

A NEW SPECIES OF *EOSENTOMON*
(PROTURA: EOSENTOMIDAE) FROM
NORTH CAROLINA AND TENNESSEE

T. P. Copeland and Charlie White

Abstract.—*Eosentomon pseudoyosemitense* White, new species, is described. Its distribution in Tennessee–North Carolina and a table summarizing differences among 10 species of U.S. *Eosentomon* are given.

Eosentomon pseudoyosemitense White, new species

White using material that had been collected by Copeland in 1959–1961 originally described this species in his M.S. thesis (1966) but this has not been published. In 1977 Copeland made additional collections in the vicinity of Highlands, North Carolina and the following description and drawings were made by him from a specimen taken near Bridal Veil Falls.

In most characters but especially in the shape of the female genital apparatus *E. pseudoyosemitense* is closely related to *Eosentomon yosemitense* Ewing (1940), both have the processus sternales in the form of two semicircles. However, *E. yosemitense* has no anterior setae on sternum VIII while *E. pseudoyosemitense* possesses two. These and other differences in related species are summarized in Table 1, some of the information taken from Bonet and Tuxen (1960).

Holotype.—♀, 725 μ long but not fully distended and poorly sclerotized.

Description.—Head: Egg shaped, length excluding labrum 89 μ . Labrum length 6 μ ; terminating in a flat V-shaped notch with relatively broad, deep, median cleft (Fig. 1); LR 14.8. Labral setae present. Rostral setae I much broadened in basal $\frac{1}{2}$ and equal length to III. Pseudoculi large, 11 μ ; PR 8.0, PR derived by dividing the pseudoculus length into head capsule length. Mandibles partially obscured but in paratypes terminate in 3 teeth. Lacinia II hooked but not as strongly as in *Eosentomon vermiforme* Ewing. Clypeal apodemes connected anteriorly.

Thorax: Glands of *filamento de sostegno* in mesothorax (Fig. 4). Spiracular setae P 3' setiform and relatively long for these setae. Two sensilla located in each membranous pleural area between thorax I–II and 1 immediately adjacent to setae A 4 on metathoracic tergum. Mesothoracic seta P 1 length $\frac{1}{2}$ as long as distance to its homolog and slightly longer than p 1'.

Tarsi: Foretarsus (Figs. 2–3) short and broad, length 65 μ ; BS 0.77. Sensilla t-1, e, g and s with huge clubs. The t-1 inserted very near to α 3; e between β 6 and γ 4; g closer to β 8 than γ 4. Sensillum b narrow

Table 1. Summary of similarities and differences among selected species of U.S. *Eosentomon*.

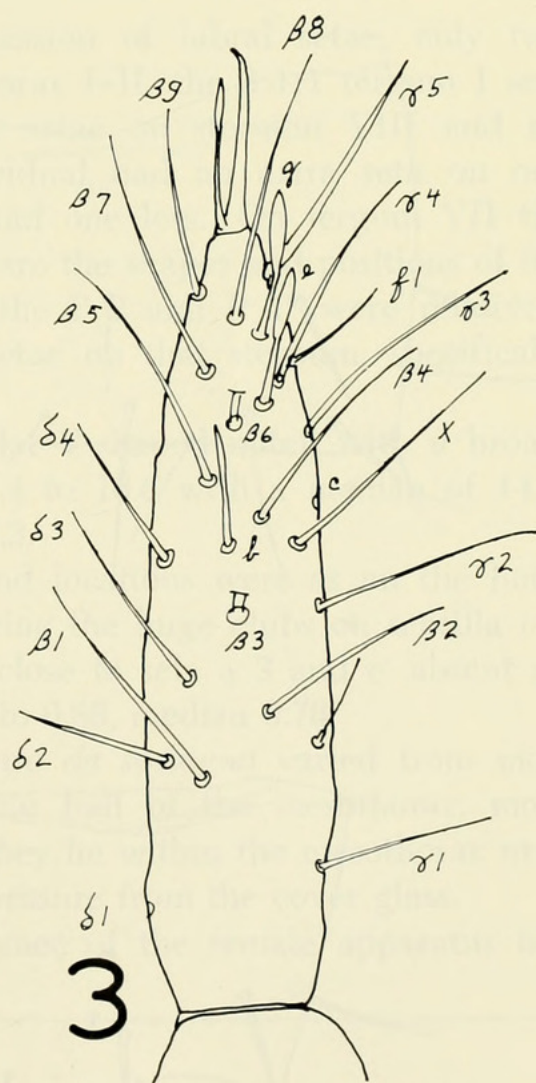
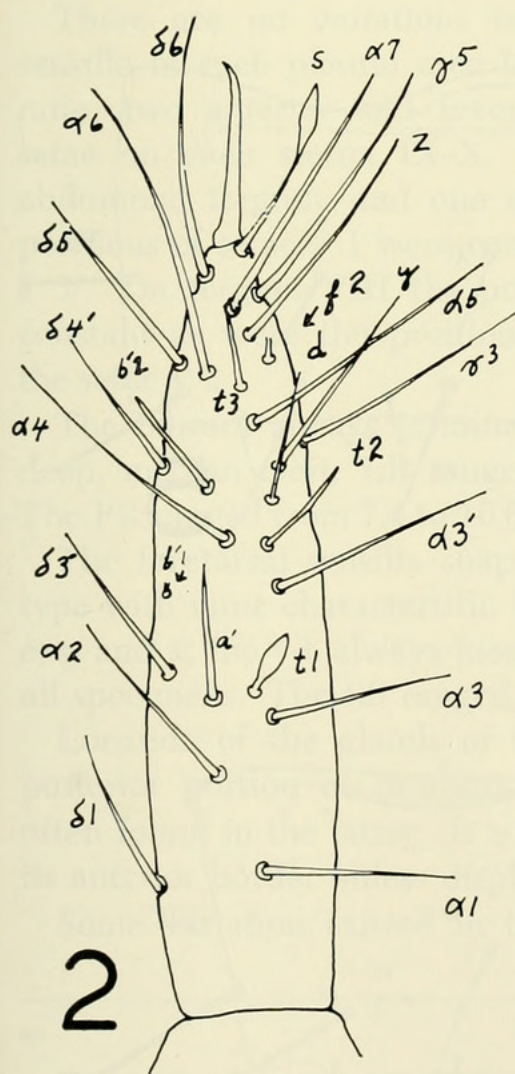
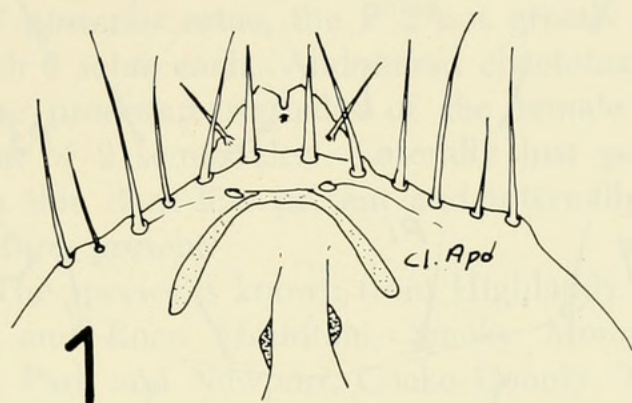
| | A | B | C | D | E |
|---|------|------|------|------|------|
| Labrum length | 6.8 | 31 | 13 | 19 | 14 |
| Labral setae present | + | 0 | + | + | + |
| Ros. setae III:I | 1.0 | 0.3 | 1.0 | 0.5 | 1.0 |
| Foretarsus length | 69 | 125 | 89 | 103 | 113 |
| BS ratio | 0.80 | 1.45 | 1.40 | 1.35 | 1.51 |
| Sensillum b' 1 pres. | + | 0 | 0 | 0 | 0 |
| t-1 closer to α 3' than α 3 | 0 | + | + | + | + |
| Seta no. ant. row t IV | 8 | 10 | 10 | 10 | 8 |
| Seta no. ant. row t V-VI | 8 | 8 | 8 | 8 | 8 |
| Abd. acc. setae longer | + | 0 | + | 0 | + |
| Setae no. s VIII | 2/7 | 2/7 | 2/7 | 2/7 | 2/7 |
| Setae no. s IX-X | 6 | 6 | 6 | 4 | 4 |
| | F | G | H | I | J |
| Labrum length | ? | ? | 15 | 15 | 32 |
| Labral setae present | + | ? | + | + | 0 |
| Ros. setae III:I | ? | ? | 0.8 | 0.7 | 2.0 |
| Foretarsus length | ? | 80 | 113 | 108 | 103 |
| BS ratio | 0.81 | 0.90 | 0.98 | 0.84 | 1.42 |
| Sensillum b' 1 pres. | 0 | ? | + | + | 0 |
| t-1 closer to α 3' than α 3 | 0 | 0 | 0 | 0 | + |
| Seta no. ant. row t IV | 10 | 8 | 10 | 10 | 10 |
| Seta no. ant. row t V-VI | 10 | 6 | 8 | 8 | 8 |
| Abd. acc. setae longer | + | + | 0 | 0 | + |
| Setae no. s VIII | 2/7 | 0/7 | 0/7 | 0/7 | 2/7 |
| Setae no. s IX-X | 6 | 4 | 6 | 6 | 4 |

| | | |
|--------------------------------|-----------------------------|--------------------------|
| A. <i>E. pseudoyosemitense</i> | D. <i>E. pseudowheeleri</i> | G. <i>E. yosemitense</i> |
| B. <i>E. quadridentatum</i> | E. <i>E. tennesseense</i> | H. <i>E. dureyi</i> |
| C. <i>E. wheeleri</i> | F. <i>E. pusillum</i> | I. <i>E. pallidum</i> |
| | | J. <i>E. erwini</i> |

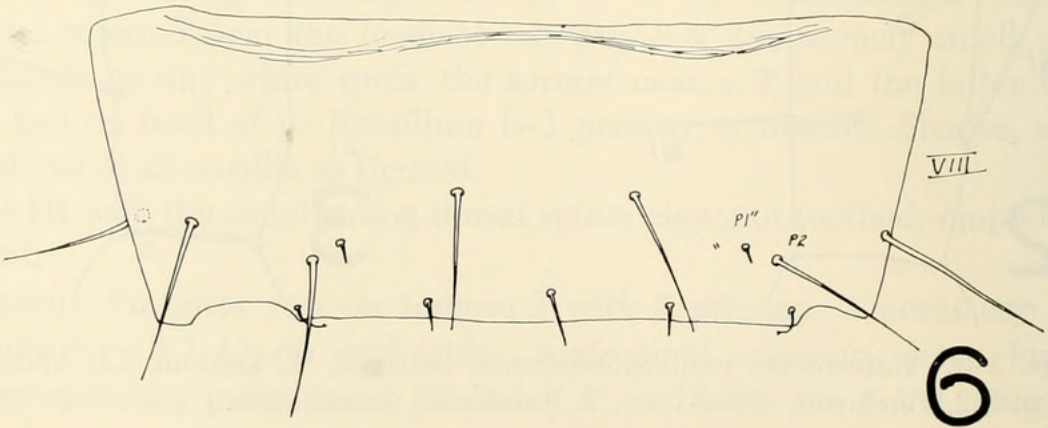
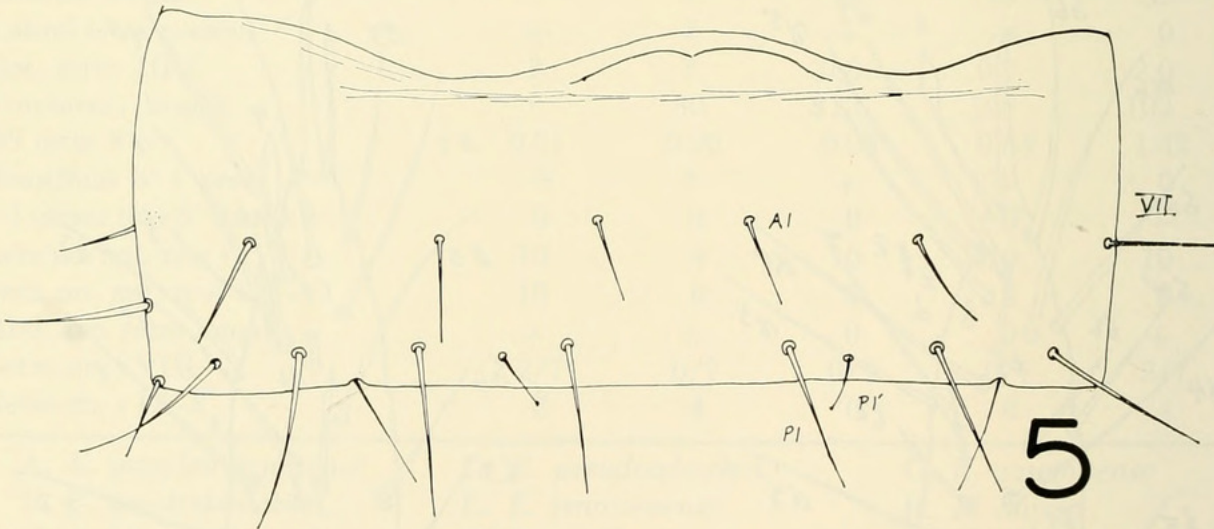
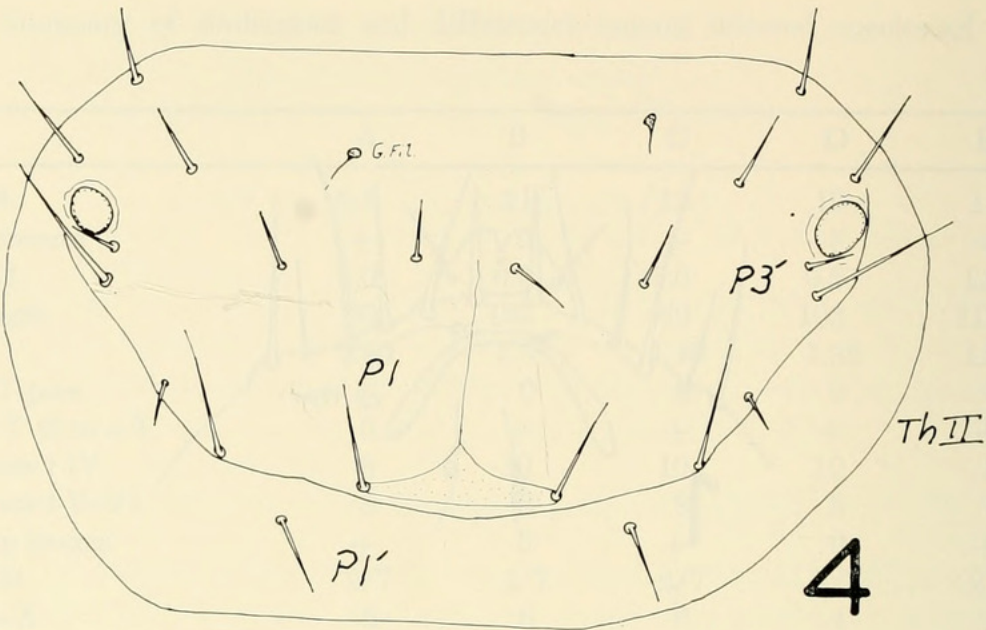
lanceolate, tip barely reaching base of β 6; f-1 setaceous; a' narrow lanceolate, inserted near the level of t-1; pits 1 & 2 extremely small, represented only as tiny white spots, the former near α 3' and the latter very close to and on level of γ . Sensillum b'-1 present; c' absent. Shapes, sizes and locations of all sensilla as figured.

Tarsus III with the usual strong dorsal spine; claw not toothed; empodium very short.

Abdomen: Posterior row on tergum I with 3 primary, 1 accessory and 1 microchaeta (3:1:1) on each side. Abdominal accessory setae longer than corresponding primaries, t IV P 1:P 1' = 15:18. On t VII (Fig. 5)



Figs. 1-3. *Eosentomon pseudoyosemitense*, holotype. 1, Labrum; Cl. Apd., clypeal apodeme. 2, Foretarsus, dorsal view. 3, Foretarsus, ventral view.



seta P 1 not displaced anteriorly; P 1' filamentous, relatively long for this seta, terminating in a "brush" tip and inserted near level of P 1-P 2. Arrangements of setae on t VIII as in Fig. 6. Sternum VIII (Fig. 7) with 2 anterior and 7 posterior setae, the P 2 not greatly displaced anteriorly. Sterna IX-X with 6 setae each. Abdominal chaetotaxy shown in Table 2.

Genitalia: The processus sternales of the female apparatus (Fig. 8) roughly in shape of 2 semicircles. Laterally just posterior to the basal apodeme arms a thin dark line present and internally from each, 2 more or less oval structures present.

Discussion.—The species is known from Highlands and Mount Mitchell, North Carolina and Roan Mountain, Smoky Mountain National Park, Chickasaw State Park and Newport, Cocke County, Tennessee. All specimens except those from Newport, were collected at or above 1100 m elevation. Repeated collecting at the Newport site failed to produce additional specimens. Total number of adults collected were 52, plus immatures which were not examined.

There are no variations in the possession of labral setae, only two sensilla in each pleural area between thorax I-II, the 3:1:1 tergum I seta ratio, two anterior and seven posterior setae on sternum VIII and six setae on each sterna IX-X. One individual had an extra seta on one abdominal tergum, and one specimen had one less. On tergum VII the positions of setae P 1 were constant as were the shapes and positions of the P 1'. On tergum VIII the positions of the P 2 and P 1'' were relatively constant as were the positions of the setae on that sternum, specifically the setae P 2.

The labrum always terminated in a flat V-shaped notch with a broad, deep, median cleft; LR ranged from 11.4 to 16.6 with a median of 14.6. The PR ranged from 7.4 to 10.6, median 9.3.

The foretarsal sensilla shapes, sizes and locations were as on the holotype with most characteristic features being the huge clubs on sensilla t-1, e, g and s, the t-1 always inserted very close to seta α 3 and c' absent on all specimens. The BS ranged from 0.69 to 0.86, median 0.76.

Location of the glands of the *filamento de sostegno* varied from most posterior portion of prothorax to anterior half of the mesothorax, more often found in the latter. It is felt that they lie within the mesothorax near its anterior border unless displaced by pressure from the cover glass.

Some variation existed in the appearance of the female apparatus but

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Figs. 4-6. *Eosentomon pseudoyosemitense*, holotype. 4, Mesothorax; G. Fil., glands *filamento de sostegno*, P 1, P 1', P 3' setae. 5, Abdominal tergum VII. 6, Abdominal tergum VIII.

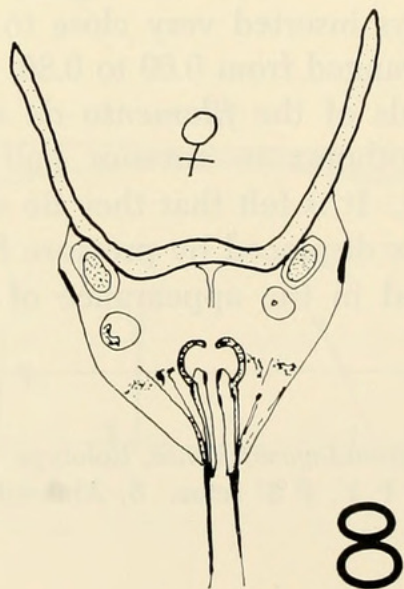
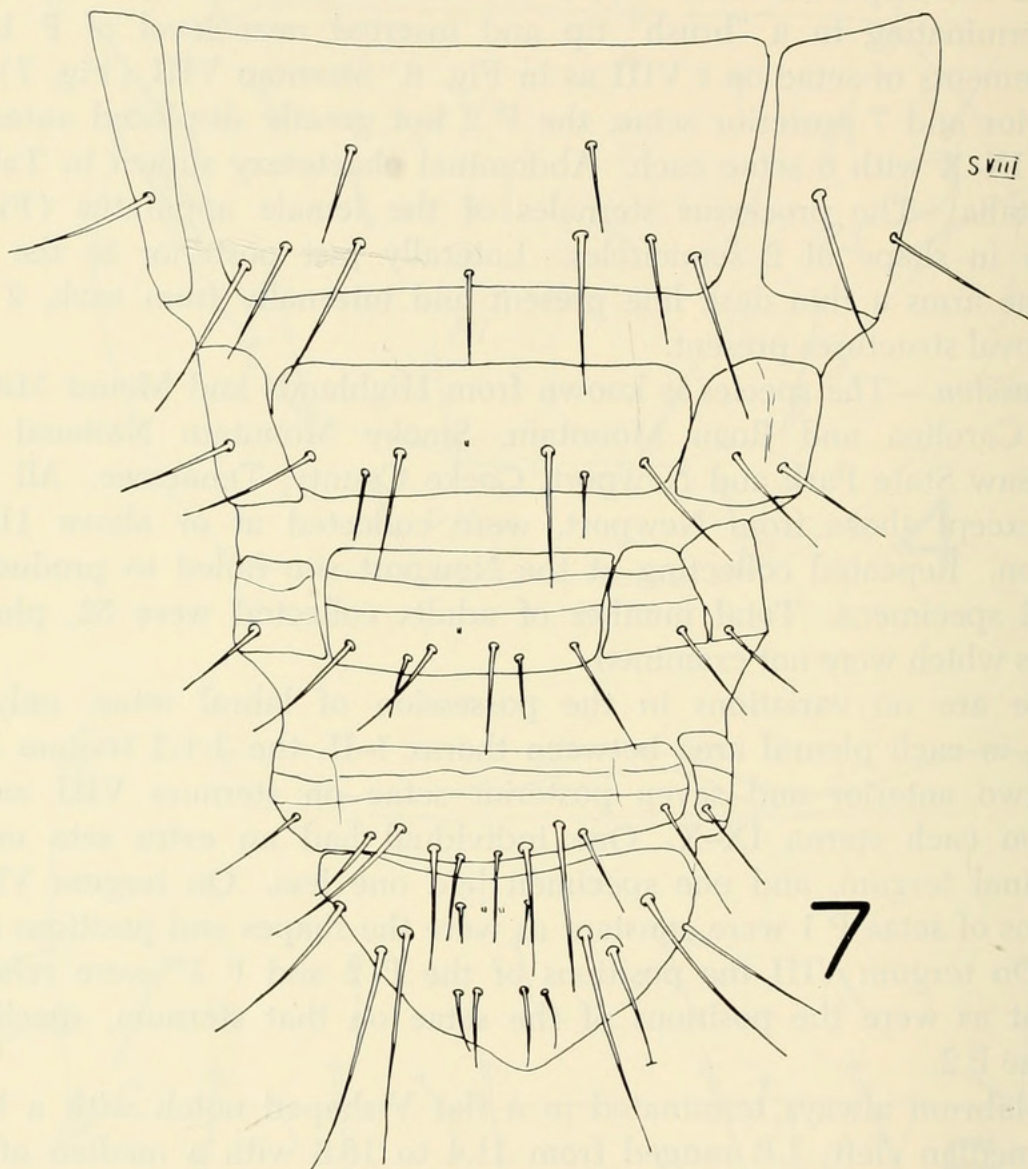


Table 2. Schematic representation of abdominal chaetotaxy for *Eosentomon pseudoyosemitense*.

| Abdomen | | I | II-III | IV-VII | VIII | IX-X | XI | XII |
|---------|---|-----------------|--------|--------|------|------|----|-----|
| Terga | a | 4 | 8 | 8 | 6 | 8 | 8 | 9 |
| | p | 10 ^a | 16 | 16 | 9 | | | |
| Sterna | a | 4 | 6 | 6 | 2 | 6 | 8 | 12 |
| | p | 4 | 4 | 10 | 7 | | | |

Abbreviations: a = anterior row; p = posterior row.
^a Three primary, one accessory and one microchaeta on each side.

it is felt this is more apparent than real, probably distortions caused by pressure of the cover glasses. The four oval spots shown in the genital apparatus appear to be of no taxonomic significance as they are often not present in female paratypes. No unusual features in the male apparatus observed. A North Carolina specimen was selected for the holotype because White's original specimen is in poor condition.

Type-locality.—Bridal Veil Falls on Highway 64, two miles west of Highlands, North Carolina.

Types and deposition.—The holotype, a female on slide NC 881-13 collected 25 June 1977 by T. P. Copeland from deciduous leaf litter, 3600 ft., Bridal Veil Falls, Natahala National Forest, approximately 2 miles west of Highlands, North Carolina.

Paratypes: The species is also known from 51 paratypes, 32 ♀ and 19 ♂. Paratypes from the following localities: Highlands, North Carolina, Coll. T. Copeland, 25 June 1977, deciduous leaf litter, 3600–3800 ft., slide nos.; ♀ ♀, X-5; 886-1; 887-10; 888-21; 888-45; 888-49; 888-58; 889-8; 889-32; 889-39; 890-F-Z; 890-I-1; 890-S-2; 891-F-1; ♂ ♂, 879-8; 881-22; 881-31; 885-3; 887-12; 888-67; 889-1A; 890-0-3; 891B-23. Mt. Mitchell, North Carolina, Summer 1962, Coll. R. A. Durey, 4500–6500 ft., slide nos.; ♀ ♀ 45-12/1; 48-8/5; 60-4/7; 65-8/2; 65-15/1; 65-15/2; 65-15/3; 65-15/7; 65-15/8. Smoky Mt. Nat. Park, Sevier Co., Tenn., 4000 ft., Hwy 441, Coll. T. Copeland, 27 Oct. 59, slide nos: ♀ ♀, 621-8; 622-8; 622-9: Trout Branch, S.M.N. Park, 27 Sept. 61, 712-X8-2; 712-X8-5; 712-X20-2; ♂ ♂, 712-X8-2; 712-X8-5; 712-X20-2; 712-X8-3. Newport, Tenn. Coll. T. Copeland, 23 Nov. 61; ♂ ♂, 717-3; 718-11. Roan Mountain, Tenn., Coll. T. Copeland, 11 Oct. 59; ♂ 558-3. Chickasaw State Park, Tenn., Coll. G. Hunnicutt, 26 June 1964, slides GSH; ♀ ♀, 55-5; 97-5; 132-17; ♂ ♂, 117-30; 120-3; 122-28.

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Figs. 7–8. *Eosentomon pseudoyosemitense*, holotype. 7, Sterna VIII–XII. 8, Female genital apparatus.

The holotype and a male paratype will be deposited in the National Museum of Natural History, Smithsonian Institution. Male and female paratypes will be given to Dr. S. L. Tuxen, Zoological Museum, Copenhagen, Denmark and to Dr. Gentaro Imadate, Tokyo Medical and Dental University, Tokyo, Japan. All others will be retained in the East Tennessee State University Museum.

Literature Cited

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(TPC) Department of Biology, East Tennessee State University, Johnson City, Tennessee 37601; and (CW) Department of Biology, New River Community College, Dublin, Virginia 24084.



Copeland, T P and Whitefoord, C. 1978. "New Species Of Eosentomon (Protura Eosentomidae) From North carolina And Tennessee." *Proceedings of the Entomological Society of Washington* 80, 485–492.

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