

Assignment to Genus *Naesiotus* (Albers, 1850) of
Several Species Formerly Assigned to
Rabdotus (Albers, 1850)
(Gastropoda: Pulmonata: Bulimulidae)

by

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Abstract. The following species formerly assigned to *Rabdotus* are assigned to the genus *Naesiotus* on the basis of anatomical and conchological evidence: *Rabdotus nigromontanus* (Dall, 1897); *R. christenseni* Miller & Reeder, 1984; *R. milleri* Hoffman, 1987, of southern Arizona and Sonora, Mexico; and *R. pallidior* (Sowerby, 1833); *R. rimatus* (Pfeiffer, 1846); *R. excelsus* (Gould, 1853); *R. xantusi* (Binney, 1861); *R. spirifer* (Gabb, 1868); *R. gabbi* (Crosse and Fischer, 1872); *R. beldingi* (Cooper, 1892); *R. altus* (Dall, 1893); *R. montezuma* (Dall, 1893); *R. veseyianus* (Dall, 1893); *R. cosmicus* (Mabille, 1895); *R. dentifer* (Mabille, 1895); *R. ceralboensis* (Hanna, 1923); *R. chamberlini* (Hanna, 1923); *R. hannai* (Pilsbry, 1927); *R. gigantensis* Christensen & Miller, 1977; and *R. laevapex* Christensen & Miller, 1977, from Baja California, Mexico.

While working on the zoogeography and interrelationships of several land snail species that had been placed in the genus *Rabdotus* Albers, 1850, I found that some of them more closely matched the diagnosis of *Naesiotus* Albers, 1850, according to BREURE (1979). These species were from southern Arizona, and from Sonora and Sinaloa, Mexico. I also found that a number of species from Baja California, Mexico, seemed, from drawings of their reproductive anatomy (CHRISTENSEN, 1978), to be in the genus *Naesiotus*.

The diagnostic points of difference between *Rabdotus* and *Naesiotus* lie in the reproductive anatomy and embryonic whorls of the shell. In the reproductive tract of *Rabdotus*, the vagina and penis are typically short (Figure 1), the glandular part of the penis consists largely of "pouches" (BREURE, 1979), and the spermathecal duct becomes broad midway along its length and has ridges within its lumen (CHRISTENSEN, 1978; Hoffman, unpublished data). In the reproductive tract of *Naesiotus*, the vagina and penis are typically longer (Figure 1), the glandular portion of the penis consists largely of tubules, and the spermathecal duct is uniformly narrow and cylindrical, lacking internal ridges (HOFFMAN, 1987; BREURE, 1979; BREURE & COPPOIS,

1978; CHRISTENSEN, 1978). The embryonic whorls of the shells of both genera have axial riblets, but the embryonic whorls of *Naesiotus* have very fine spiral threads in the interstices between the riblets, while *Rabdotus* lacks them (BREURE, 1979; BREURE & COPPOIS, 1978) (Figure 2).

While trying to deduce the relationships and geographical source of a complex of snails including *Rabdotus nigromontanus* (Dall, 1897), *R. christenseni* Miller & Reeder, 1984, and *R. milleri* Hoffman, 1987, I concluded that they had all of the characteristics of *Naesiotus*. By comparing reproductive anatomies and apical sculptures of other bulimulid snails that occur in northern Mexico and the southwestern United States, I found that all, with the exception of some of those in Baja California, were of the *Rabdotus* type. Within Baja California, snails listed by CHRISTENSEN (1978) as subgenus *Leptobyrsus* have, in the cases when they were obtainable, reproductive anatomies typical of *Naesiotus*. In most cases the embryonic sculptures also contained the spiral threads (Table 1). I, therefore, place the three species mentioned above as well as those in Table 1 in the genus *Naesiotus*. I was unable to obtain either the reproductive anatomy or shells of *R. ceralboensis* (Hanna, 1923); *R. chamberlini* (Hanna, 1923) lacks all shell sculp-

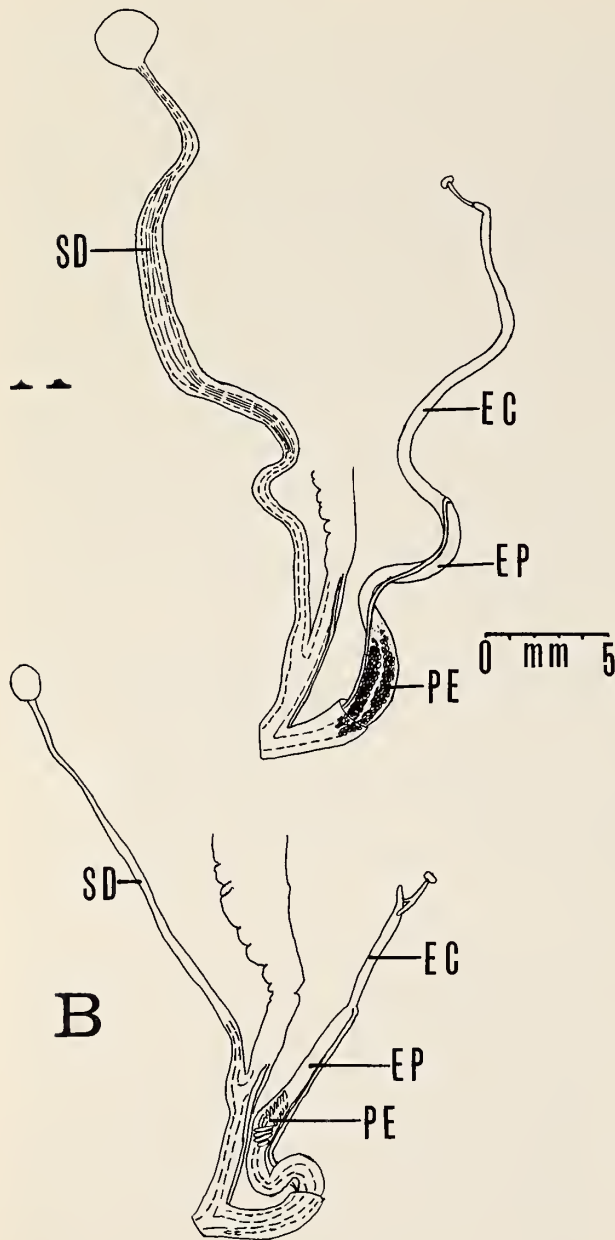


Figure 1

A. Genitalia of *Rabdotus baileyi* (Dall, 1893), J. E. Hoffman Collection No. 54A. B. Genitalia of *Naesiotus nigromontanus*, J. E. Hoffman Collection No. 52A: EC, epiphallic cecum; EP, epiphallus; PE, penis; SD, spermathecal duct.

ture, and its reproductive anatomy was also unavailable. However, because of traits that the latter two species have in common with other snails that Christensen placed in *Leptobysus*, I tentatively place them in *Naesiotus*. Species listed by CHRISTENSEN (1978) as belonging to subgenera

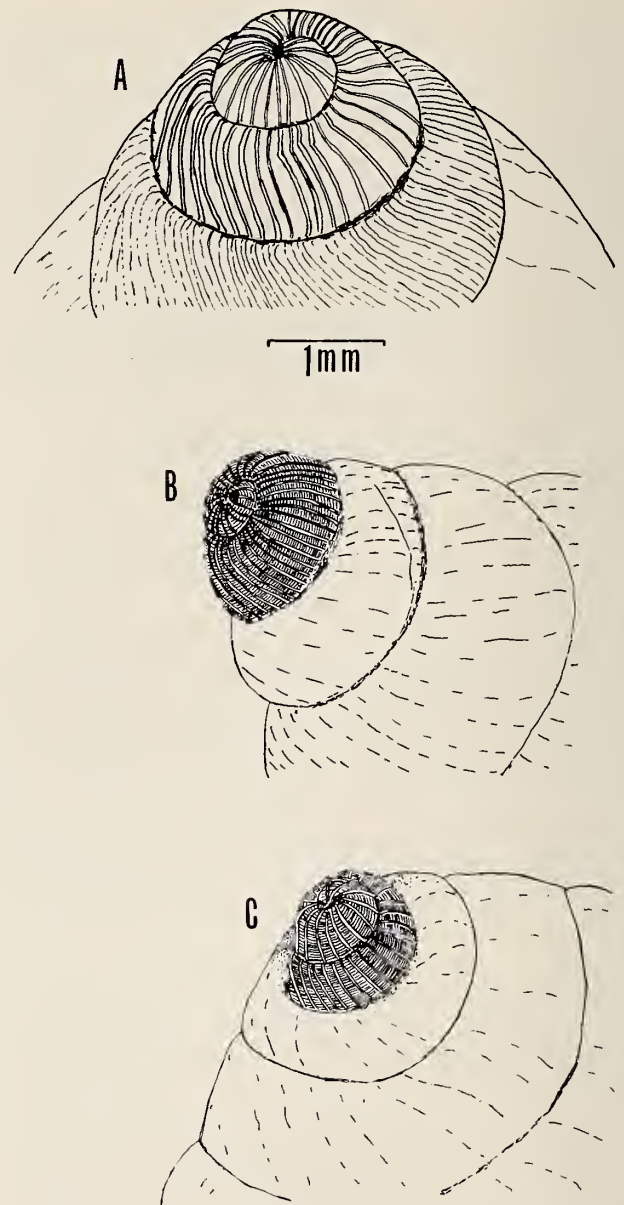


Figure 2

A. Apex of the shell of *Rabdotus baileyi* from Sonora, Mexico, J. E. Hoffman Collection No. 10. B. Apex of the shell of *Naesiotus christenseni* from Arizona, W. B. Miller Collection No. 7216. C. Apex of the shell of *Naesiotus tanneri* from Isla. Sta. Cruz, Ecuador, J. E. Hoffman Collection No. 250.

Plicolumna and *Rabdotus s.s.*, on the other hand, have typical *Rabdotus* characteristics.

Previously, *Naesiotus* was thought to be limited to South America, with its northern limit in Ecuador. These changes in assignment, of course, greatly increase the range of *Naesiotus* and indicate that the genus has a disjunct dis-



Figure 3

Proposed distribution of the genus *Naesiotus*.

tribution (Figure 3). Disjunct distributions are not rare, either among the *Bulimulidae* or land snails in general. In fact the "new" distribution of *Naesiotus* almost matches the disjunct distribution of *Bulimulus* Leach, 1815, a closely related genus, as well as that of the two subfamilies of *Helminthoglyptidae*: the *Helminthoglyptinae* of western

North America and the *Epiphragmaphorinae* of western South America. Possible explanations for this disjunct pattern might be that snails near the center of a large range have died out, or plate tectonics may have been involved. The alternative possibility of convergent evolution seems unlikely because of the diverse nature of the traits involved.

Table 1

Reproductive traits and embryonic sculpture in Baja California snails assigned to the genus *Naesiotus*.

Species	Embryonic riblets	Sculpture threads	<i>Naesiotus</i> type repro. anatomy
<i>gigantensis</i> Christensen & Miller, 1977	yes	yes	not available
<i>dentifer</i> (Mabille, 1895)	yes	yes	not available
<i>gabbi</i> (Crosse & Fi- scher, 1872)	yes	yes	yes
<i>hannai</i> (Pilsbry, 1927)	yes	yes	yes
<i>spirifer</i> (Gabb, 1868)	shell	unavail.	yes
<i>rimatus</i> (Pfeiffer, 1846)	yes	yes	yes
<i>veseyianus</i> (Dall, 1893)	shell	unavail.	yes
<i>excelsus</i> (Gould, 1853)	yes	no*	yes
<i>pallidior</i> (Sowerby, 1833)	yes	yes	yes
<i>harribaueri</i> (Jacobson, 1958)	yes	no	yes
<i>cosmicus</i> (Mabille, 1895)	yes	yes	yes
<i>montezuma</i> (Dall, 1893)	yes	no	yes
<i>beldingi</i> (Cooper, 1892)	yes	yes	yes
<i>altus</i> (Dall, 1893)	shell	unavail.	probably
<i>laevapex</i> Christensen & Miller, 1977	no	no	yes
<i>xantusi</i> (Binney, 1861)	yes	yes	yes

* Threads may have been missed owing to very weak embryonic sculpture in this species.

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