A NEW SPECIES AND NEW SYNONYM IN THE 
HYPOGASTRURA (S. STR.) NIVICOLA GROUP 
(COLLEMBOLA: HYPOGASTURIDAE)

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ABSTRACT: Springtails of the Hypogastrura (s. str.) nivicola group are cyclomorphic species
more commonly known as snowflakes. Recent study of the Indiana species of Hypogastrura (s.
str.) has resulted in the discovery of a new species, H. simsi n. sp. and a new synonym within the
H. nivicola group. The new species is closely related to the palearctic H. lapponica but is distinct
from that species on the basis of its size, lack of clavate body setae, differences in the macro/dens
ratios, and color differences. Hypogastrura simsi will key to H. tooliki in the most recent keys to
the species of Nearctic Hypogastrura but clearly differs by its diminutive size at maturity, elon-
gation of the dentes beyond the distal apex of the mucro, and PAO:eye ratio as well as other char-
acters. Summer and winter morph forms are described for H. simsi. Hypogastrura indiana, is
identified as a junior subjective synonym of H. harveyi, New Synonym, based on morphological
similarities and on observed transformation between the two forms.

The present division of the genus Hypogastrura (s. str.) into distinct
species groupings (Yosii, 1960, 1962; Christiansen and Bellinger, 1980,
1992) is at best difficult (however, also see Fjellberg, 1980, 1984, 1985).
Eight species of this subgenus have been collected in Indiana. These eight
species may be placed into three of five groups defined previously by Chris-
tiansen and Bellinger (1980, 1992) as follows: Nivicola group – cyclomorphic
species that have both a summer and winter form. The winter form possesses
thorn-like tubercles on the dentes. All species possess a single, strong, clavate
tenent hair in the lower or 1-row (Yosii, 1962) of each tibiotalarsus and 4+4
tenacular teeth. Five species of the nivicola group were studied in Indiana: H.
nivicola (Fitch), 1847; H. packardi (Folsom), 1902 (= H. notha (MacNa-
mara), 1922, winter form of packardi, see Waltz and Hart, 1985); H. harveyi
(Folsom), 1902 (= Hypogastrura indiana Christiansen and Bellinger, 1980,
summer form of harveyi, see below); H. sparta Christiansen and Bellinger,
1980, known only as a summer form; and H. simsi n. sp. Viatica group –
species with multiple tenent hairs and 3+3 tenacular teeth. One species of the
viatica group is known in Indiana: H. distincta (Axelson), 1902. Manubrialis

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Hypogastrura indiana is distinct among included species of the packardi group (sensu Christiansen and Bellinger) because of the large number of lateral setae of the ventral tube (8+8 or more). It is among the species characterized by the possession of 1+1 setae in the area verticalis including H. copiosa (Folsom), H. funesta Christiansen and Bellinger, and H. madera Christiansen and Bellinger.

Within the nivicola group (sensu Christiansen and Bellinger), H. harveyi, like H. indiana above, is distinct among the included species on the basis of the large number of lateral setae of the ventral tube (11+11 or 13+13). Only H. harveyi and H. nivicola possess an area verticalis of 1+1 within the nivicola group.

Based on the morphological similarities of H. indiana and H. harveyi we investigated the possibility that these were summer and winter forms of the same species. Specimens transforming from H. harveyi to H. indiana were identified and compared to the type of H. indiana. We herein place H. indiana Christiansen and Bellinger, 1980, as a junior subjective synonym of H. harveyi (Folsom), 1902, NEW SYNONYM.

Below we describe a new species of the nivicola group.

Hypogastrura (s. str.) simsi NEW SPECIES

Description. Color: light, yellowish brown. Size: largest individual less than 1.0 mm in length. Head: Antennal segment IV with apical bulb elongate and simple; six dorsal blunt setae. No ventral file. Normal antennal III organ present. PAO (Fig. 1) subequal in diameter to nearest eye. Eyes (Fig. 1) 8X8 with seven eyes subequal to the others and one eye slightly smaller. Area verticalis setae, 2+2. Maxilla typical of the subgenus, strong and hook-like. Sublobal setae of outer lobe, 2. Body: Body granulations coarse. Ungues with small tooth approximately one-third from apex. Tenent hair of row well developed and weakly clavate. Ventral tube with 4+4 lateral setae. Tenacular teeth 4+4. Seta ml present on abdominal IV. Largest setae of Abd. V and VI acuminate, only slightly longer than other body setae and minutely, unilaterally serrate. Small anal spines on well defined papilla; spines subequal in length to length of papillae.

Furcula: Denies of summer form (Fig. 2) with fine granulations dorsally, approximately 10x length of micro and extending beyond distal end of micro as a large, lateral projection; with seven dorsal setae. Denies of winter form (Fig. 3) with fine granulations dorsally, and with three or four triangular tubercules, of which one is typically more sharply pointed than the others, denies approximately 7x length of micro and extending beyond distal end of micro as in summer form, and seven dorsal setae.


**Etymology.** simsi – possessive patronymic epithet of Robert and Opal Sims, to whom this species is dedicated, who purchased the land on which this species was discovered and studied, and who are relatives (in-laws) of J.W. Hart.

**Diagnosis.** Hypogastrura simsi is smaller (<1mm in length at maturity) than any described Nearctic species of the nivicola group and is easily differentiated from *H. tooliki* to which it most readily keys by the shape of the mucro, the unusual extension of the dens beyond the tip of the mucro, and the PAO:nearest eye ratio. This new species is apparently most closely related to the palearctic species *H. lapponica* (Axelson), 1902, (see Gisin, 1960, Fjell-
berg, 1980, Leinaas, 1981a) from which H. simsi differs by the absence of clavate body setae on the tibiotarsi and abdominal segments, differences in body color, and H. simsi is distinctly smaller than H. lapponica.

BIOLOGY

Hypogastrura simsi shares a similar biology with previously reported Nearctic (Folsom, 1902) and European (Lienaas, 1981a, b) species of this group. Leinaas (1981a) provided detailed information on the biology of H. lapponica most of which is easily applied to our (JWH) observations of H. simsi. However, our data differs significantly from that reported by Leinaas (1981a) in that both summer and winter forms of H. simsi are known from the subcortical habitat. Summer and winter morph forms have been collected from beneath the bark of felled red mulberry (Morus rubra), ash (Fraxinus sp.), and American beech (Fagus grandifolia). Rarely have specimens been collected outside the subcortical habitat, possibly indicating a strong behavioral preference for the subcortical habitat. Specimens molting from the winter form to the summer form are known from a range of dates beginning in late February (II-27) to early April (IV-10).

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LITERATURE CITED


