Copepoda (Crustacea) from Acidic Wetlands in the District of Columbia and Maryland, including a Description of Acanthocyclops columbiensis n. sp.

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Copepoda (Crustacea) from Acidic Wetlands in the District of Columbia and Maryland, Including a Description of *Acanthocyclops columbiensis* n. sp.[1]

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Abstract. Collections from acidic freshwater wetlands in parks in the southeastern District of Columbia and neighboring Maryland yielded seven species of cyclopoid and harpacticoid copepods. Notable records include the rare cyclopoid *Diacyclops nearcticus* and the new species *Acanthocyclops columbiensis*, described herein. The female of *A. columbiensis* is distinguished from all congeners by its antennule of 14 articles.

Four samples of leaves and detritus from wetlands in parks in the southeastern District of Columbia and neighboring Maryland were brought by Mr. Stephen Syphax of the National Park Service to the National Museum of Natural History. Seven species of cyclopoid and harpacticoid copepods were represented in the samples. These included the rarely collected *Diacyclops nearcticus* Kiefer, 1934, previously known only from Massachusetts, North Carolina, and Texas (Yeatman, 1959), Missouri (Bunting, 1973), and New York [Strayer, 1988 (1989)a,b], and the new species *Acanthocyclops columbiensis*, described herein.

METHODS

All samples were collected on 4 November 1988. Specimens were collected by scooping bottom sediment and detritus into 500-ml plastic bottles. Physical and chemical data were gathered using a LaMotte Model HA Series pH Meter, a Yellow Springs Instrument Co. (YSI) Model 57 Oxygen Meter, and a YSI Model 33 S-C-T Meter. For microscopical examination, specimens were mounted temporarily in glycerine or permanently in glycerine jelly or in commercial polyvinyl lactophenol medium with chlorazol black E added and drawn at 400× or 600× with the aid of a camera lucida mounted on a Wild M20 compound microscope. Details were confirmed using oil immersion at 1,000×.

LOCALITIES AND MATERIAL

Fort Stanton seep, U.S. Reservation 412, Fort Stanton Park, wet depression located approximately 100 m N of Fort Circle Hiker/Biker Trail bridge, and approximately 30 m W of stream between Good Hope Road and Fort Place, SE District of Columbia, 38°51′32″N 76°58′44″W. Water temperature 23°C, specific conductance 125 μSiemens (μS), pH 5.0:

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[1] Sincere thanks are due the collector, Mr. Stephen Syphax, for donating these specimens to the NMNH, and for providing valuable habitat data. Dr. David Strayer kindly made available manuscripts and preprints of his articles recording and describing *Acanthocyclops parvulus*. Publication costs, in part, are being met by a grant from the Spencer–Tolles Fund of the American Microscopical Society.

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Paracyclops fimbriatus chiltoni (Thomson, 1882), 1 male, 2 copepodids
Eucyclops cf. *agilis* (Koch, 1838), 1 copepodid
Acanthocyclops columbiensis, new species, 1 female, 1 male, 1 copepodid
Canthocamptus (*Attheyella*) *illinoisensis* S. A. Forbes, 1882, 3 females
Bryocamptus (*Bryocamptus*) *zschokkei* (Schmeil, 1893), 1 female

Oxon Run Bog, U.S. Reservation 501, Oxon Run Parkway, on a talus slope behind housing development on Valley Terrace, SE District of Columbia, 38°50′26″N 76°58′44″W. Specific conductance 90 μS, pH 3.3, dissolved oxygen (DO) about 1.0 ppm:

Macrocyclops albidus (Jurine, 1820), 1 male
Diacyclops nearcticus, 1 female, 2 males, 2 copepodids

Oxon Run Bog seep, a few yards above Oxon Run Bog. Temperature 12.5°C, specific conductance 60 μS, pH 4.0:

Paracyclops fimbriatus chiltoni, 20 females, 12 males, 3 copepodids

Gardener's Spring, U.S. Reservation 404M, Oxon Hill Farm, small brick pool near end of Woodlot Trail, about 150 m from Bald Eagle Road, Maryland, 38°48′09″N 77°00′22″W. Temperature 13.0°C, specific conductance 60 μS, pH 5.0, DO about 13.5 ppm:

Paracyclops fimbriatus chiltoni, 1 male
Diacyclops nearcticus, 2 females, 1 male
Acanthocyclops columbiensis, 5 females, 1 male

Taxonomic Account

Family Cyclopidae G. O. Sars, 1913
Genus *Acanthocyclops* Kiefer, 1927
Acanthocyclops columbiensis n. sp.
(Figs. 1–3)

Material examined. Holotype, 1 ♀, USNM (United States National Museum) 241925, Fort Stanton seep; allotype, 1 ♂, USNM 241926, Fort Stanton seep; paratypes, 1 copepodid, USNM 241929, Fort Stanton seep, 2 ♀♀, each dissected on one slide, USNM 241928, and 3 ♀♀ and 1 ♂, USNM 241927, Gardener's Spring. Undissected specimens preserved in 70% ethanol.

Type locality. Fort Stanton seep, District of Columbia.

Description

Female. Length of holotype excluding caudal setae 0.46 mm; lengths of paratypes 0.46–0.48 mm. Prosome (Fig. 1a) compact, posterior prosomites with rounded margins. Hyaline fringes of urosomites (Fig. 1a–c) finely serrate. Genital segment (Fig. 1a–c) broadened anteriorly; seminal receptacle with anterior and posterior expansions produced laterally. Anal somite with spinules on ventral margin above caudal rami; anal operculum (Fig. 1a, d) narrow, quadrate.

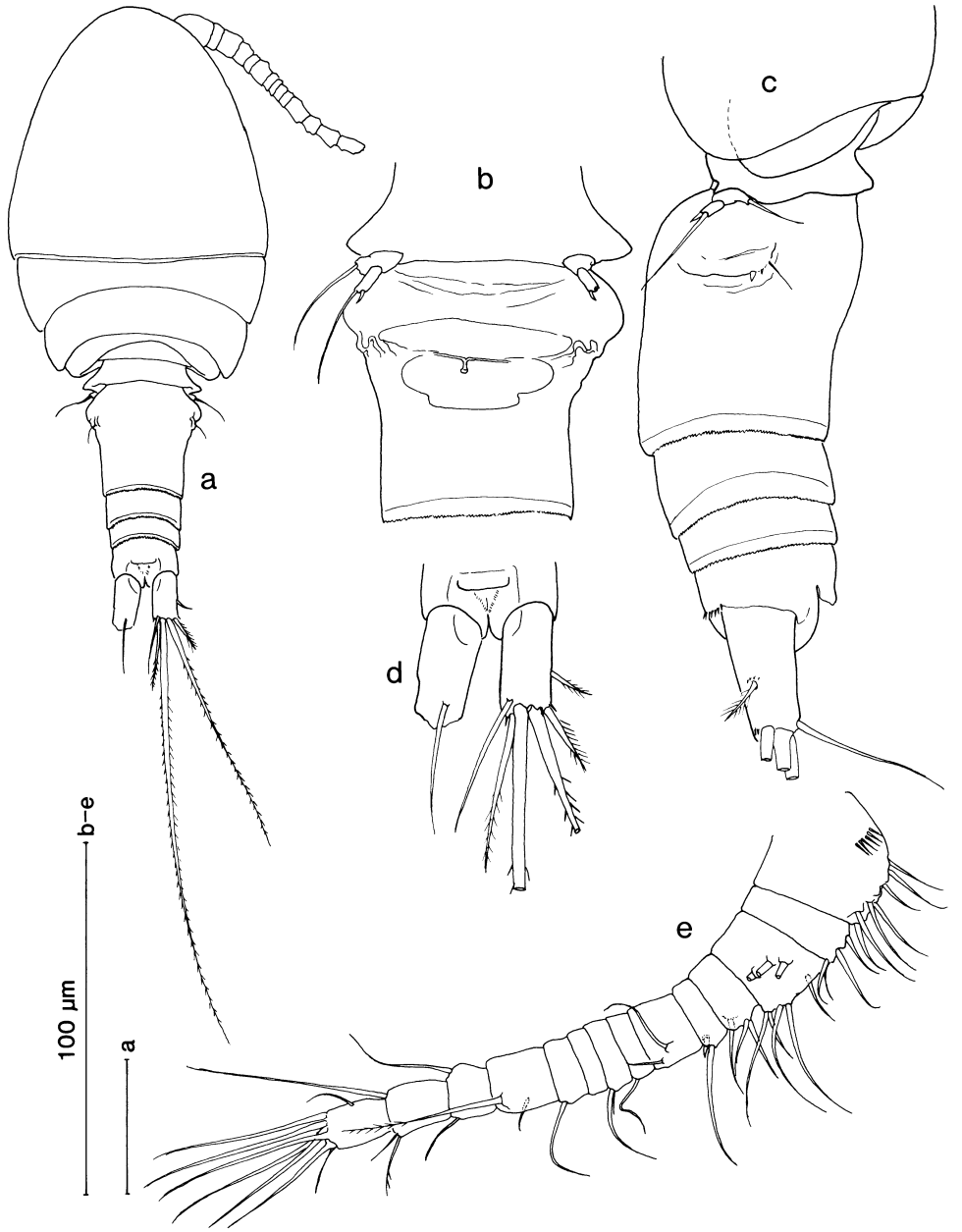

FIG. 1. *Acanthocyclops columbiensis* n. sp., female. a, habitus; b, genital segment and legs 5, ventral (setae of left leg 5 not drawn); c, leg 5 and urosome, lateral; d, caudal rami, dorsal; e, antennule.

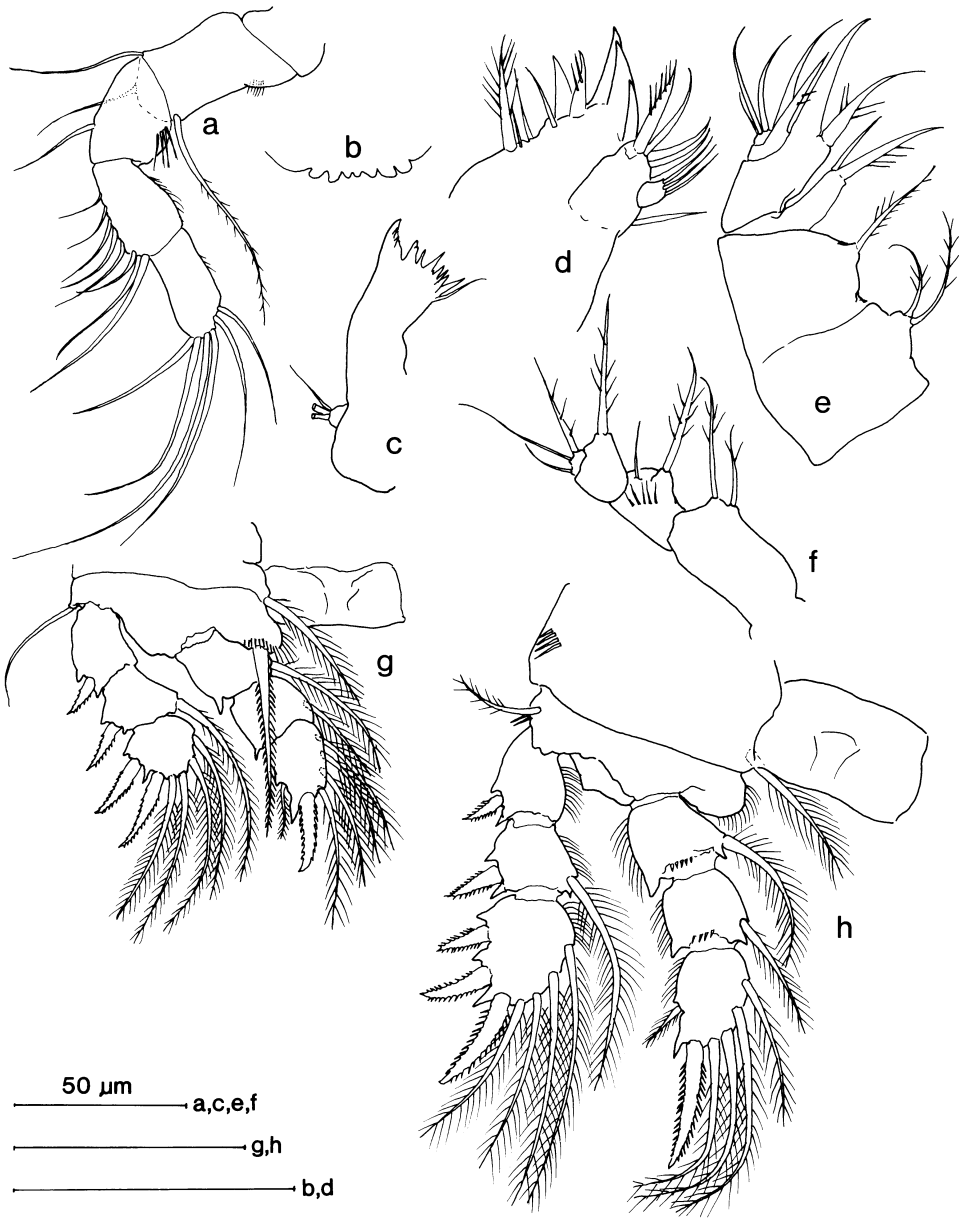

FIG. 2. *Acanthocyclops columbiensis* n. sp., female. a, antenna; b, labrum; c, mandible; d, maxillule; e, maxilla; f, maxilliped; g, leg 1, anterior; h, leg 2, posterior.

Caudal ramus (Fig. 1a, c, d) about 2.3 times longer than broad, lateral seta inserted on posterior one-third of ramus. Median terminal setae of ramus with fine spinules. Lengths of caudal setae of holotype in µm: lateral 6, dorsal 15, outermost to innermost terminal 10, 75, 135, 22.

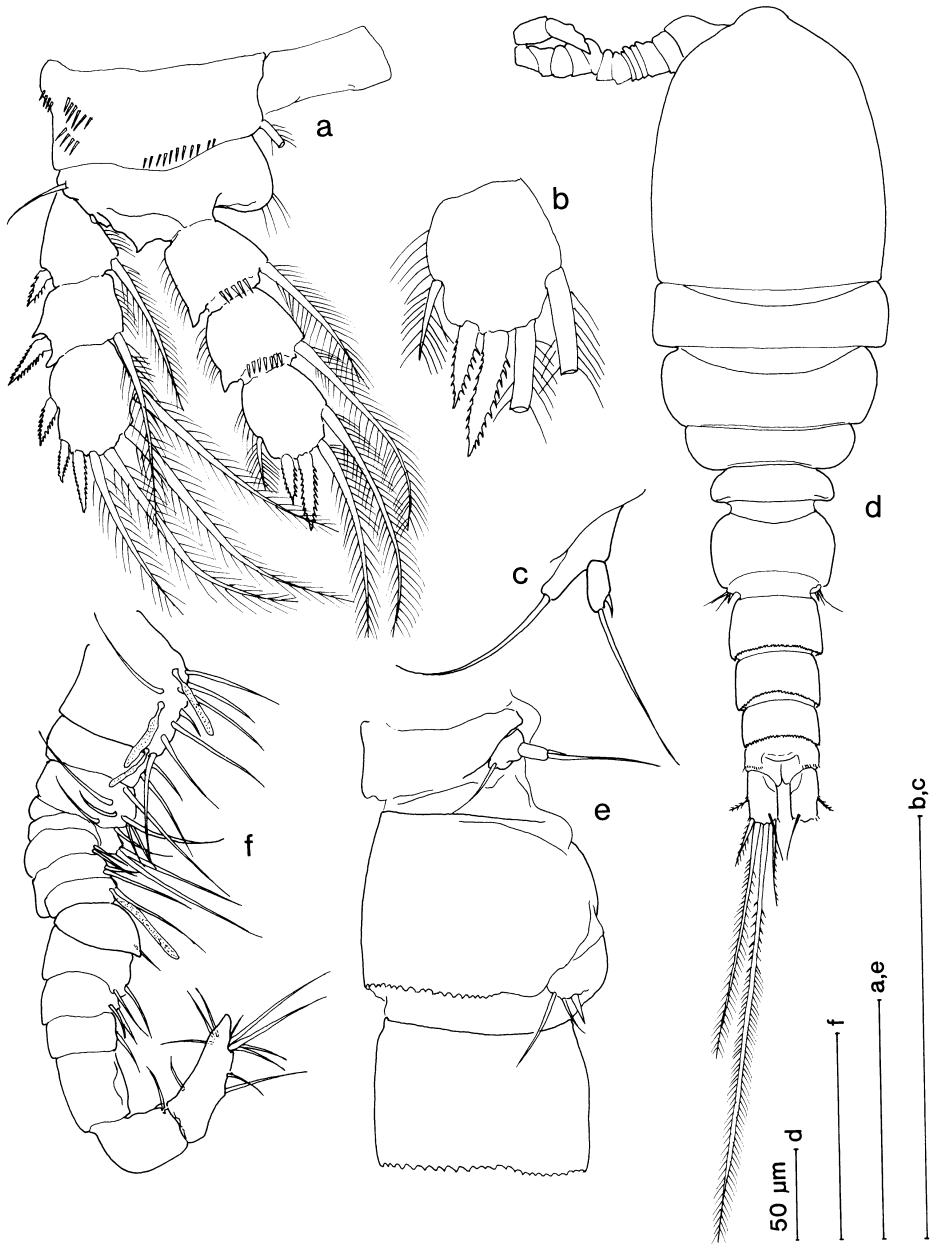

FIG. 3. *Acanthocyclops columbiensis* n. sp. a, leg 4, posterior, female; b, leg 4 endopod article 3, female; c, leg 5, female; d, habitus, male; e, legs 5 and 6, male; f, antennule, male.

Antennule (Fig. 1a, e) of 14 articles, not reaching past posterior margin of cephalosome; article 5 with spine, article 8 with minute slender esthetasc; sensory hair of article 13 about one-half length of article 14; no hyaline membrane visible on terminal articles. Article 1 of antenna (Fig. 2a) with row of

hairs on proximal posterior margin, otherwise without ornament except usual three distally inserted setae. Labrum (Fig. 2b) with seven blunt teeth. Mandible (Fig. 2c) with palp bearing two long plumose setae (not completely figured) and one short hair-like seta. Maxillule (Fig. 2d) with basis of palp furnished apically with one spine bearing row of spinules and with three stout naked setae, and proximally with one naked seta; endopod with three naked setae of equal lengths. Claw of maxilla (Fig. 2e) lacking both usual comb of teeth and seta usually inserted near base of claw. Article 1 of maxilliped (Fig. 2f) with only two setae.

Swimming legs 1–4 (Figs. 2g, h, 3a, b) with rami each of three articles and spine formula 2,3,3,3; leg 3 similar to leg 2. Spine on medial expansion of basipod of leg 1 reaching past end of article 3 of endopod. Basal lamellae of all legs without ornament. Article 3 of endopod of leg 4 only slightly longer than broad, ending in two terminal spines of which inner spine is about one-third longer than outer spine; seta on outer margin of this article not reaching end of outer spine.

Leg 5 (Figs. 1a–c, 3c) normal for genus, with article 1 distinct from somite and bearing one seta on lateral expansion, article 2 bearing subterminal short curved spine and terminal seta. No female specimen possessed an extra spine inserted laterally to terminal seta as observed in some congeners (Yeatman, 1959). Leg 6 (Fig. 1a, c) bearing short inner spine, minute middle spine, and slender outer seta.

Male. Length of allotype 0.44 mm; length of paratype 0.36 mm. Body in dorsal view (Fig. 3d) more slender than that of female; anal operculum narrow, convex; spinules on posterior margin of anal somite extending dorsally; proximal spinules on next innermost caudal seta grading to fine setules, plumage of remaining terminal setae less coarse than that of female.

Antennule (Fig. 3d, f) geniculate, of 15 articles, with three esthetascs on article 1 and one on article 8. Leg 5 (Fig. 3e) similar to that of female; leg 6 consisting of short inner spine and two longer outer setae, outermost seta about twice length of inner seta.

Etymology. Named for the type locality in the District of Columbia.

Discussion

Nine species and subspecies of the genus *Acanthocyclops* sensu Kiefer, 1927, have been recorded from North America. In three species, the antennule of the female is composed of 17 articles: *A. vernalis* (Fischer, 1853), *A. robustus* (G. O. Sars, 1863), and *A. carolinianus* Yeatman, 1944. Four species and subspecies have the antennule composed of 12 articles: *A. capillatus* (G. O. Sars, 1863), *A. venustus* Norman & Scott, 1906, *A. venustoides* Coker, 1943, and *A. venustoides bispinosus* Yeatman, 1951. *Acanthocyclops parvulus* Strayer, 1989, has the antennule of 11 articles; the antennule of *A. exilis* (Coker, 1934) usually is composed of 11 but sometimes of 12 articles. *Acanthocyclops columbiensis* is distinguished from these and from all other congeners by its antennule of 14 articles. Otherwise, *A. columbiensis* is similar to *A. exilis* and *A. parvulus* in

having a relatively short caudal ramus with a naked inner margin, as well as a short terminal article of the leg 4 endopod.

Pennak & Ward (1985) described a new species, *A. plattensis*, from interstitial stream habitats in Colorado. These authors placed this species in *Acanthocyclops* sensu Gurney, 1933, following Rylov (1948), but most authors (e.g., Dussart & Defaye, 1985; Yeatman, 1959) continue to accept Kiefer's (1927) subdivision of this species group as *Megacyclops, Acanthocyclops*, and *Diacyclops*. Although I have not been able to examine specimens of Pennak and Ward's species, their figure of leg 5 of the female (Pennak & Ward, 1985, fig. 1B) illustrates a long medial subterminal spine, indicating that it is a member of the genus *Diacyclops*. *D. plattensis* was inadvertently omitted from my recent key to North American *Diacyclops* (Reid, 1988).

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