

FOUR SPECIES OF SPHAERODORIDAE
(ANNELIDA: POLYCHAETA)
INCLUDING ONE NEW GENUS AND THREE
NEW SPECIES FROM ALASKA

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Abstract.—Four species of Sphaerodoridae (Polychaeta) including one new genus and three new species are described from Alaska. *Amacrodorum bipapillatum* is a new genus and species from the Aleutian Island of Akutan; *Sphaerodoropsis uzintunensis* and *S. katchemakensis* are both new species from Katchemak Bay, Homer; *Sphaerodoropsis sphaerulifer* (Moore, 1909) is also reported. *Amacrodorum* is partly characterized by the absence of macropapillae and the presence of two kinds of papillae. It is strongly isolated in the family, and superficially similar to *Levidorum* Hartman in that both taxa lack macropapillae. However, *Amacrodorum* differs from *Levidorum* in not having smooth body surfaces and in having head appendages; *Levidorum* was recently assigned to a separate family that may be more closely related to syllids (Perkins 1987). A key to described species of *Sphaerodoropsis* recorded from Alaska is presented.

A single, unusual sphaerodorid polychaete that could not be placed to a known genus led to a study of the family in Alaska. The specimen was obtained from a benthic survey in Akutan Straits, near the Aleutian Island of Akutan as part of an environmental impact study for the township of Akutan to obtain a permit from the Environmental Protection Agency for an offshore waste discharge site. Survey details and results are available in Jones & Stokes (1984a, b). Additional sphaerodorids were obtained from another impact study of a boat harbor expansion for the city of Homer by Dames and Moore (1984). Type materials are deposited in the National Museum of Natural History, Smithsonian Institution, Washington D.C. (USNM).

Family Sphaerodoridae Malmgren
Amacrodorum, new genus

Type species.—*Amacrodorum bipapillatum* new species, by original designation.

Diagnosis.—Macro- and microtubercles absent; papillae present over all body surfaces of which both elliptical and hemispherical papillae present on dorsum. Anterior end truncate, with 1 median and 2 pairs of lateral antennae; all antennae short. Parapodia each with a single aciculum; setae simple; large recurved hooks absent.

Remarks.—*Amacrodorum* differs from all other described genera of sphaerodorids in lacking both macro- and microtubercles, and in having two kinds of papillae. The hemispherical papillae appear not to have been described previously for the family. As such, *Amacrodorum* is highly isolated in the Sphaerodoridae. Fauchald (1974:270) made a similar observation for *Levidorum* Hartman, 1967, which totally lacks both macro- and microtubercles as well as papillae. In fact, Fauchald (1974:270), first suggested that one taxon each of amacropapillate (represented by *Levidorum*) and macropapillate species be recognized as separate families in a superfamily complex.

In light of this suggestion, Perkins (1987) both redescribed *Levidorum* and assigned it to the newly defined Levodoridae Perkins, 1987; *Levidorum* is the type genus by monotypy. However, Perkins states that *Levidorum* is more closely allied to syllids than to sphaerodorids, particularly since the two former groups both have a chitinous foregut and proventriculus. Perkins further suggests that both eye and setal morphologies of his newly described species further ally this family more closely to syllids than sphaerodorids. Palps may also be present in *Levidorum* which is a syllid trait not typically associated with sphaerodorids, although Perkins could not establish an homology between the palps of levodorids and syllids. Levodorids differ from both syllids and sphaerodorids in having perhaps two peristomial segments, each of which lacks cirri and antennae. However, it will be most informative histologically to confirm the presence of two peristomial segments before this particular trait can be critically accepted, especially since only one was noted by Fauchald (1974:270).

In any case, *Amacrodorum* differs strikingly from *Levidorum* in having papillae distributed over all general body surfaces, in having typical sphaerodorid prostomial antennae instead of "palps," in having one aciculum per parapodium rather than two-three, and in having setae entirely simple and not a mixture of either pseudocomposite and simple bristles. Given the removal of *Levidorum* by Perkins (1987), all other described sphaerodorid genera have dorsal macropapillae. A logical extension of Fauchald's suggestion would be to establish another family or subfamily for morphologically distinct sphaerodorids such as *Amacrodorum* (i.e. Amacrodoridae or Amacrodorinae). Clearly, this new sphaerodorid genus is strongly isolated within the family. While such an approach is probably justifiable, it is clearly parsimonious to retain *Amacrodorum* in the Sphaerodoridae for the present time.

Etymology.—*Amacrodorum* derives from Latin, *A*, meaning without, *macro*, meaning large, and *dorum*, meaning dorsal surface, referring to the absence of dorsal macro-tubercles. Gender: Feminine.

Amacrodorum bipapillatum, new species
Figs. 1, 2A

Material examined.—ALASKA: Akutan Island, Akutan Harbor, just north and east of Akun Strait, sta 11-3, sample 23, 54°09'72"N, 165°42'83"W, 59 m, poorly sorted silty sand, 18 Sep 1983, coll. Harvey Van Veldhuizen; Holotype USNM 102784.

Description.—A small species, measuring 2.1 mm long, 0.45 mm wide without parapodia, 0.5 mm wide with for 16 setigers. Body short, grub-like, widest anteriorly; translucent, lacking pigmentation; white yolky eggs visible through body wall.

Prostomium truncate anteriorly; median antenna stout, digitiform, distally blunt (Fig. 1A, B). All lateral antennae digitiform, distally blunt, having similar lengths, longer than median antenna. Superior laterals each with 2 proximal papillar spurs (Fig. 1B); inferior lateral antennae lacking proximal spurs. Eyes numbering 1 pair (Fig. 1A). Peristomial cirri shorter than median antenna, distally inflated, blunt (Fig. 1A, B). Proboscis short, muscular, extending to setiger 2. Six papillae encircled by prostomial antennae; papillae otherwise present on peristomium.

Parapodia uniramous, stout, as long as wide (Fig. 1C, D); acicular lobe truncate, with presetal lobes digitiform, distally round, projecting well beyond acicular lobe; postsetal lobes absent (Fig. 1C–E). Ventral cirri conical, distally blunt, projecting beyond acicular lobe (Fig. 1D, E). Parapodial papillae numbering only 1, present on anterior parapodial surfaces; all other parapodial surfaces lacking papillae (Fig. 1C, D).

Dorsal macro-tubercles, micro-tubercles absent. Dorsum otherwise with hemispherical and elliptical papillae (Fig. 1F, G) ar-

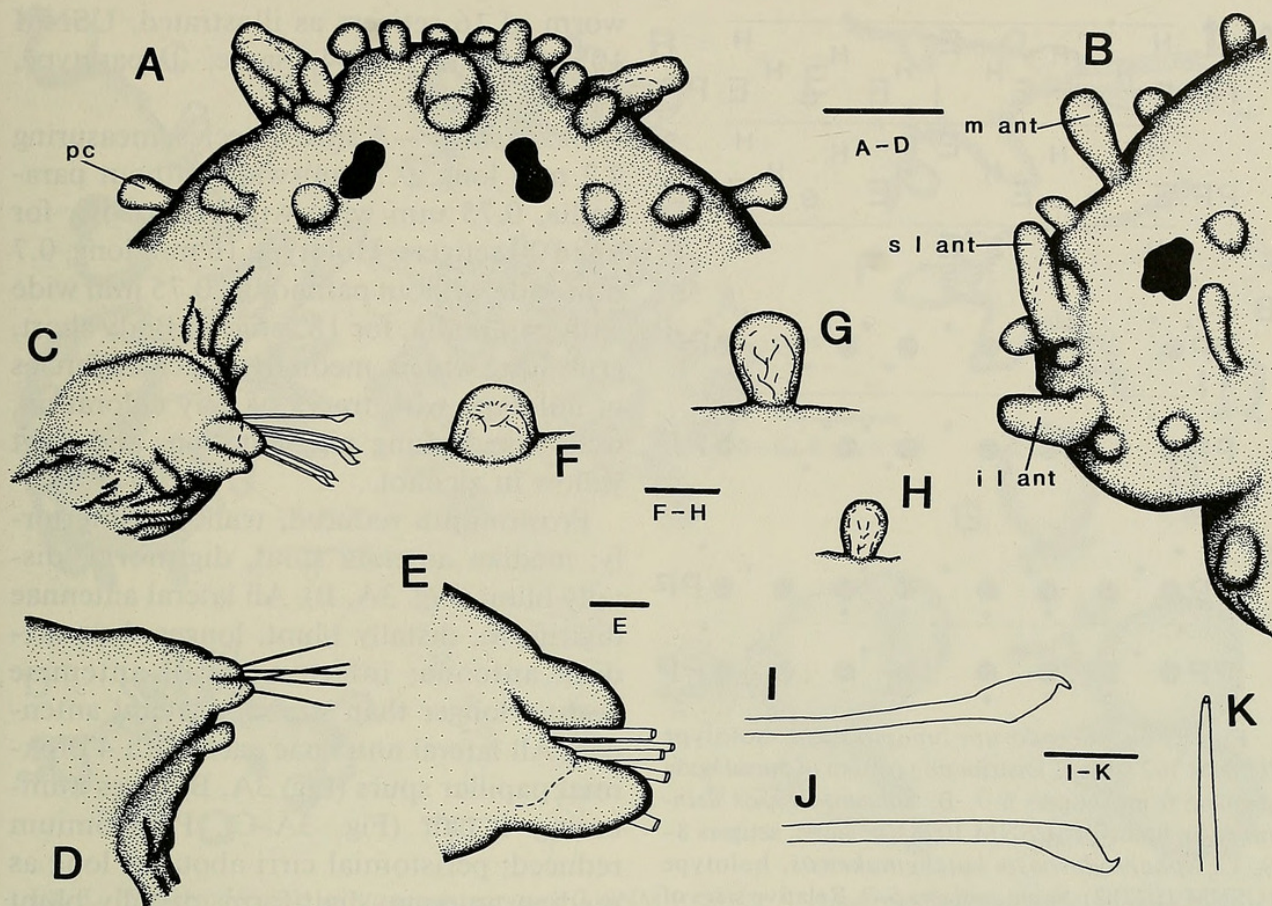


Fig. 1. *Amacrodorum bipapillatum*, holotype (USNM 102784): A, Anterior segments, dorsal view; B, Anterior segments, left lateral view; C, Left setiger 14, oblique anterolateral view; D, Left setiger 13, dorsal view; E, Left setiger 12, detail of distal parapodium, anterior parapodial papilla not shown, dorsal view; F, Hemispherical papillae, lateral view; G, Ellipsoidal papilla, lateral view; H, Ventral papilla, lateral view; I, Superior simple seta, lateral view; J, Inferior simple setae, lateral view; K, Simple seta, dorsal view. m ant, median antenna; s l ant, superior median antenna; i l ant, inferior median antenna. Scales: A-D = 0.05 mm; E, J-K = 0.01 mm; F-H = 0.02 mm.

ranged in complex pattern of 13 rows (Fig. 2A). Ventral papillae resembling dorsal papillae, arranged in zig-zag pattern of 7 alternating rows of elliptical and hemispherical papillae (Fig. 1H).

Simple falcigers present in all setigers, typically numbering 4–5 per fascicle, having sharp, distally recurved tips, and blade-shaped subdistal regions having smooth dorsal cutting edges (Fig. 1I–K); subdistal spurs on concave cutting surfaces absent.

Remarks.—*Amacrodorum bipapillatum* differs from all other described sphaerodorids in having two kinds of papillae present on dorsal and ventral surfaces. The setae of *A. bipapillatum* superficially resemble

those of *Sphaerodorum recurvatum* Fauchald, 1974, *S. vietnamense* Fauchald, 1974, and other members of this genus in having distally recurved tips. However, the above species of *Sphaerodorum* also possess a small subdistal spur on concave cutting surfaces which is absent in *A. bipapillatum*. These *Sphaerodorum* species also tend to have long, tapering recurved distal tips and not short, stout tips.

Etymology.—The epithet, *bipapillatum* refers to the presence of two different kinds of body papillae. It is considered a noun in apposition.

Type locality.—Akutan Harbor, Akutan Island, Alaska.

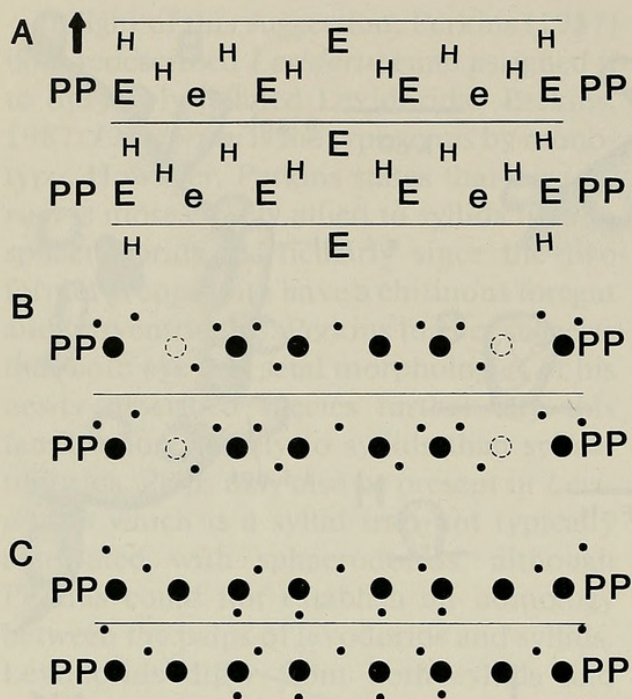


Fig. 2. *Amacrodorum bipapillatum*, holotype (USNM 102784): A, Distribution pattern of dorsal body papillae from setigers 6-7. B, *Sphaerodoropsis uzintunensis*, holotype (USNM 102810): Same, setigers 8-9. C, *Sphaerodoropsis katchemakensis*, holotype (USNM 102782): Same, setigers 6-7. Relative sizes of papillae reflected in different sized letters. H = hemispherical papillae; E = large elliptical papillae; e = small elliptical papillae. Large black dots refer to macropapillae; small dots to papillae. Arrow points anteriorly. A-C, schematic, not to scale.

Sphaerodoropsis Hartman and Fauchald, 1971

Sphaerodoropsis uzintunensis, new species
Figs. 2B, 3

Material examined.—ALASKA: Katchemak Bay, Homer Spit Boat Harbor, sta 210-1, 59°36'18.4"N, 151°24'41.8"W, 10 m, silt-clay, 28 Feb 1984, coll. Dave Erikson, 1 paratype, USNM 102808.—Sta 215-2 59°36'19.1"N, 151°24'39.0"W, 15 m, silt-clay, 28 Feb 1984, coll. Dennis Lees, 1 paratype, USNM 102809.—Sta 310-1, 59°36'11.7"N, 151°24'35.7"W, 3 m, slightly silty fine sand with shrimp wastes, 29 Feb 1984, coll. Dennis Lees, holotype having 18 setigers, USNM 102810, 1 paratype, USNM 102811.—Sta 315-1, 59°36'14.8"N, 151°24'34.5"W, 15 m, silt-clay, 29 Feb 1984, coll. Bill Blaylock, 3 paratypes, including

worm of 16 setigers as illustrated, USNM 102812.—Sta. 315-4, same, 1 paratype, USNM 102813.

Description.—A small species, measuring 2.2 mm long, 0.7 mm wide without parapodia, 0.75 mm wide with parapodia, for up to 20 setigers. Holotype 16 mm long, 0.7 mm wide without parapodia, 0.75 mm wide with parapodia, for 18 setigers. Body short, grub-like, widest medially; macrotubercles of holotype with traces of gray coloration, otherwise lacking pigmentation, and light yellow in alcohol.

Prostomium reduced, truncate anteriorly; median antenna stout, digitiform, distally blunt (Fig. 3A, B). All lateral antennae digitiform, distally blunt, longer than median antenna; inferior lateral antennae slightly longer than superior lateral antennae. All lateral antennae each with 4 proximal papillar spurs (Fig. 3A, B). Eyes numbering 1 pair (Fig. 3A-C). Peristomium reduced; peristomial cirri about as long as median antenna, digitiform, distally blunt (Fig. 3A-D). Proboscis long, muscular, extending over setigers 3-7. Seven papillae tightly encircled by prostomial antennae; papillae otherwise present on peristomium (Fig. 3C).

Parapodia uniramous, stout, about 2× longer than high at base (Fig. 3E, F); acicular lobe triangular and distally pointed; 1 pre-setal lobe, distally blunt, subdistally inflated, projecting well beyond acicular lobe (Fig. 3E, F); 1 distal postsetal lobe inserted just behind superior dorsal edge level with acicular lobe (Fig. 3E, F). Ventral cirrus conical to trapezoidal, distally blunt, approaching but not projecting beyond acicular lobe (Fig. 3E, F). Parapodial papillae numbering 3, including 1 on anterior surfaces, and 1 each on proximal dorsal superior (not shown) and ventral inferior edges (Fig. 3E, F); absent from posterior parapodial surfaces.

Dorsal macrotubercles sessile (Fig. 3G), arranged in 6-8 longitudinal rows (Fig. 3D), each macrotubercle spherical, with 13-15 longitudinal rows of long, papillae arranged in complex nonrandom pattern (Fig. 2B).

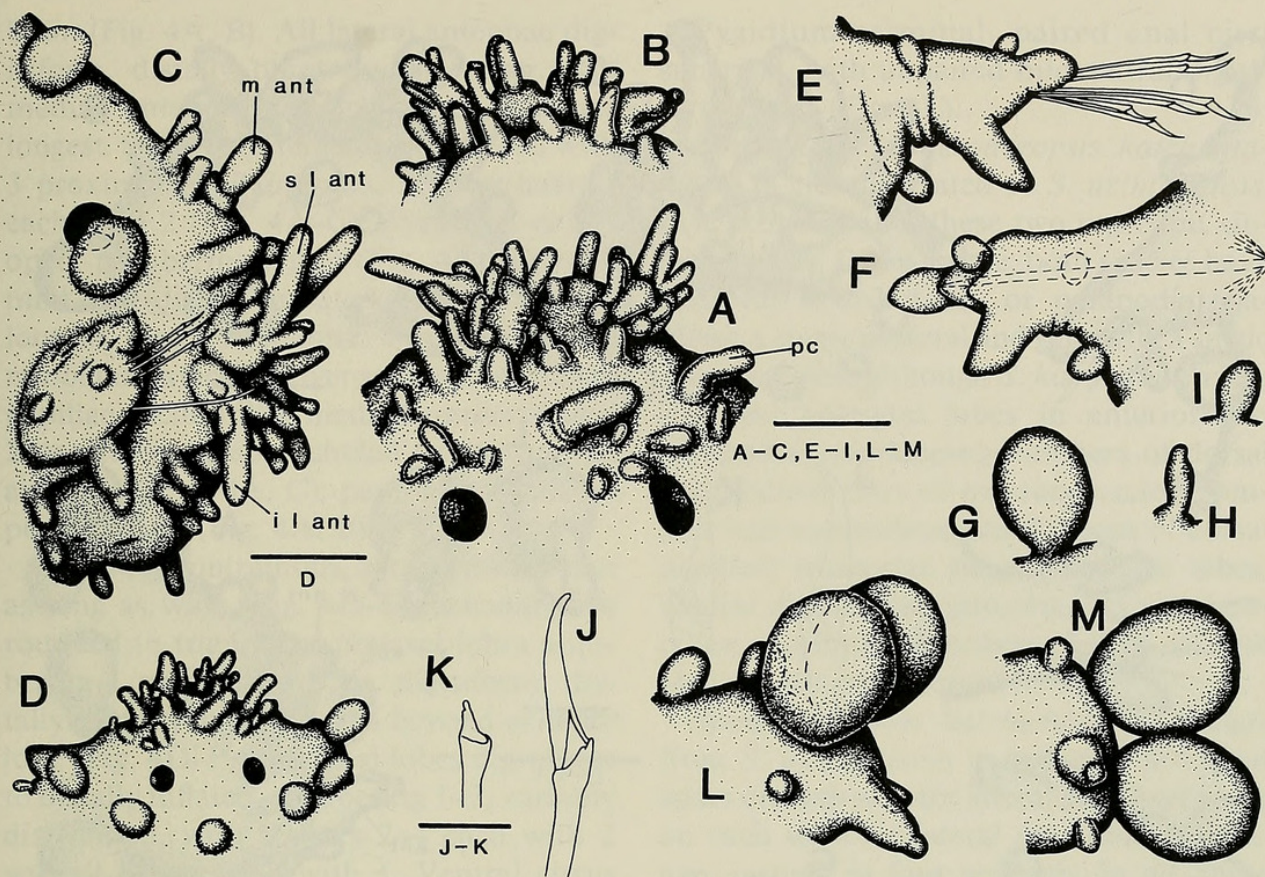


Fig. 3. *Sphaerodoropsis uzintunensis*, paratype (USNM 102812): A, Head region, dorsal view; B, Head region, ventral view; C, Anterior segments, lateral view; D, Anterior segments, dorsal view; E, Left setiger 7, anteroventral view, dorsal superior papilla omitted; F, Same, posterior view, setae and dorsal superior papilla omitted; G, Macrotubercle, lateral view; H, Dorsal papilla, lateral view; I, Ventral papilla, lateral view; J, Composite falciger, lateral view; K, Detail, shaft tip of composite falciger, ventrolateral view; L, Pygidium, lateral view; M, Same, ventral view. m ant, median antenna; s l ant, superior median antenna; i l ant, inferior median antenna. Scales: A-C, E-I, L-M = 0.05 mm; D, J-K = 0.01 mm.

Ventrum with 9 alternating rows of small, elliptical papillae (Fig. 3I) forming zig-zag pattern.

Composite falcigers numbering 4–6 per fascicle; blades long, smooth, distally recurved, unidentate (Fig. 3E, J), decreasing in length within a fascicle; shafts long; shaft tips slightly inflated, with dorsal superior distal surfaces smooth; dorsal superior branch long, spike-shaped, subdistally notched, ventral inferior branch truncate, forming socket for blade (Fig. 3K).

Pygidium terminal; paired anal cirri huge, larger than dorsal macrotubercles, spherical, with large, conspicuous unpaired mid-ventral cirrus flanked by pair of smaller, digitiform papillae (Fig. 3L, M).

Remarks. — *Sphaerodoropsis uzintunensis*, new species, is related to both *S. sphae-*

rulifer (Moore, 1909), and *S. benguellarum* (Day, 1963) in having similar numbers of sessile macrotubercles and a single presetal parapodial lobe. *Sphaerodoropsis uzintunensis* has a single postsetal lobe, which is absent from the other two species. *S. uzintunensis* further differs from *S. sphaerulifer* in having proximal papillar spurs on prostomial antennae and in having small dorsal papillae distributed between adjacent rows of macrotubercles. This species is also superficially similar to *Sphaerodoropsis minuta* (Webster and Benedict, 1887) from which it differs in having six to eight dorsal macrotubercles rather than the usual 10–12 macrotubercles; only one instead of two, postsetal parapodial lobes; one parapodial papilla each on anterior parapodial surfaces and proximal ventral inferior parapodial

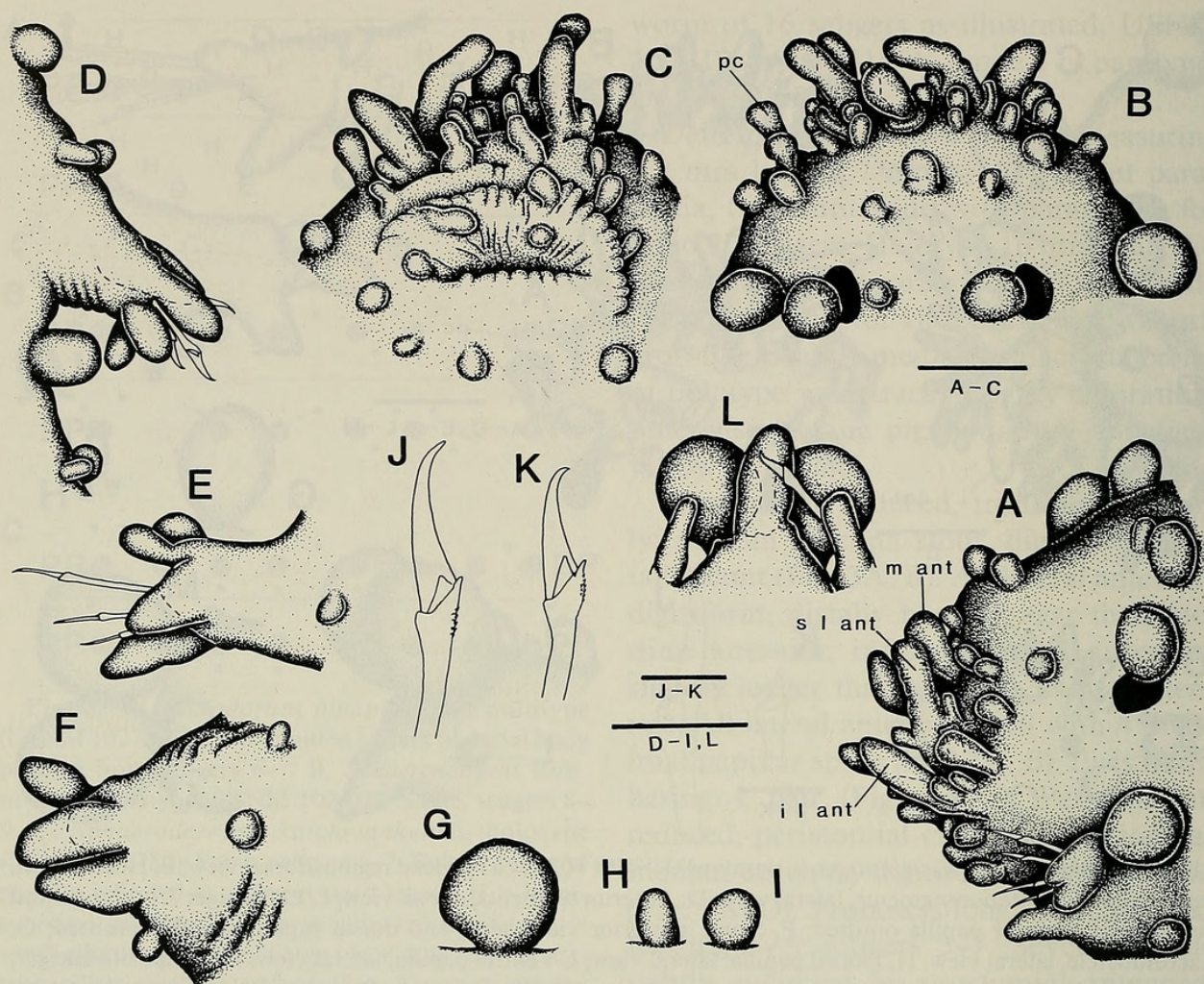


Fig. 4. *Sphaerodoropsis katchemakensis*, holotype (USNM 102782): A, Head region, lateral view; B, Same, dorsal view; C, Same, ventral view; D, Right setiger 6, dorsal view; E, Right setiger 6, anterior view; F, Left setiger 6, posterior view; G, Macropapilla, lateral view; H-I, Papillae, lateral view; J-K, Composite falcigers, lateral view; L, Pygidium, ventral view. m ant, median antenna; s l ant, superior median antenna; i l ant, inferior median antenna. Scales: A-C, D-I, L = 0.05 mm; J-K = 0.01 mm.

edges rather than one each on both anterior and posterior parapodial surfaces; and smooth and not minutely serrated composite falcigers.

Etymology.—The epithet derives from the Tanainan Indian place name for the Homer Spit where this species was discovered.

Type locality.—Homer Boat Harbor, Homer, Alaska.

Sphaerodoropsis katchemakensis,
new species
Fig. 2C, 4

Material examined.—ALASKA: Katchemak Bay, Homer Spit Boat Harbor, sta

200-4, 59°36'18.0"N, 151°24'44.5"W, 5 m, coarse to fine sand between boulders and cobble, 28 Feb 1984, coll. Dave Erikson, 2 paratypes, USNM 102783.—Sta 210-1, 59°36'18.4"N, 151°24'41.8"W, 10 m, silt-clay, 28 Feb 1984, coll. Dennis Lees, holotype, USNM 102782.

Description.—A small species; holotype measuring 1.2 mm long, 0.6 mm wide without parapodia, 0.65 mm wide with parapodia, for 14 setigers. Body short, truncate anteriorly and posteriorly, widest posteriorly; lacking pigmentation; light brown to white in alcohol.

Prostomium truncate anteriorly; median antenna short, strongly inflated, distally

blunt (Fig. 4A, B). All lateral antennae digitiform, distally blunt, much longer than median antenna; superior lateral antennae longest. Superior lateral antennae each with 3 proximal papillar spurs; inferior laterals each with 2 (Fig. 4A–C). Eyes well developed, numbering 1 pair (Fig. 4A). Peristomial cirri distally inflated, blunt, about as long as median antenna. Proboscis short, muscular, extending over setigers 3–6. Three papillae including 1 median unpaired and 2 ventral papillae encircled by prostomial antennae (Fig. 4A, C); papillae present on peristomium (Fig. 4A, B).

Parapodia uniramous, short, stout, about as long as wide (Fig. 4D–F); acicular lobe rounded to triangular; presetal lobes numbering 1 per parapodium, digitiform, distally blunt, projecting well beyond acicular lobe (Fig. 4D–F); postsetal lobes digitiform to distally inflated, numbering 1–2, variably distributed, with setigers 2–4 each with 2 and all others each with 1. Ventral cirrus bluntly conical, extending beyond acicular lobe (Fig. 4D). Parapodial papillae numbering 3, including 1 on anterior surfaces, and 1 each on proximal dorsal superior and ventral inferior edges (Fig. 4D–F); absent from posterior parapodial surfaces. One interramal papilla present between adjacent parapodia (Fig. 4D).

Dorsal macrotubercles spherical, sessile, variable sized (Fig. 4G), arrayed in 8–9 longitudinal rows, accompanied by around 10 smaller papillae (Fig. 4H) arranged in complex non-random pattern (Fig. 2C). Ventrum with 11 alternating rows of papillae (Fig. 4I) forming zig-zag pattern.

Composite falcigers generally numbering 4–5 per fascicle; blades moderately long, smooth, distally recurved, unidentate (Fig. 4J, K), decreasing in length both within a fascicle and posteriorly along body; shafts moderately long to short; shaft tips distally serrated along dorsal superior edges (Fig. 4J, K), with dorsal superior branch long, spike-shaped, sometimes subdistally notched, ventral inferior branch truncate, forming socket for blade (Fig. 4J, K).

Pygidium terminal, paired anal cirri spherical, with unpaired midventral digitiform cirrus (Fig. 4L).

Remarks.—*Sphaerodoropsis katchemackensis* is closely related to *S. uzintunensis*. It is probable that these two represent sibling species. For example, both species have identical distributions of parapodial papillae; a single presetal and generally a single postsetal lobe, although *S. katchemackensis* has two postsetal lobes in anteriormost parapodia; overlapping numbers of dorsal longitudinal rows of macrotubercles; complex and nonrandom distributions of dorsal papillae; triangular shaped acicular lobes; similar distribution patterns of ventral papillae; and similar numbers of setae, all with smooth cutting margins.

Sphaerodoropsis katchemackensis differs from *S. uzintunensis* in having 2 proximal spurs on each inferior lateral and three spurs on each superior lateral prostomial antennae, instead of four on each. In all, three papillae are encompassed by the antennae of *S. katchemackensis*, instead of seven as in *S. uzintunensis*. Rows of dorsal papillae number ten rows in *S. katchemackensis*, and 13–15 in *S. uzintunensis*. Parapodia are as long as wide in *S. katchemackensis*, and twice the width in *S. uzintunensis*. Ventral cirri of *S. katchemackensis* extend beyond the acicular lobes of parapodia, and do not in *S. uzintunensis*. Lastly, distal regions of setal shafts are conspicuously serrated in *S. katchemackensis* and smooth in *S. uzintunensis*.

Specimens of *S. katchemackensis* were initially identified as *Sphaerodoropsis minuta* (Webster and Benedict, 1887) based on the presence of two parapodial postsetal lobes in anteriormost parapodia, and the numbers of dorsal macrotubercles (Webster and Benedict 1887, Pettibone 1963, Hartman 1968, Banse and Hobson 1974). However, detailed examinations revealed that usually only one postsetal lobe is present instead of two; the ventral cirrus projects well beyond the acicular lobe, and approaches but does not surpass the tip of the presetal lobe, rath-

er than not extending beyond the acicular lobe; acicular lobes are shorter, and do not project to or beyond the postsetal lobes; the total number of parapodial papillae number three instead of two; the posterior parapodial surfaces lack papillae whereas one is present in *S. minuta*; the number of dorsal macrotubercles number eight to nine, not 10–12 to 14; and the blades of composite falcigers are smooth and not serrated. These differences are both consistent in the present materials and differ significantly from *S. minuta*.

Etymology. — The epithet, *katchemakensis*, derives from the name of Katchemak Bay, Alaska, where this species was discovered.

Type locality. — Homer Boat Harbor, Homer, Alaska.

Sphaerodoropsis sphaerulifer (Moore, 1909)

Sphaerodorum sphaerulifer Moore, 1909: 336. — Uschakov, 1955:222.

Sphaerodoridium sphaerulifer. — Lützen, 1961:415. — Banse and Hobson, 1968: 18. — Hartman, 1968:605.

Sphaerodoropsis sphaerulifer. — Fauchald, 1974:277. — Banse and Hobson, 1974:76.

Material examined. — ALASKA: Katchemak Bay, Homer Spit Boat Harbor, sta 215-1, 59°36'19.1"N, 151°24'39.0"W, 15 m, silt-clay, 28 Feb 1984, coll. Dennis Lees, 1 specimen, USNM 102800. — Sta 215-2, same, 1 specimen, USNM 102801.

Remarks. — These two specimens are tentatively referred to *S. sphaerulifer* on the basis of Banse and Hobson (1974), and pending receipt of additional material. A more precise determination is not possible since their prostomia are either distorted (USNM 102800) or fully retracted (USNM 102801). In any case, these specimens agree generally with previous descriptions, and differ in some important ways from those provided by Moore (1909), Hartman (1968), and Fauchald (1974). For example, Fauchald (1974), who embellished Moore's

(1909) original contribution, describes the presence of small papillae between the macropapillae, distally truncate parapodial lobes, and short falcate blades on compound setae. Specimens from Alaska differ in totally lacking papillae between dorsal macropapillae, in having triangular acicular lobes, and in having notably long falcate blades. As such, Alaskan specimens appear to agree more closely with descriptions provided by Uschakov (1955), Lützen (1961), and Banse and Hobson (1974). Additional materials from southcentral Alaska are needed before this apparent discrepancy involving the type species for the genus can be resolved.

Distribution. — Newly reported from Alaska; previously recorded from British Columbia, Washington, California, Sea of Japan, Sea of Okhotsk.

Key to Species of *Sphaerodoropsis* Recorded from Alaska

In all, eight described species of sphaerodorids have been recorded from Alaskan waters in published accounts as follows:

Amacrodorum bipapillatum: this study, Akutan Island.

Sphaerodoridium clapedii (Greeff), Beaufort Sea; (Bilyard and Carey 1980).

Sphaerodoropsis biserialis (Berkeley and Berkeley), southeast and southcentral Alaska, ?Aleutian Islands to Japan; (Lützen 1961, Hartman 1968, Imajima 1969) *S. minuta* (Webster and Benedict), Beaufort and Chukchi Seas, southcentral and southeast Alaska; (Hartman 1968, Bilyard and Carey 1970, Kudenov, unpublished data).

S. katchemakensis: this study, Katchemak Bay, Homer, Alaska.

S. sphaerulifer (Moore), southcentral Alaska; this study.

S. uzintunensis: this study, Katchemak Bay, Homer, Alaska.

Sphaerodorum papullifer Moore, southeast Alaska, (Kudenov, unpublished).

The following key is based on published records of *Sphaerodoropsis* species from Alaskan waters, and partly follows Banse and Hobson (1974:76).

1. Dorsum with 4 dorsal longitudinal rows of macrotubercles ... *S. biserialis*
 - Dorsum with 6–14 dorsal longitudinal rows of macrotubercles 2
2. Blades of composite setae minutely serrated 3
 - Blades of composite setae smooth, not minutely serrated 4
3. Dorsum with 7–8 dorsal longitudinal rows of macrotubercles; dorsum without papillae; parapodia without postsetal lobes *S. sphaerulifer*
 - Dorsum with 10–14, normally 10–12 dorsal longitudinal rows of macrotubercles; dorsum with papillae; parapodia with 2 postsetal lobes ...
..... *S. minuta*
4. Dorsum with 8–9 dorsal longitudinal rows of macrotubercles; superior and inferior lateral antennae each with 3 and 2 proximal spurs; ventral cirri project beyond acicular parapodial lobes
..... *S. katchemakensis*
 - Dorsum with 6–8 dorsal longitudinal rows of macrotubercles; superior and inferior lateral antennae each with 4 proximal spurs; ventral cirri do not project beyond acicular lobes *S. uzintunensis*

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