5, partially coalesced. *Thorax* longer than broad, broader than head, thoracic sternal plate as in fig. 21. *Legs*. Second and third pair of legs lacking toothlike projection at outer basal angle of tarsus. Claws of first pair not apically bifurcate. *Abdomen*. Dorsal longitudinal plate of segment 2 variously developed, sometimes missing, not especially broadened posteriorly, none of setae in horizontal row of this segment inserted on the plate. Paratergal plates present on segments 2-4. Paratergal plate II with dorsal detached portion bearing two setae, one long, other very short; ventral detached portion posteroapically bilobed. Two or three very small setae laterally on segment 2, between parts of paratergal plate. Plate III with posterior apex bi-

lobed, each lobe narrowly rounded or acute, bearing two apical setae, one of these very long, other minute. Plate IV posteroapically narrowly rounded or truncate, often with apex notched. Setation of abdomen as shown in figure. *Aedeagus* (fig. 20). Basal plate rounded anteriorly, gradually broadening to short lateral posterior arms which embrace only tips of paramere bases; with paddle-shaped median process which has a narrow neck joining basal plate and rounded, expanded apex. Parameres narrow, curved, posteriorly excised to form a mesal rounded-to-

truncate lobe and hook-shaped lateral lobe. Pseudopenis with narrowed waist, posteriorly acutely rounded, apex somewhat trilobed in appearance.

FEMALE (fig. 18): As male except for genital segments (fig. 39). Genital plate quadrate, not fringed posteriorly, with small circular sclerotization near posterior apex. Lateral setigerous lobes of eighth segment extending posterior to genital plate, oval, bearing three medium-sized setae on mesal margin near posterior apex. Often, below setigerous lobes, with two horizontally elongate plates which bear one

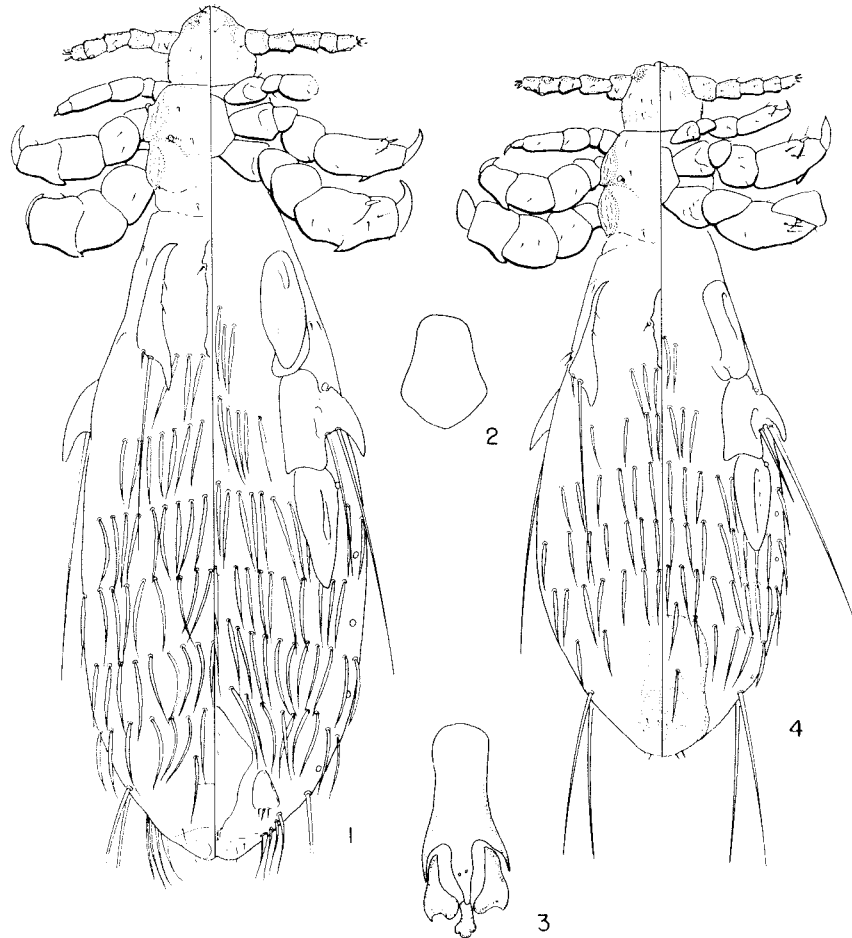


PLATE 1

Fahrenholzia microcephala Ferris: male holotype, female allotype. FIG. 1, female. FIG. 2, thoracic sternal plate, female. FIG. 3, aedeagus. FIG. 4, male.

seta each on posterior margin, but these plates not always developed.

LENGTH.—Male holotype, 1.4 mm., paratypes, 1.4–1.5 mm.; female allotype, 1.8 mm., paratypes, 1.75–1.94 mm.

This species is named in honor of my colleague,

Dr. G. B. Fairchild of Gorgas Memorial Laboratory, Panama.

***Fahrenholzia hertigi*, new species**

(Figs. 22, 23, 34, 40)

TYPE DATA.—Female holotype and six female

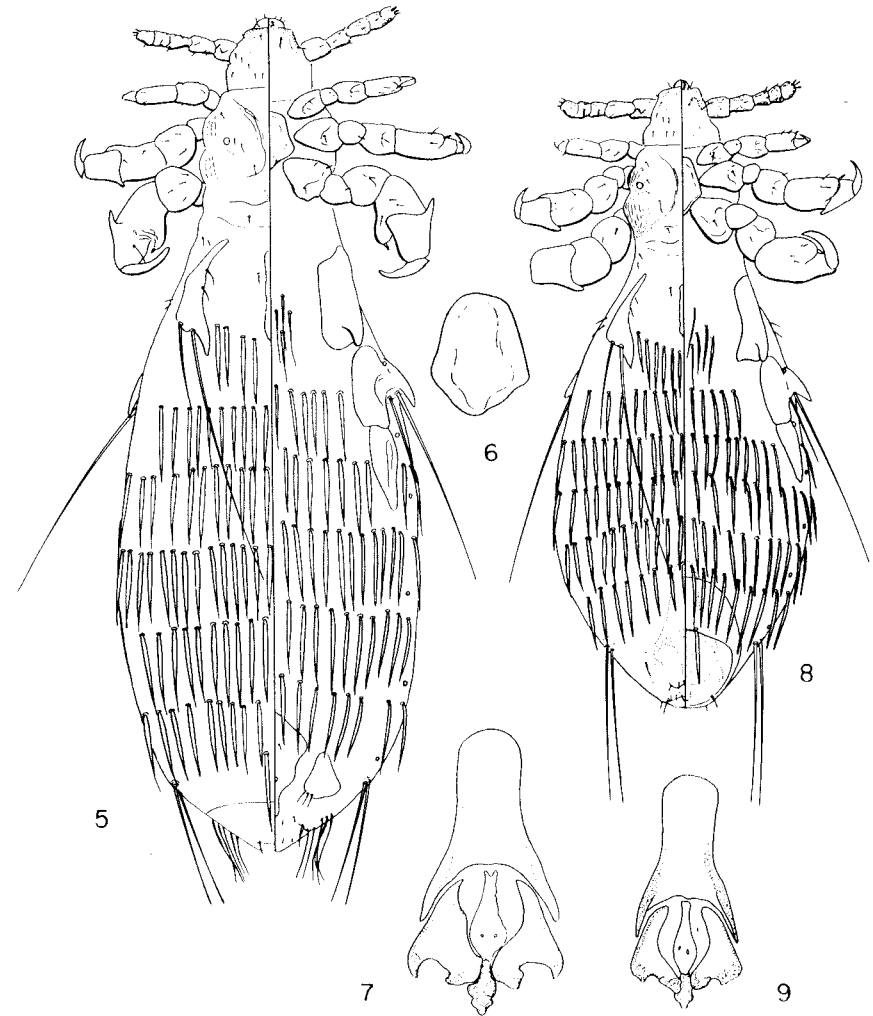


PLATE 2

Fahrenholzia ehrlichi, new species.

FIG. 5, female allotype. FIG. 6, thoracic sternal plate, female allotype. FIG. 7, aedeagus, holotype. FIG. 8, male holotype. FIG. 9, aedeagus, paratype from *L. irroratus*, Matamoros, Mex. (not to same scale as fig. 7)

paratypes from *Heteromys desmarctianus*, Cerro Azul, Republic of Panama, 29 January 1958, Malaria Control and Survey Branch collectors, No. 4037 (host determined by C. H. Handley, U.S.N.M.). One female from *Zygodontomys cherrii*, Camp

Piña, Panama Canal Zone, 13 June 1957, Malaria Control and Survey Branch collectors, No. 3359.

Holotype deposited in the collections of the United States National Museum.

The single female from *Zygodontomys* was probably

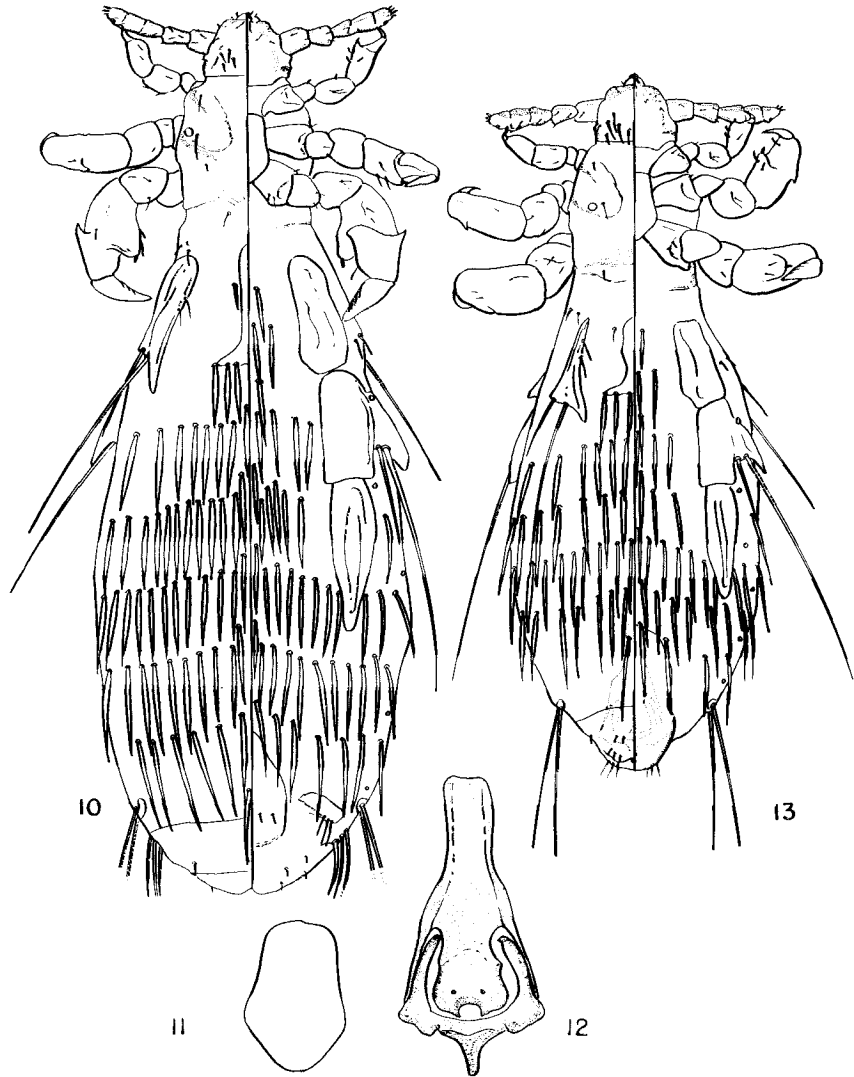


PLATE 3

Fahrenholzia ferrisi Werneck: from *Heteromys* sp., Guatemala.

FIG. 10, female. FIG. 11, thoracic sternal plate, female. FIG. 12, aedeagus. FIG. 13, male.

a straggler. There was no chance of mechanical contamination in this case, since Major Altman has informed me that for 2 weeks prior to and after the date of collection, no *Heteromys* or *Liomys* had been collected in Camp Piña.

DIAGNOSIS.—Immediately separable from other members of the *microcephala* group in that the antennae have segments 3-5 completely coalesced and are no longer than the head (fig. 34). Further separable in that the thorax is no broader than the head, and has its sternal plate divided into a large pos-

terior part and a small detached anterior part (fig. 23).

DESCRIPTION.—FEMALE (fig. 22): Head (fig. 34) longer than broad, extending before antennae for about one-fourth of its total length; ventrally rugose; narrowed at juncture to thorax, postantennal margins convex. Antennae not longer than length of head, segments 3-5 coalesced. Thorax no wider than head, longer than broad, thoracic sternal plate divided into a large posterior part and a small detached anterior part (fig. 23). Legs. Second and third pairs

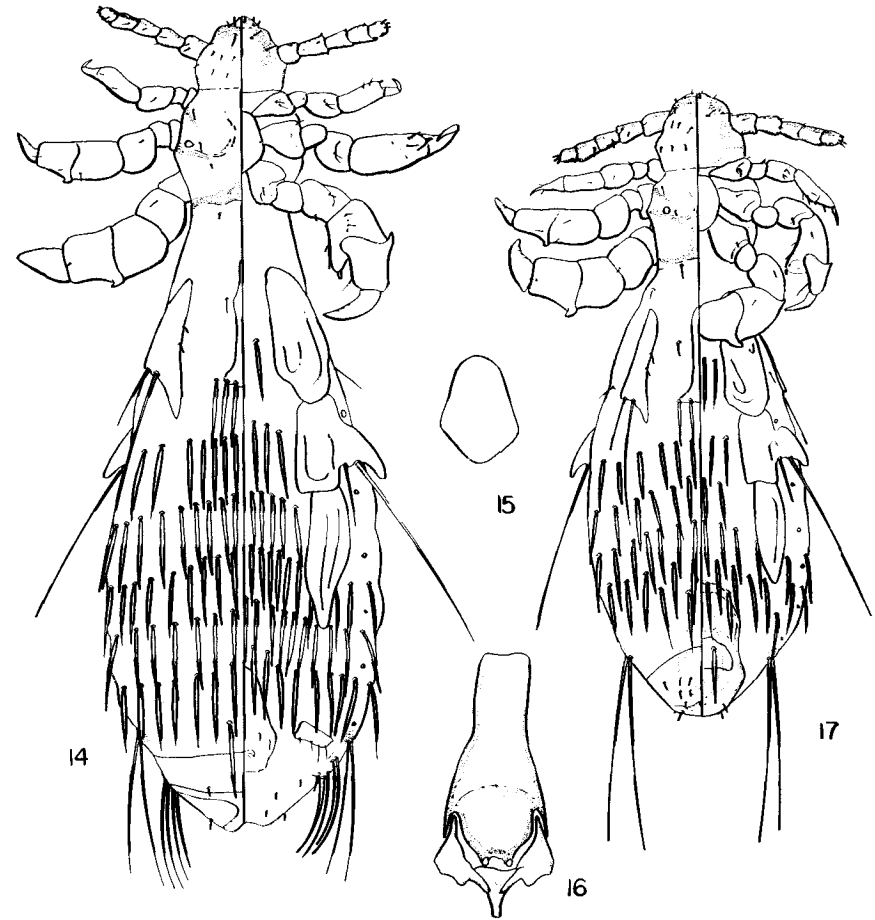


PLATE 4

Fahrenholzia schoutzi Werneck: from *Heteromys anomulus*, Trinidad.

FIG. 14, female. FIG. 15, thoracic sternal plate, female. FIG. 16, aedeagus. FIG. 17, male.

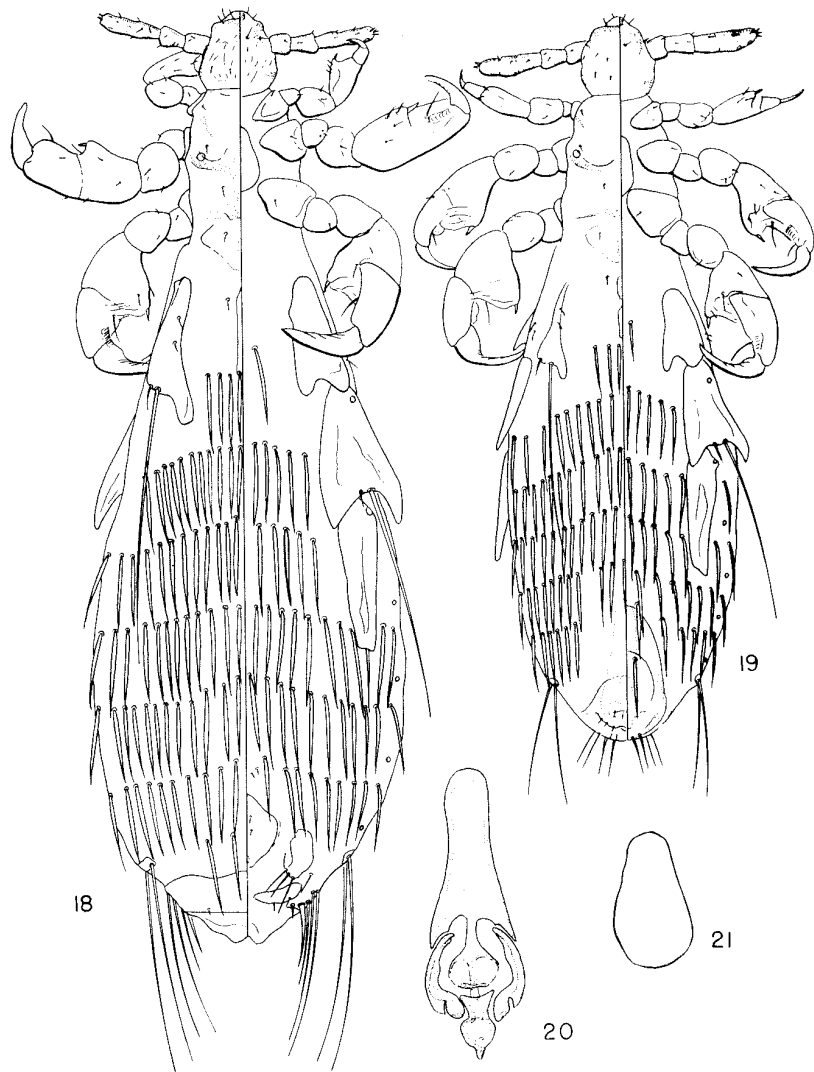


PLATE 5

Fahrenholzia fairchildi, new species: male holotype, female allotype. FIG. 18, female. FIG. 19, male. FIG. 20, aedeagus. FIG. 21, thoracic sternal plate, female.

lacking toothlike projection at outer basal angle of tarsus. Claw of first leg not apically bifurcate. *Abdomen* narrow and elongate, with a narrow longitudinal dorsal plate on segment 2 which is not expanded posteriorly; anterior to third segment abdomen rugose both dorsally and ventrally. Paratergal plates present on segments 2-4. Paratergal plate II with dorsal detached portion having long, narrow, apical process;

with two apical setae, one about as long as plate, other much shorter; ventral part of plate lacking setae, apically bilobed. Two rather small setae laterally on segment 2, between parts of paratergal plate. Plate III with posterior apex divided by deep concavity into two equal acutely rounded lobes and with a pair of apical setae, one seta longer than plate, other shorter. Plate IV lacking setae, narrowly rounded

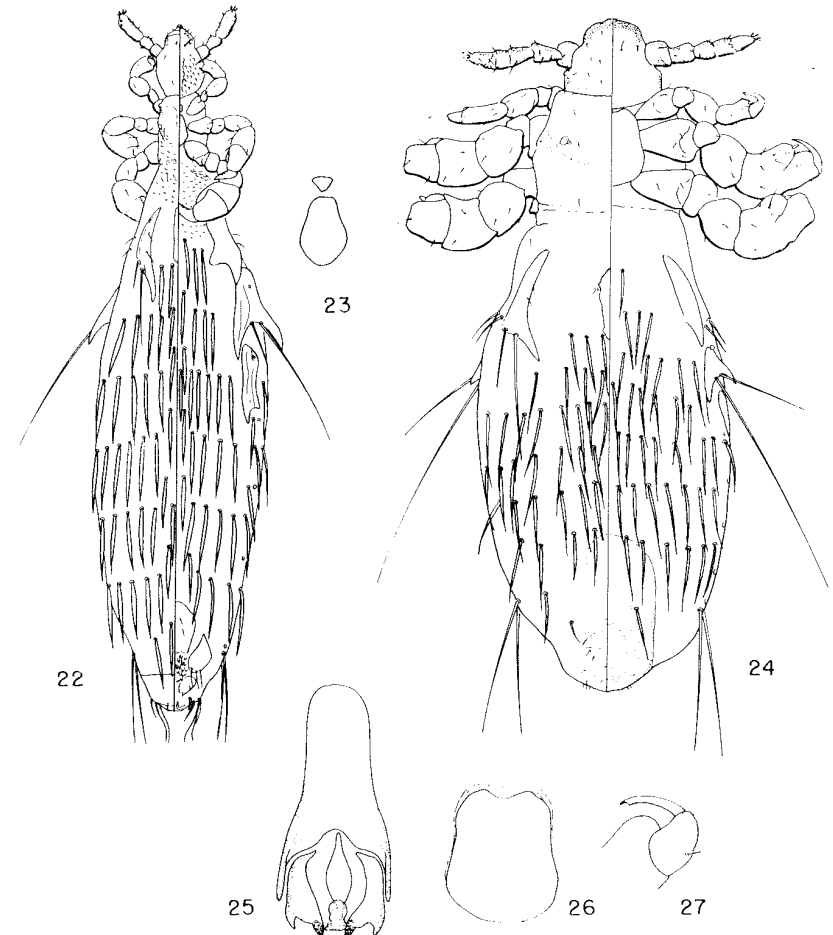


PLATE 6

Fahrenholzia hertigi, new species: female holotype. FIG. 22, female. FIG. 23, thoracic sternal plate. *Fahrenholzia texana* Stojanovich and Pratt; male from *Liomys irroratus texensis*, Brownsville, Texas. FIG. 24, male. FIG. 25, aedeagus. FIG. 26, thoracic sternal plate. FIG. 27, claw of first leg.

posteroapically, at times apex notched. Setation of abdomen as in figure. *Genitalia* (fig. 40) with genital plate broadest medially; below plate, surface (lip of vulva?) is patterned. Lateral setigerous lobes of eighth segment narrowest anteriorly, posteriorly rounded, bearing three small setae on mesal margin of apex. Two small plates, more-or-less well-defined, below setigerous lobes.

LENGTH.—Holotype, 1.5 mm., paratypes, 1.35-1.55 mm.

This species is named for my colleague, Dr. Marshall Hertig of Gorgas Memorial Laboratory, Panama.

Fahrenholzia texana Stojanovich and Pratt

(Figs. 24-27, 33)

Fahrenholzia microcephala Ferris, 1922, Contributions toward a monograph of the sucking lice, 2(3): 161 (partim). Ferris, 1951, The sucking lice, p. 174 (partim).

! *Fahrenholzia ferrisi* Werneck, 1952, Rev. Brasil. Biol. 12(1): 69 (doubtfully referred specimens from *Liomys texensis* to this species).

Fahrenholzia texana, Stojanovich and Pratt, 1961, Ann. Ent. Soc. Amer. 54(5): 693, pl. 1.

TYPE DATA.—Female holotype, male allotype, three female paratypes from *Liomys irroratus texensis*, Noriegas Wildlife Refuge, Cameron County, Texas.

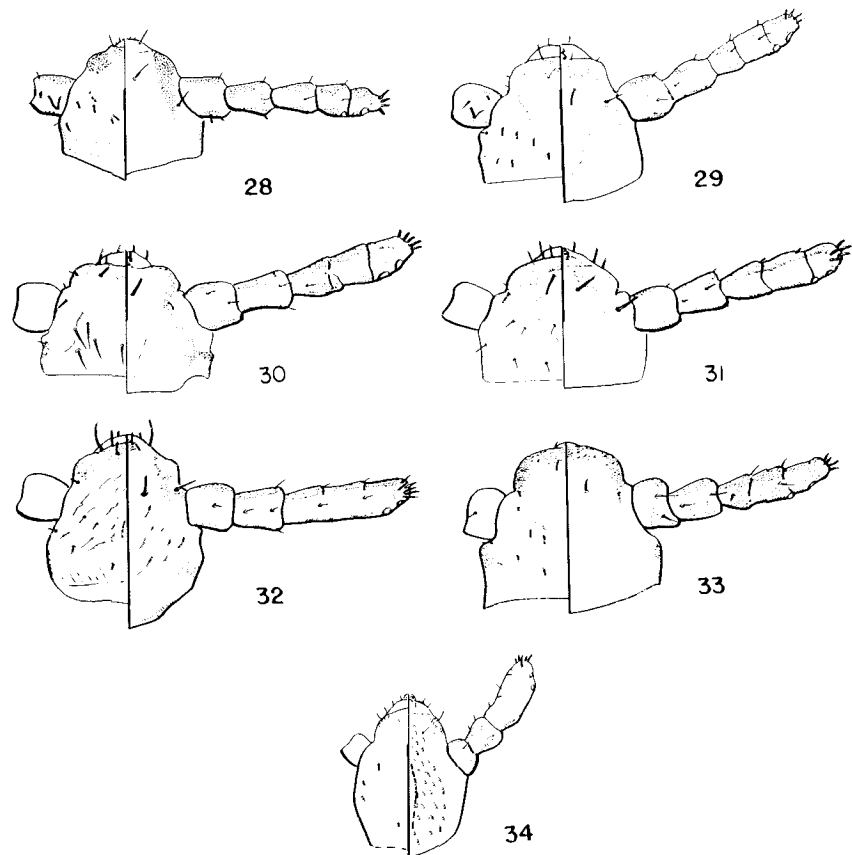


PLATE 7

Fahrenholzia microcephala-group: dorsal-ventral views of heads.

FIG. 28, *microcephala*, female allotype. FIG. 29, *chrlichi*, female allotype. FIG. 30, *ferrisi*, female from *Heteromys*, Guatemala. FIG. 31, *schwartzi*, female from *H. anomalus*, Trinidad. FIG. 32, *fairchildi*, female allotype. FIG. 33, *texana*, male from *L. i. texensis*, Brownsville. FIG. 34, *hertigi*, female holotype.

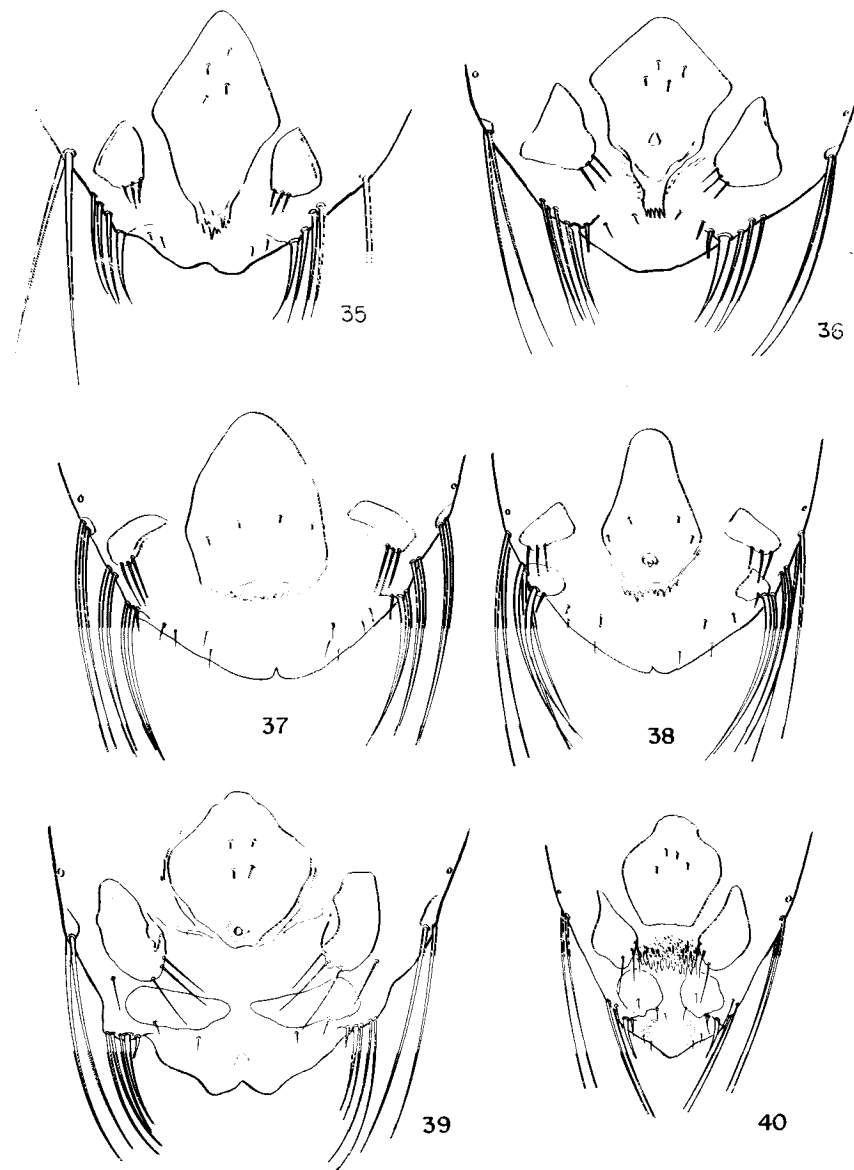


PLATE 8

Fahrenholzia microcephala-group: female genitalia.

FIG. 35, *microcephala*, allotype. FIG. 36, *chrlichi*, allotype. FIG. 37, *ferrisi*, from *Heteromys*, Guatemala. FIG. 38, *schwartzi*, from *H. anomalus*, Trinidad. FIG. 39, *fairchildi*, allotype. FIG. 40, *hertigi*, holotype.

SPECIMENS EXAMINED.—One male from *Liomys irroratus texensis* (U.S.N.M. 29943), Brownsville, Texas (included in the *microcephala* type series).

DIAGNOSIS.—*F. texana* differs from all the *microcephala*-like species in having the claw of the first leg bifurcate apically (fig. 27). Further separable from all the *microcephala* group except *fairchildi*, n. sp., and *hertigi*, n. sp., in that the outer basal angle of tarsi two and three lacks a toothlike process, and paratergal plate III (of the third abdominal segment) has the ventral apical angle acute (fig. 24). *F. texana* differs from *hertigi* in that antennal segments 3-5 are not completely coalesced (fig. 33), the antenna is longer than the head is broad, and the thoracic sternal plate lacks an anterior detached portion. Distinct from *fairchildi* in that paratergal plate II is longer than plate III, and the claws of the second and third legs are no longer than the width of the head. Male *texana* is distinguished from *fairchildi* by having toothlike projections posteriorly on the parameres, and the posteromedian extension of the basal plate is detached (fig. 25). In the female, *texana* differs from *fairchildi* in having the lateral setigerous lobes of the eighth segment horizontally elongate, not oval, and the genital plate lacks a circular sclerotization near the posterior apex.

DESCRIPTION.—**MALE** (fig. 24): *Head* (fig. 33) about as wide as long, lateral postantennal margin with heavy medial sclerotization which is carried on to dorsal head surface as short, pale, horizontal band. Antennal segments 3-5 not coalesced, first segment lacking toothlike dorsal projection. *Thorax* broader than head. Thoracic sternal plate as in fig. 26. *Legs.* Claws of median and posterior legs not so long as head width. Lacking toothlike projection at outer basal angle of tarsi of median and posterior legs. *Abdomen.* Dorsal longitudinal plate of segment 2 variously developed, not expanded posteriorly, one or two of setae in horizontal row may be inserted on posterior apex of this plate. Paratergal plates

present on segments 2-4. Dorsal detached portion of plate II with two apical setae, one of them shorter than plate bearing it; two or three medium-sized setae on lateral margin of segment between parts of plate II; ventral portion of plate II with short, acutely rounded, apical lobe. Plate III shorter than plate II, with two acutely rounded apical lobes; with two apical setae, both longer than plate, one much longer than other. Plate IV small, narrow, acute apically. *Setation of abdomen* as in figure. *Aedeagus* (fig. 25). Basal plate rounded-truncate anteriorly, not much widened posteriorly, posterolateral arms enclosing parameres for most of their length; posteromedian extension detached from basal plate, irregularly spindle-shaped. Parameres with lateral margins straight, abruptly angled so that posterior margin forms right angle to lateral margin, blunt toothlike projection at this outer angle, another such projection medially. Pseudopenis truncate anteriorly and posteriorly, with narrowed waist (flexed upon itself in figure).

FEMALE: As male except for genital segments. Genital plate with anteroapical angle acutely rounded, posteriorly convex, this part spiculated. Lateral setigerous lobes of eighth segment lying to either side of genital plate just below middle, horizontally elongate, with convex anterior, and concave posterior margins; posterior margin bearing three setae.

LENGTH.—Male, 1.2 mm.; female, 1.5 mm.

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