

To Steve Shuster  
 good luck  
 with the n.m. 'pod.

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**THERMOSPHAEROMA SUBEQUALUM, N. GEN., N. SP. (CRUSTACEA : ISOPODA) FROM BIG BEND NATIONAL PARK, TEXAS\***

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**Abstract**

A new species of the Sphaeromatidae (*Thermosphaeroma subequalum*) is described from thermal waters (32°-35°C) in Big Bend National Park, Brewster Co., Texas. A new genus, *Thermosphaeroma*, is proposed to include the Texas species and other sphaeromatids from hot springs in the American Southwest and Mexico: *Exosphaeroma dugesi* (Dollfus, 1893) from Aguascalientes, Mexico, and *E. thermophilum* (Richardson, 1897) from Socorro, New Mexico.

**Introduction**

During April, May and June, 1974, some sphaeromatid isopods were collected by Carol A. Bane and Owen T. Lind from hot springs in Big Bend National Park, Brewster Co., Texas (Lind & Bane, 1975). The crustaceans represented an unknown species which is described in this paper. Furthermore, we are assigning them to a new genus.

Isopods were collected from two springs near Boquillas Canyon (102° 56' long, 29° 28' lat) and a site on the Rio Grande Village Nature Trail (102° 56' long, 29° 11' lat). Temperatures of the two Boquillas Canyon springs were 34°C in April 1974. At the same time the overflow of two capped springs to the Nature Trail collecting site had wa-

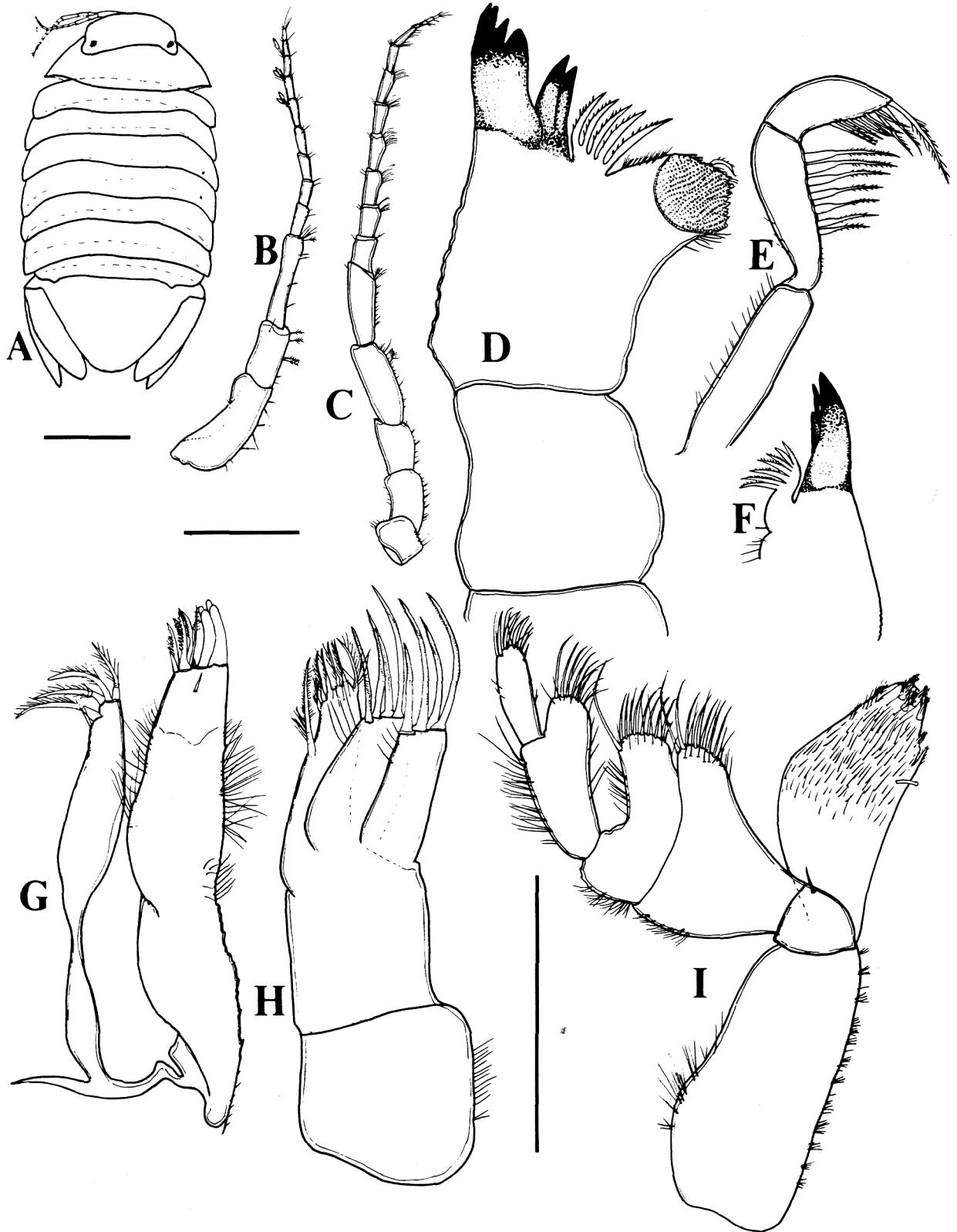
ters of 33° and 34°C. This overflow forms a marsh around part of the Nature Trail. The marsh temperature during April was 24°C.

Sixty-nine specimens were collected; the largest was a male from Boquillas Canyon Spring I, 9 June 1974 (Figs. 1-3). This spring is typical of springs found in this region and is designated the type locality. Its discharge at 1015 hrs, 8 April 1974, was 120 liters min<sup>-1</sup>; it is situated about 14 km from the Rio Grande near the mouth of Boquillas Canyon. Because it is well concealed by cane and dead mesquite, its presence was not recorded until 1973.

There are at least four species of inland sphaeromatids known from hot springs in southwestern USA and Mexico. Dollfus (1893) described one from the state of Aguascalientes, Mexico, calling it *Sphaeroma dugesi*. Four years later Richardson (1897) named *S. thermophilum* from a warm spring near Socorro, New Mexico. An undescribed species occurs in at least one spring in Chihuahua, Mexico, and the Big Bend species, with which this paper deals, is the fourth.

Richardson (1905) assigned *S. dugesi* and *S. thermophilum* to the genus *Exosphaeroma* Stebbing. Dr. Thomas E. Bowman (personal comm.) pointed out, however, that the two species do not conform to the description of *Exosphaeroma* because, among other things, they are eubranchiate forms rather than hemibranchiate. They are not referable to *Sphaeroma* Latreille for the same main reason and because, in them, the exopod of pleopod 3 is biarticulate and the outer surface of the uro-

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224 Fig. 1. *Thermosphaeroma subequalum* sp. nov., male. A. habitus, dorsal aspect. B. antenna 1. C. antenna 2 D. left mandible. E. palp, left mandible. F. right mandible, incisors and spine row. G. maxilla 1. H. maxilla 2. I. maxilliped Horizontal lines = 2 mm for A; 0.5 mm for B, C. Vertical line = 0.5 mm for D-I.

pod exopod is not dentate. Similarly, they differ from the hemibranchiate *Gnorimosphaeroma* Menzies by lacking a clearly biarticulate exopod of pleopod 4, possessing no marginal plumose setae on that ramus, and by showing only one unsutured pleonite anterior to the pleotelson.

For the reasons above, we are defining a new genus for this group of hot-springs isopods. *Thermosphaeroma*.

Isopoda, Cirolanoidea

Family Sphaeromatidae

*Thermosphaeroma*, n. gen.

*Sphaeroma dugesi*, Dollfus, 1893, p. 115, Figs. 1, 2.

*Sphaeroma thermophilum*, Richardson, 1897, p. 465.

*Sphaeroma thermophilum*, Richardson, 1900, p. 223.

*Sphaeroma dugesi*, Richardson, 1904, p. 24.

*Exosphaeroma thermophilum*, Richardson, 1905, p. 294, Figs. 311, 312.

*Exosphaeroma dugesi*, Richardson, 1905, p. 295, Figs. 313, 314.

*Exosphaeroma thermophilum*, Van Name, 1936, p. 450, Fig. 281.

*Exosphaeroma dugesi*, Rioja, 1950, p. 352, Figs. 1-39.

*Exosphaeroma*, Pennak, 1953, p. 431, Fig. 270 A. B (partim)

*Exosphaeroma thermophilum*, Chace et al., 1959, p. 874.

Type species *Sphaeroma dugesi* Dollfus, 1893.

#### Diagnosis

Sphaeromatidae. Eubranchiata. Mouthparts similar in both sexes. Maxilliped, palp 5-segmented, segments 2-4 with strongly produced lobes on inner margin. Pleopods undivided except for the biarticulate exopod of pleopod 3. Pleopod 2, male, appendix masculinus sinuate, extending past apex of endopod. Pleopods 4, 5, rami without marginal setae; exopods with transverse branchial folds sometimes poorly developed. One pleonite, without marginal sutures, visible anterior to pleotelson. Pleotelson, similar in both sexes, somewhat rounded terminally. Uropod, rami smooth, relative lengths varying according to species.

#### Etymology

The generic name calls attention to the thermal-spring habitat of the known species referable to the genus.

*Thermosphaeroma subequalum* sp. nov.

#### Diagnosis

A small poorly pigmented *Thermosphaeroma*; uropod.

exopod length subequal to endopod length, slightly longer in small individuals; mouthparts lacking chromatophores, although mandibular incisors, lacinia mobilis and teeth on external plate of maxilla 1 are amber colored. Pleopod 5, exopod with an apical and a more proximal reniform zone of small hooks; a slight indentation just proximal to the latter.

#### Description

Male: 8.15 mm. Body, pigmented dorsally, scanty pigmentation ventrally, lacking on appendages; length about 1.9 x width. Pleotelson, comprising about 0.25 total body length, proximal width 2 x pleotelson length, rounded terminally. Head, 2.5 x wider than long, comprising about 0.11 total body length; eyes small, rounded, on posterolateral lobes.

Antenna 1, extending back to pereonite 2. Peduncle, with three segments, the first robust and longest; the second stout, 0.5 length of first; the third narrow, cylindrical, 0.8 x length of first. Flagellum, with nine segments, segments 6-8 each bearing two trowel-shaped sensory structures.

Antenna 2, 1.2 x length of antenna 1, extending past cephalic border of pleonite 2. Peduncle with five segments, relative lengths of 1-5 being 1.0, 2.0, 1.7, 2.8 and 2.8. Flagellum, subequal to peduncular length, 11 segments.

Mandibles. Incisors, sharp, chitinized, the right with three teeth, the left with four; lacinia mobilis on left mandible with two sharp teeth; left spine row composed of five stout plumose setae; right spine row with seven stout plumose setae; molar process rounded, strongly triturative, bearing one or two plumose setae. Palp, of three segments, the proximal longest; segment 2, recurved, bearing seven pectinate spines; segment 3, curved, bearing 10 plumose setae on the concave margin, the distal three being much longer than the others.

Maxilla 1. Outer ramus, longer and stouter than internal; ten curved apical teeth, inner five pectinate, the others smooth; a large plumose seta and a short conical spur inserted between the two groups of teeth; another longer, sharp spur situated near the base of innermost pectinate tooth. Internal ramus, with four stout plumose apical setae.

Maxilla 2. Outer ramus, extending slightly beyond palp, with four long curved apical spines, the longest equals the length of the plate. Inner ramus, extending beyond outer plate, with five stout apical setae and one long internal sub-apical seta, all plumose. Palp, with four

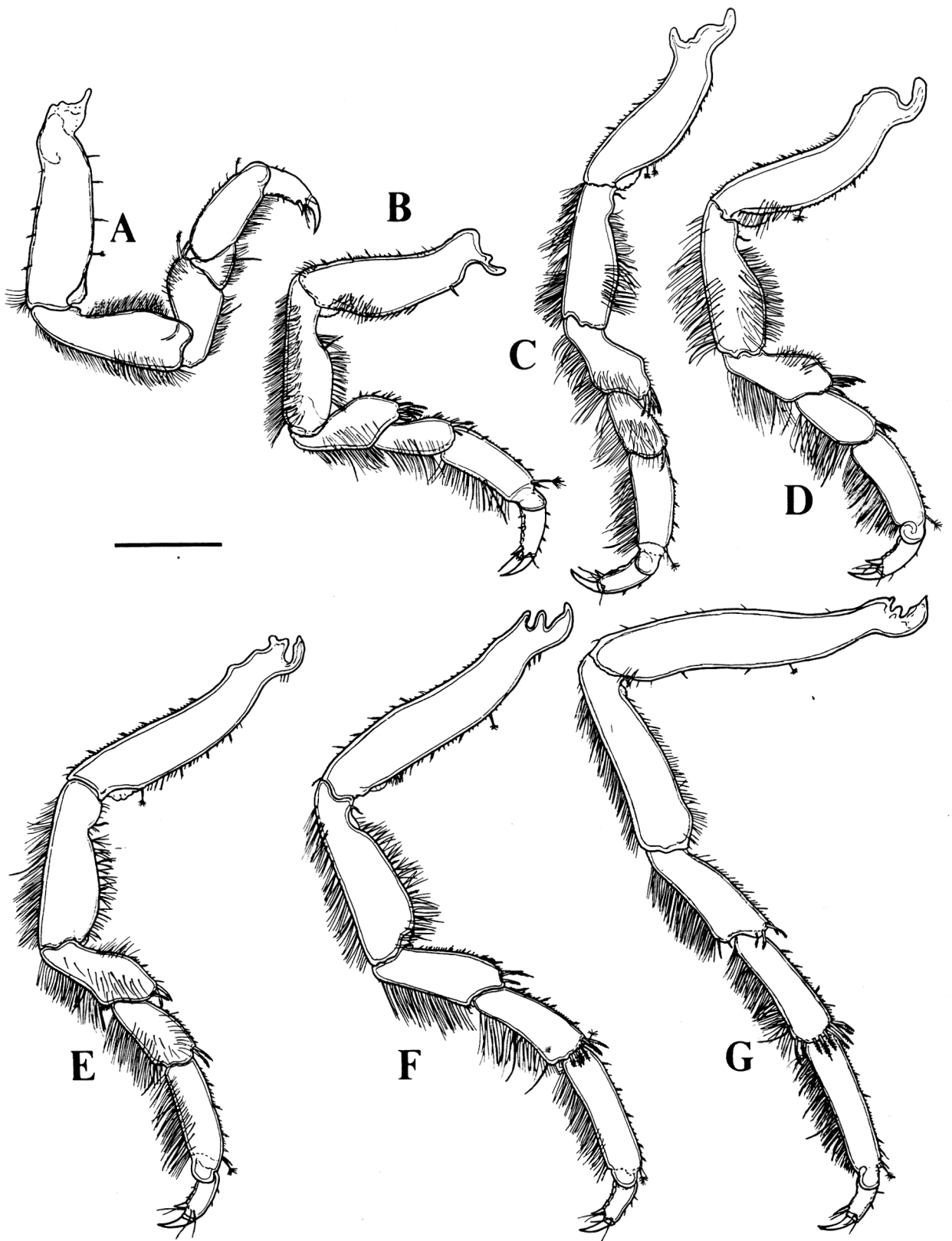


Fig. 2. *Thermosphaeroma subequalum* sp. nov., male. A. pereopod 1. B. pereopod 2. C. pereopod 3. D. pereopod 4. E. pereopod 5. F. pereopod 6. G. pereopod 7. Horizontal line = 0.5 mm.

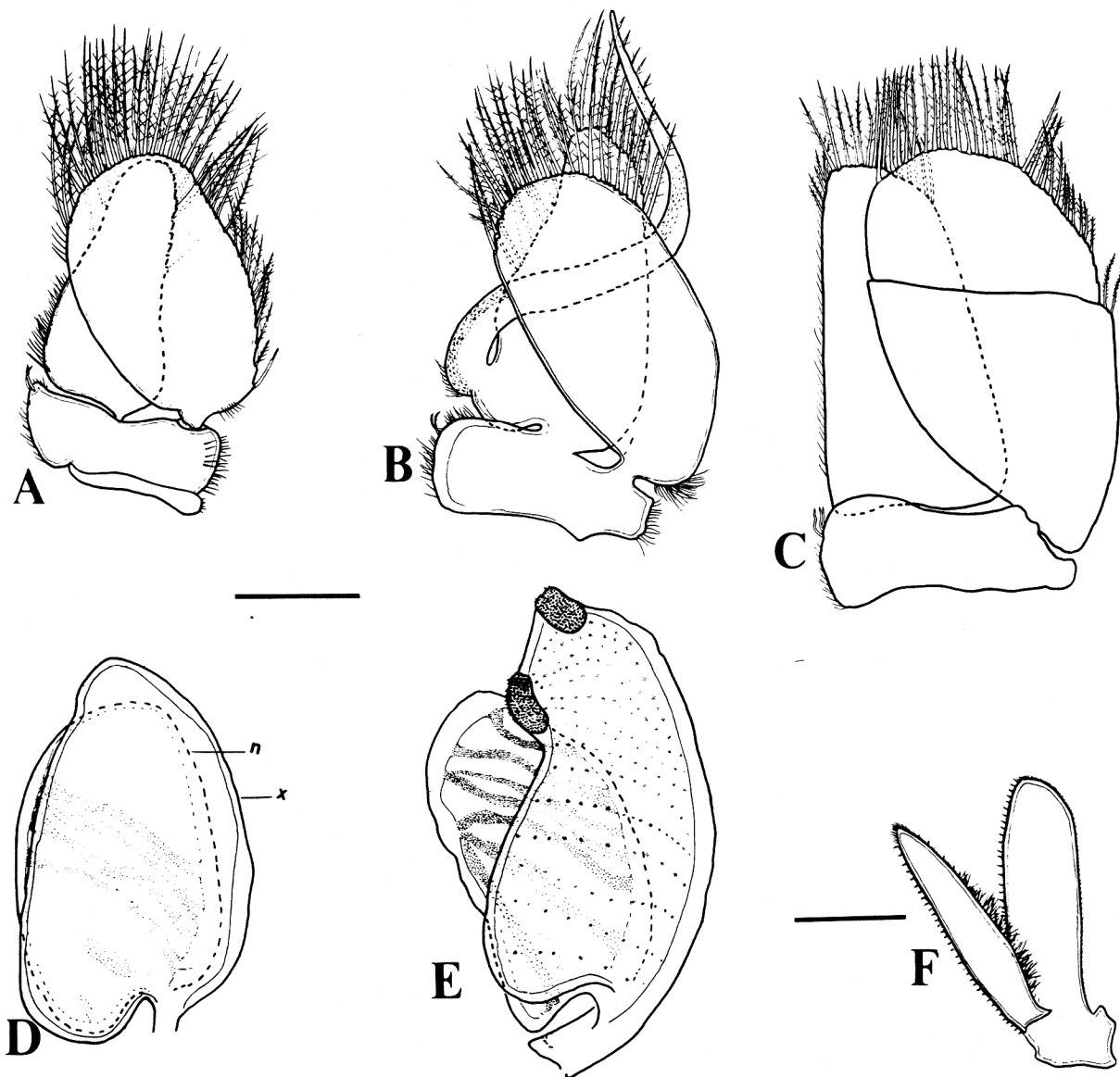


Fig. 3. *Thermosphaeroma subequalum* sp. nov., male. A. pleopod 1. B. pleopod 2. C. pleopod 3. D. pleopod 4; n = endopod, x = exopod. E. pleopod 5. F. uropod. Horizontal lines, upper = 0.5 mm; lower right = 1.0 mm, for F only.

long curved apical spines, the longest equals palp length.

Maxilliped. Palp, of five segments; segments 2-4 with strongly produced medial lobes, bearing many strong setae; proximal segment shortest, armed with one medial seta; the second segment is the largest; ultimate segment, elongate, unproduced, armed with 9-12 strong apical setae. Inner plate, shorter than palp, bluntly pointed

end armed with three stout plumose setae; distal third, inner surface armed with four submarginal stout plumose setae; small coupling spine inserted in distal half of internal surface.

Pereopods, non-prehensile, increasing in length posteriorly; dactylar claws slender. Basis and dactylus least setose. Merus, armed distally with toothed spines. Car-

pus, armed distally with toothed spines in pereopods 3-7; 6 and 7 especially spinose; small and subtriangular in pereopod 1. Sensory setae on basis and propodus.

**Pleopods.** Pleopods 1-3, both rami with slender marginal plumose setae. Pleopod 2, male, endopod longer than exopod, bearing sinuate appendix masculinus extending well beyond both rami. Pleopod 3, exopod with transverse suture. Pleopods 4, 5, both rami lack marginal setae, fleshy, respiratory with transverse branchial folds especially strong in endopods. Pleopod 5, exopod, with two reniform chitinous areas, one apical, the other medial in distal third, a shallow indentation proximal to the latter.

**Uropods.** Rami subequal in length; exopod lanceolate, margins smooth, armed with short setae; endopod, 1.9 x broader, blunter, margins smooth, bearing short setae.

#### *Etymology*

The specific name, *subequalum*, refers to the relative lengths of the uropod rami. The most obvious differences among the known species of *Thermosphaeroma* are their exopod : endopod length ratios.

#### *Disposition of types*

The holotype, a male (8.15 mm) has been deposited in the United States National Museum (USNM 170588). Paratypes also have been deposited in the USNM (170589).

#### *Affinities*

Although there have been no comparative studies, the species of *Thermosphaeroma* seem to show close morphologic similarities. The relative lengths of the uropod rami serve readily to distinguish them. In *T. thermophilum*, the somewhat broad exopod extends to or slightly beyond the middle of the endopod. The exopod in *T. dugesi* is lanceolate and extends about 0.75 the endopod length. In *T. subequalum* the exopod is subequal in length to the endopod, occasionally surpassing it slightly. An undescribed member of the genus from Chihuahua has a sharply-pointed exopod, 1.5 x the endopod length and held at right angles to it.

Although pigmentation may vary among individuals and from season to season, the Big Bend species seems to be the least pigmented, contrasting with the other forms that have well pigmented mouthparts and pereopods. Perhaps *T. dugesi* is slightly less pigmented than *T. thermophilum*, because Rioja (1950) emphasized that the inner plate of the former's maxilla 1 lacks chromatophores; some are present on the corresponding structure in the latter species.

The transverse respiratory folds on the exopods of pleopods 4 and 5 may vary, but, from the specimens we have examined, it appears that *T. thermophilum* has the strongest. It clearly is eubranchiate. *T. dugesi* and *T. subequalum* show poorly-developed respiratory thickenings on these plates.

Other features of the exopod of pleopod 5 may have some taxonomic worth; certainly the shape and arrangement of the chitinized, pad-like zones (Fig. 3,E) differ among the species. A terminal, ovoid or reniform pad exists in each species. In *T. dugesi* and in the undescribed form from Chihuahua, there is an elongate chitinized zone along the inner margin more proximally. In *T. thermophilum* and *T. subequalum*, the proximo-medial pad is short, being roughly the same shape as the apical chitinized zone. In the former species, the exopod is incised deeply just proximal to the internal pad, giving the ramus a bilobed appearance.

In *T. subequalum* there is but a shallow indentation in the same region (Fig. 3,E). From the similarities and differences in the exopod of pleopod 5, *T. subequalum* would seem closer to *T. thermophilum* than to the Mexican species.

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