APLODONTOPHILA, A NEW GENUS OF CHIGGERS (ACARI: TROMBICULIDAE) FROM THE NORTHWESTERN UNITED STATES

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Abstract. A new genus, Aplodontophila, is proposed for 2 species: the type species, Trombicula aplodontiae off Aplodontia rufa from Washington, and Aplodontophila pacifica, n. sp. off A. rufa from Oregon.

Brennan (1946) described Trombicula aplodontiae from the Mountain Beaver, Aplodontia rufa (Rafinesque), in Washington. Numerous larvae of T. aplodontiae and of an undescribed but similar species were taken off Aplodontia rufa, collected along the Oregon Coast from 1970 through 1973. Studies of these 2 taxa have revealed that they represent a separate genus, distinct from but most similar to certain members of the subgenus Digenualaea Vercammen-Grandjean, 1960 ("microti" group of Brennan & Wharton 1950) of Neotrombicula Hirst, 1925.

The descriptions of the new species and of T. aplodontiae are based on the holotypes, paratypes and other specimens examined. Numbers in parentheses under specimens examined refer to number of larvae examined and number of hosts if more than 1. All measurements are in micrometres, with those for the holotype followed in parentheses by the mean, range and sample size for other specimens.

Aplodontophila Wrenn & Maser, new genus

Type-species. Trombicula aplodontiae Brennan.

Referred species. A. pacifica, n. sp.

Diagnosis. Trombiculine larvae with palpal setal formula B/B/BBB/7BS; palpal claw 3-pronged; galeala B; scutum hexagonal, anterior margin concave, posterior margin broadly rounded, 3-sided, obscured by encroaching cuticular striae; AW < SD; sensillae flagelliform, nude; legs 7-7-7 segmented; 2 genulae I, genua II and III, tibia I with 9B, subterminala and parasubterminala I, tibia III, nude or branched mastifemorala, nude mastitibiala, 2 nude or branched mastitarsalae.

Description. Palpal setal formula B/B/B/B/7BS; galeala B; palpal claw 3-pronged. Cheliceral blade with tricuspid cap, cheliceral base strongly punctate. Scutum hexagonal; AW < SD; anterior margin strongly concave, prominent cuticular striae obscure a weakly defined, 3-sided posterior margin; prominent ridge anterior to SBs, 5 scutal setae, AM < AL < PL; sensillae flagelliform, nude; SB posterior to PL bases. Eyes 2/2 in ocular plate or absent. Legs 7-7-7 segmented. Nonspecialized branched setae on legs I to III. Coxa 1-1-1, trochanter 1-1-1, basifemur 1-2-2, telofemur 5-4-3, genu 4-3-3, tibia 9-6-6, tarsus 22-16-15. Internal annulations of genu, tibia and tarsus of all legs 1, 2, 2, respectively. Onychotriches absent.

Remarks. Asanuma (1959) erected the subgenus Tsutsugamushia with Trombicula blumbergi Asanuma, 1959, as the type species. He also included T. aplodontiae in the subgenus on the basis of encroachment of cuticular striations over the posterior margin of the scutum and the presence of 2 mastitarsalae. Although Vercammen-Grandjean & Langston (1976) transferred T. blumbergi to the genus Toritrombicula Sasa, Hayashi & Kawashima, they did not mention T. aplodontiae. Our studies of T. aplodontiae show that it is not a Toritrombicula and, therefore, is not congeneric with T. blumbergi. Aplodontophila differs from Toritrombicula in possessing a subterminala on the palpal tarsus (lacking in T. blumbergi), a branched galeala (nude in Toritrombicula), SB posterior to PL bases (rather than anterior), nude sensillae (branched on distal ½) and parasubterminala I usually nude (always branched).

Aplodontophila appears most similar to Neotrombicula cavicola (Ewing, 1931) of the microti group. The microti group as defined by several authors (Brennan & Wharton 1950, Kardos 1954, Gould 1956) belongs in the subgenus Digenualaea Vercammen-Grandjean (1960), and is usually placed in the genus Neotrombicula. Features shared by Aplodontophila and N. cavicola include branched
palp and galeal setae, nude sensillae, SB posterior to PL bases, PSB < ASB, posterior margin of scutum without median angle, and 9B on tibia I. It differs from *N. cavicola* and other species of *Digenualae* in having a narrower, hexagonal scutum (pentagonal in *Digenualae*), strongly concave anterior margin (biconcave or only slightly concave), prominent ridge anterior to SBs (lacking), and a 3-sided posterior margin obscured by encroachment of striae (2-sided, no encroachment of striae). Differences in scutal proportions and other features for *Aplodontophila* and *Digenualae* include the following: AW < SD (AW ≥ SD); SD/PSB > 4 (<4); AM ≤ AL < PL (AM = AL < PL).

The name *Aplodontophila* refers to the affinity of the larvae for *Aplodontia rufa*.

**Aplodontophila aplodontiae** (Brennan), new combination

Fig. 1


*Trombicula* (*Tsutsugamushia*) *aplodontiae*: Asanuma, 1959: 34.

**Diagnosis.** Eves 2/2, with ocular plate, tarsala 1 = tarsala II; nude mastifemorala, nude mastitibiala, 2 nude mastitarsalae: genuala and tibiala III < 20.

**Redescription of species** (based on holotype with differences among paratypes and specimens listed in parentheses). Idiosoma 276 × 228, slightly engorged, orange in life. Eves 2/2 with ocular plate. **Body setae.** Dorsal setae 2-8-8-6-2-2, total 28; anterior setae similar to PLs, posterior setae with few short, stubby setules. Ventral setae 2-2 + 24 preanals and 8 postanals, total 34. Setal measurements: humeral, 75 (75, 71-81, 23); median of 1st posthumeral row, 74 (78, 71-89, 26); posterior dorsal, 51 (50, 45-57, 27); 1st sternal, 53 (54, 47-55, 25); preanal, 48 (54, 47-61, 26); postanal setae similar to posterior dorsal setae. **Scutum.** Conspicuously punctate, anterior margin strongly recurved, posterior margin obscured by cuticular striae; sensillae flagelliform, nude. AM setules short, stubby; AM < AL < PL. **Scutal measurements:** AW, 38 (38, 34-41, 21); PW, 71 (71, 67-83, 23); SB, 24 (26, 21-28, 26); ASB, 47 (47, 44-49, 18); PSB, 11 (10, 9-13, 21); AP, 38 (39, 36-45, 17); AM, 38 (40, 34-46, 24); AL, 71 (73, 67-85, 24); PL, 85 (85, 78-95, 26); S, 85 (84, 69-99, 15). Gnathosoma. Palpal seta formula B/B/BB/7BS; Galea B. Legs. All leg segments conspicuously punctate. Leg index of holotype: I, 314; II, 119; III, 368; total 973. Positions of branched setae and measurements and positions of nude setae as in Fig. 1D.—F. Parasubterminala I nude (occasionally forked or with 2 branches). Measurements (mean, range and sample size) of selected nude setae of specimens from throughout the range: subterminala I, 28, 25-33, 25; tarsala I, 21, 19-24, 26; tarsala II, 19, 18-20, 26; proximal tibiala I, 16, 13-18, 25; distal tibiala I, 14, 13-16, 23; proximal tibia I, 12, 12-14, 25; distal tibia I, 12, 11-13, 26; tibiala III, 13, 11-14, 27; dorsal genuala I, 20, 19-24, 18; posteriorventral genuala I, 20, 19-22, 19; genuala II, 15, 12-20, 26; genuala III, 14, 12-15, 24; microgenuala I, 6, 5-8, 11; microtibiala I, 6, 5-8, 13. Since the mastisetae were broken or obscured, it was not possible to obtain reliable measurements and as a result only those of the holotype are given (Fig. 2F).


**Remarks.** Larvae of *A. aplodontiae* from all localities (Snohomish Co., Washington, south to Humboldt and Placer Counties, California) agree closely with each other and with the holotype. No significant differences of any character studied were observed among localities.

**Ecological notes.** Larvae have been found on the ear pinnae of *A. rufa* in every month except February. *Aplodontia rufa* occurs in British Columbia south through the western 1/3 of Washington and Oregon into the Coast Range (Marin Co.) and Sierra Nevada Mountains (Tuare Co.) in California. The only record of *A. aplodontiae* from a host other than *A. rufa* is the single larva from a Long-tailed Weasel, *Mustela frenata*, captured in an *A. rufa* burrow, as reported by Brennan (1946). No larvae were found on any of the numerous small mammals from the same coastal Oregon localities where *A. rufa* harbored *A. aplodontiae*.

**Aplodontophila pacifica** Wrenn & Maser, new species

Fig. 2

**Diagnosis.** Eves absent; mastifemorala and 2 mastitarsalae with branches; genuala and tibiala III > 20.

**Description of holotype** (differences among paratypes listed in parentheses). Idiosoma 230 × 186, slightly engorged, white in life. Eves absent. **Body setae.** Dorsal setae 2-6-4-4-4-2, total 26; anterior setae similar to PLs, posterior setae with numerous short setules. Ventral setae 2-2 + 22 preanals and 8 postanals, total 34. Setal measurements: humeral, 78 (78, 72-83, 27); median of 1st posthumeral row, 82 (78, 76-83, 26); posterior dorsal, 49 (48, 42-53, 26); 1st sternal, 37 (35, 30-50, 23); preanal, 51 (55, 47-57, 26); postanal setae similar to posterior dorsal setae. **Scutum.** Conspicuously punctate, anterior margin strongly concave, posterior margin obscured by cuticular striae; sensillae flagelliform, nude: AM setules long, thin, AM < AL < PL. **Scutal measurements:** AW, 38 (38, 34-41, 21); PW, 62 (61, 57-65, 23); SB, 19 (19, 17-22, 26); ASB, 45 (43, 39-45, 21); PSB, 11 (11, 9-12, 25); AP, 35 (34, 34-38, 22); AM, 46 (45, 42-47, 25); AL, 59 (56, 57-66, 24); PL, 71 (72, 68-78, 27);
Fig. 1. *Aplodontophila aplodontiae* (Brennan): A, scutum and eyes; B, dorsal aspect of gnathosoma; C, ventral aspect of palpal tibia and tarsus; D, distal 3 segments of leg I showing specialized setae and bases of other setae (measurements in μm); E, leg II as above; F, distal 4 segments of leg III as above; G, posterior dorsal body seta.
FIG. 2. *Aplodaniophila pacifica* n. sp: A, scutum; B, dorsal aspect of gnathosoma; C, ventral aspect of palpal tibia and tarsus; D, distal 3 segments of leg I showing specialized setae and bases of other setae (measurements in μm); E, leg II as above; F, distal 4 segments of leg III as above; G, posterior dorsal body seta; H, anterior dorsal body seta.
throughout the year. Larvae have been found only
and tibiala
of proximal tibiala I) (Fig. 1D, 2D), and genuala
salae (nude), microtibiala I ventral to and in line
on their respective segments. It differs in lacking
specialized setae of the legs occupy similar positions
most features examined. The palpal setae possess
numerous setules, and, with 1 exception, the spe-
cialized setae on the legs occupy similar positions
on their respective segments. It differs in lacking
eyes (eyes 2/2 for A. aplodontiae) and in having a
narrower scutum, AW < 42, PW < 68 (AW > 44,
PW > 70), branched mastifemorala and mastitar-
alae (nude), microtibiala I ventral to and in line
with proximal tibiala I (slightly ventral and distad
of proximal tibiala I) (Fig. 1D, 2D), and genuala
and tibiala III > 20 (<20).

The species name is derived from the subspecific
name of the Mountain Beaver, A. rufa pacifica,
from which larvae were collected.

**Ecological notes.** This species occurs along
the Oregon coast (Tillamook, Lincoln, Douglas, Coos
and Curry Counties) in March, April, July, August
and December, and larvae probably are on hosts
throughout the year. Larvae have been found only
on the pinnae of 12 A. rufa; 11 of these also har-
bored A. aplodontiae.

**DISCUSSION**

Of 37 A. rufa examined for ectoparasites from
coastal Oregon, 31 (84%) harbored 1 or more chig-
gers. Of these positive hosts, 30 (97%) were para-
sitized by either 1 or both species of Aplodontontophila.
All larvae were found on the ear pinnae. Other
chigger species recovered included Neotrombicula
caricola (Ewing) (2 hosts), Euschoengastia brennani
Wrenn & Loomis (2 hosts) and an undescribed
species of Euschoengastia (3 hosts). The lack of rec-
ords from other hosts suggests host specificity for
both A. aplodontiae and A. pacifica. Daniel (1957),
in a study of ecologic aspects of 3 species of Czecho-
slovakian trombiculids, suggested that the extent
and intensity of larval infestations were deter-
mined by ecological specificity. Easton (1975) also
suggested that A. aplodontiae may exhibit either an
ecological specificity or a physiological dependency
on the host. Additional studies are necessary to
determine whether Aplodontontophila species are host
specific or whether both the chiggers and their
host require similar factors (or portions thereof),
such as those provided in the burrow.

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The time periods indicated below are those currently in effect, which we hope to be able to maintain. The period from first submittal to publication, in the case of a MS requiring only minor changes and that is expeditiously reviewed and promptly returned by the author, averages 9 months.

Newly submitted manuscripts are acknowledged immediately upon receipt and are sent to at least 2 extramural reviewers. Reviewers’ anonymity is maintained (unless they prefer to identify themselves). Reviewers are asked to provide reviews within 3 weeks. The time interval between receipt of MSS and completion of outside reviews is approximately 1½ months; this period will be longer if alternate reviewers must be selected or if initial reviews are so widely disparate that additional review is required. When all reviews are received, the MS undergoes editorial review and editing. A decision regarding acceptability and required revision is usually communicated to the author within 2 months of submission. The revision period depends primarily on the author’s expediency and on whether the necessary revision is relatively simple and straightforward or involves major changes and/or further experimentation. When the revised MS is returned, it is reviewed again by the editor. Occasionally, a revised MS is sent out for re-review by a specialist; sometimes it is necessary to return a MS 2 or more times to the author for further modification. Once a paper is deemed acceptable, it is “copy-edited” for the printer. The average interval from return of a revision to formal acceptance for publication is about 1 month. The MS is then sent to the printer, along with all other papers constituting that issue. The scheduled interval from dispatch to the printer until publication is 5½ months. This time period is governed largely by requirements of the printing process, which include setting the MS into type and producing a 1st proof, which is read by author and editor, and a revised proof, which is checked by the editor.

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