PARVITERMES SUBTILIS, A NEW SUBTERRANEAN TERMITE (ISOPTERA: TERMITIDAE) FROM CUBA AND THE DOMINICAN REPUBLIC

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ABSTRACT

The soldier and worker caste of *Parvitermes subtilis* n. sp., from Cuba and the Dominican Republic, are described for the first time. A key to soldiers of West Indian species of *Parvitermes sens. str.* is provided.

Key Words: Nasutitermitinae, West Indies, soldier, worker.

RESUMEN

Se describen, por primera vez las castas de soldado y de obrero para *Parvitermes subtilis* n. sp., de Cuba y la República Dominicana. Se presenta una clave para los soldados de las especies de *Parvitermes sens. str.* de las Indias Occidentales.

The genus *Parvitermes* Emerson was erected for an assemblage of Neotropical termite species characterized by small monomorphic or very slightly dimorphic nasute soldiers with slightly constricted heads. Emerson's description (in Snyder 1949, pp. 376-377) was based mainly on the soldier caste and was comprised of six species which were listed by Snyder (1949). Emerson included *P. laticephalus* (Snyder) from Bolivia, but gave it only a tentative placement in *Parvitermes*, concerned that further collections would reveal a distinct second soldier form. The other five species, *P. brooksi* (Snyder), *P. discolor* (Banks), *P. flaveolus* (Banks), *P. pallidiceps* (Banks), and *P. wolcotti* (Snyder), all from the West Indies, were included outright. Mathews (1977) described an additional species, *P. bacchanalis* Mathews, collected from Brazilian cerrado, and noted some additional generic characters of the worker caste.

The imago caste of *Parvitermes* has never been diagnosed nor has the imago been described for any species. Paradoxically, Snyder (1956) included a single, brief couplet for *Parvitermes* spp. in his key for winged adults of West Indian termites.

In this paper, *Parvitermes subtilis* n. sp. is described from Cuba and the Dominican Republic from soldiers and workers and compared with existing species of *Parvitermes sens. str.* from the West Indies.

MATERIALS AND METHODS

Foraging groups (soldiers and workers) of *P. subtilis* n. sp. were collected in Sancti Spiritus Province, Cuba, at Las Cuevas near Trinidad City (22°33'N, 79°53'W) on 14-

XII-1973 by Luis de Armaz; in Guantánamo Prov. at Loma de la Herradura, Guantánamo City (20°09'N, 75°12'W) on 8-VIII-1974 by J. Křeček; in Santiago de Cuba Prov. at Playa Siboney (19°57'N, 75°40'W) on 2-VII-1966 by I. Hrdý, and on 5-XI-1971 by J. Křeček; and at Castillo del Morro near the City of Santiago de Cuba (19°58'N, 75°52'W) on 23-V-72 by J. Křeček. Collections in the Dominican Republic were made at La Guajaca (19°42'N, 71°42'W), Monte Cristi Prov., 19-VI-1991; 24 km E. Azua (18°25'N, 71°26'W), Azua Prov., 26-II-92; Caracoles (18°26'N, 71°23'W), Azua Prov., 27-II-92; and Las Lavas(19°34'N, 70°49'W), Santiago Prov., 8-VI-92. Foragers were collected by aspirator and field-preserved in 85% ethanol.

Measurements of specimens, made with a calibrated ocular micrometer on an Olympus SZH microscope, follow those defined by Roonwal (1970). Terms used to describe soldier morphology and color follow those of Sands (1965). Scanning electron micrographs were made with a Hitachi S-4000 field emission microscope (10kV) of two *P. subtilis* n. sp. soldiers dehydrated in absolute ethanol and 1,1,1,3,3,3-hexamethyldisilazane (Nation 1983) and then sputter coated with gold. Fifty soldiers, including 36 from the Dominican Republic and 14 from Cuba, and 21 workers, including 15 from the Dominican Republic and 6 from Cuba, representing the later six localities above, were used for measurements.

The holotype soldier from Caracoles, Dominican Republic, will be deposited in the collection of the National Museum of Natural History, Washington, D.C. Paratype soldiers will be deposited in the Florida State Collection of Arthropods, Fla. Dept. Agric. Cons. Serv., Division of Plant Industries, Gainesville, Florida, at the institutions of the first and second authors (in Ft. Lauderdale and Prague, respectively), the Instituto de Ecología y Sistemática, Academia de Ciencias de Cuba, and at the Universidad de Santo Domingo, Dominican Republic.

Parvitermes subtilis Scheffrahn and Křeček, New Species

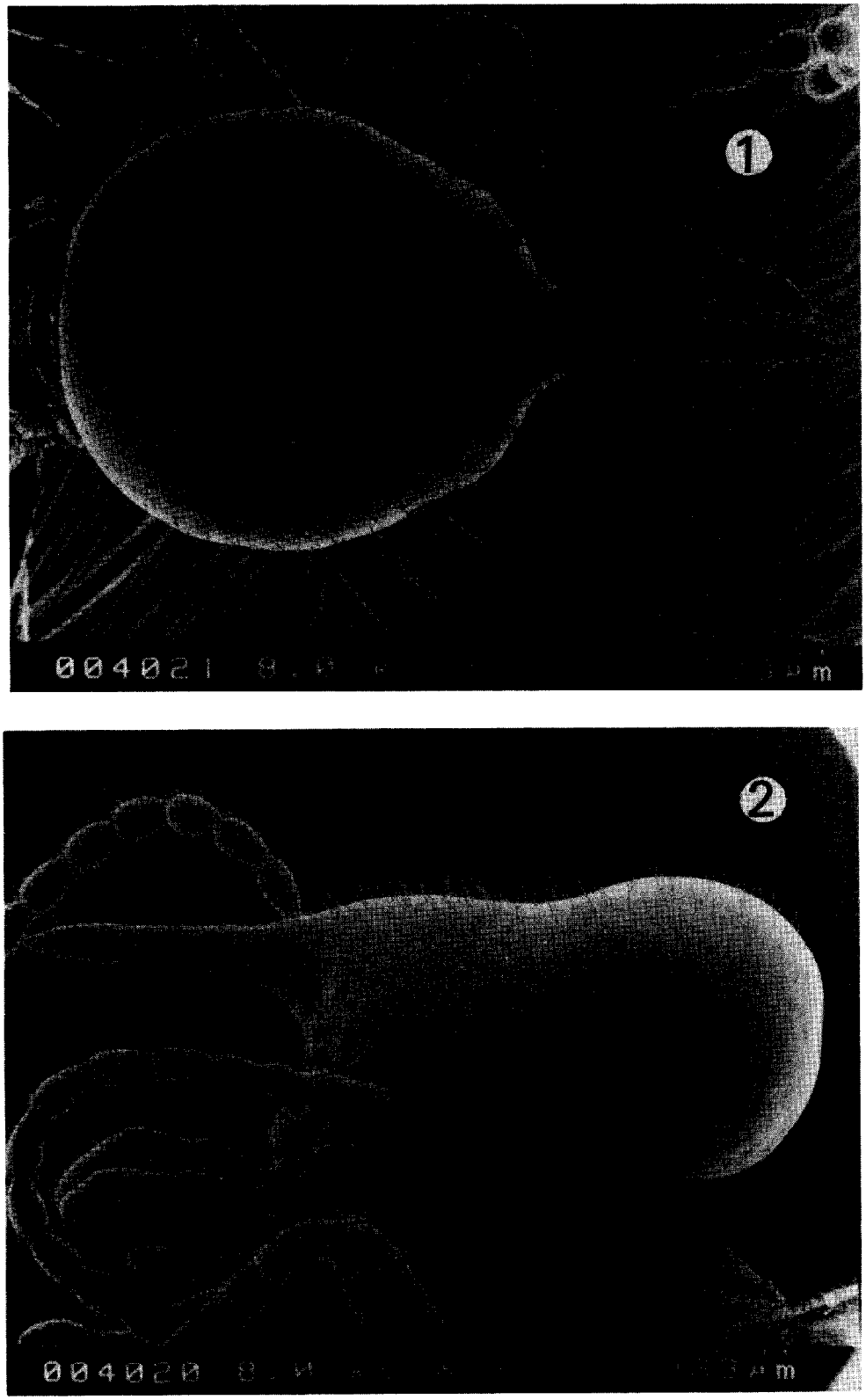
Imago. Unknown.

Soldier (Figs. 1-2). Head capsule pale yellow, nasus deeper yellow; antennae and pronotum yellow-white; remainder of body whitish.

Head capsule in dorsal view with very slight constriction behind antennae; in lateral view, vertex raised in front of and behind constriction above line of nasus. Nasus, vertex, and sides of head densely covered with several hundred fine, parallel, short, and anterior-leaning (45°) setae; setae on head of equal length, shorter on nasus; head surface anterior to constriction with four, and posterior to constriction with 2-4 more erect setae twice as long as other setae on head.

Antennae 12-segmented; second, third, and fourth subequal in length; third narrowest. Mandibles without points. Nasus slender and nearly cylindrical; projecting straight forward in dorsal plane of head. Tibia thin, much shorter than head length with nasus.

Measurement in mm (n = 50)	Range	Mean ± SD	Holotype
Head length with nasus	1.06-1.23	1.13 ± 0.041	1.11
Head length without nasus	0.66-0.74	0.70 ± 0.021	0.70
Head width, maximum	0.60-0.68	0.64 ± 0.023	0.65
Nasus width at base	0.13-0.16	0.14 ± 0.007	0.14
Nasus width at middle	0.063-0.075	0.067 ± 0.004	0.063
Head height, maximum	0.40-0.50	0.44 ± 0.026	0.46
Pronotum width	0.33-0.40	0.36 ± 0.018	0.36
Pronotum length, maximum	0.14-0.19	0.16 ± 0.013	0.16
Hind tibia length	0.64-0.78	0.69 ± 0.042	0.66



Figs. 1-2. Scanning electron micrographs of *Parvitermes subtilis* n. sp. soldier. 1) Dorsal (Caracoles, Dominican Republic) and 2) lateral (Playa Siboney, Cuba) views of head.

Key to Soldiers of West Indian *Parvitermes* Emerson *sens. str.*

1. Head length including nasus 1.23-1.42 mm; head and nasus pale brown (sometimes with lighter yellowish pigmentation in posterior third of head) ..... *discolor*
– Head length including nasus 1.05-1.23 mm; head pale yellow with yellow nasus or head pale ferruginous orange with concolorous or chestnut brown nasus 2
2. Head pale yellow, nasus more yellow; nasus slender, nearly cylindrical, median width 0.063-0.075 mm; mandibles without points; fine parallel setae on vertex forming dense, well-combed mat ..... *subtilis* n. sp.
– Head pale ferruginous orange; nasus concolorous or chestnut brown; nasus more conical, median width 0.073-0.100 mm; mandibles usually with points; setae on vertex variable in orientation, length, and density 3
3. Nasus concolorous with head or only very slightly darker; some setae on vertex nonparallel, 16-22 setae cresting along a 0.2 mm length of vertex horizon . *flaveolus*
– Nasus chestnut brown; setae on vertex clearly irregular in length when viewed laterally, 8-14 setae cresting a 0.2 mm margin of vertex ..... *brooksi*

Worker. Head and antennae yellow-white, remainder of integument unpigmented. Head, including postclypeus, covered with about 100 fine setae of varied length.

Antennae 13-segmented; second and fourth subequal, third shortest, narrowest, and least pigmented. Postclypeus twice as wide as long. Tibia generally more slender and short compared to other *Parvitermes* workers.

Molar plate of right mandible with 6 ridges; apical tooth similar to first marginal tooth.

Measurement in mm (n=21)	Range	Mean±SD
Head width, maximum	0.63-0.88	0.79±0.072
Head length to postclypeus anteclypeus suture	0.56-0.86	0.73±0.079
Postclypeus width	0.26-0.35	0.33±0.024
Postclypeus length	0.15-0.19	0.17±0.014
Hind tibia length	0.63-0.75	0.67±0.037
Hind tibia width, maximum	0.054-0.075	0.064±0.006

Comparisons. All workers of *P. subtilis* n. sp. examined (n=58) have 13 antennal segments versus the usual 14 segments for other *Parvitermes* workers. Mean head and hind tibia widths are also the smallest among West Indian *Parvitermes*.

Etymology. The Latin "subtilis" describes the fine, slender, and rather delicate nature of the headcapsule setae, nasi, tibia, and delicate bodies of the soldiers, and legs and bodies of workers of this species.

Discussion

Parvitermes subtilis foragers were collected in and under dried ruminant dung on soil, under stones, and under thin soil sheeting covering dried grasses. In Cuba, *P. subtilis* were collected sympatrically with *P. brooksi*, at Las Cuevas and El Morro, and with *Nasutitermes rippertii* (Rambur) at Siboney. In collections from the Dominican Republic, *P. subtilis* foragers were aspirated from soil concurrently with two sympatric species; once with *P. flaveolus* foragers (24 km E. Azua), and once with *Anoplotermes* sp. workers (Las Lavas). Localities where *P. subtilis* have been collected indicate that this species is adapted to dry tropical forest and scrub habitats of 1000 mm or less of

annual precipitation where dried herbaceous growth is eaten. As with other *Parvitermes* spp., *P. subtilis* does not build mounds but forages in galleries of irregular dimension beneath stones or other surface debris. The underground nest structure of *P. subtilis* is unknown.

Parvitermes subtilis is a relatively rare small nasute species in both Cuba (5/90 samples of *Parvitermes* and *Obtusitermes*) and the Dominican Republic (4/162 samples of *Parvitermes* and *Velocitermes*). Extensive collections in recent years indicate that *P. subtilis* is the only small nasute species found on both Cuba and Hispaniola. Snyder's (1956) listing of *P. discolor* in Cuba and *P. brooksi* on Bimini Island (Bahamas) are very doubtful.

Recent collections have shown that *P. pallidiceps* from Hispaniola (V. Spaeth, unpubl. thesis; Scheffrahn, unpubl. data) and *P. wolcotti* from Puerto Rico (Scheffrahn and S. C. Jones, unpubl. data) have a distinctly dimorphic soldier caste and, therefore, should not be included in *Parvitermes sens. str.* The Hispaniolan *P. pallidiceps* fits well into *Velocitermes*, while the generic placement of *P. wolcotti* from Puerto Rico remains to be determined.

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References Cited

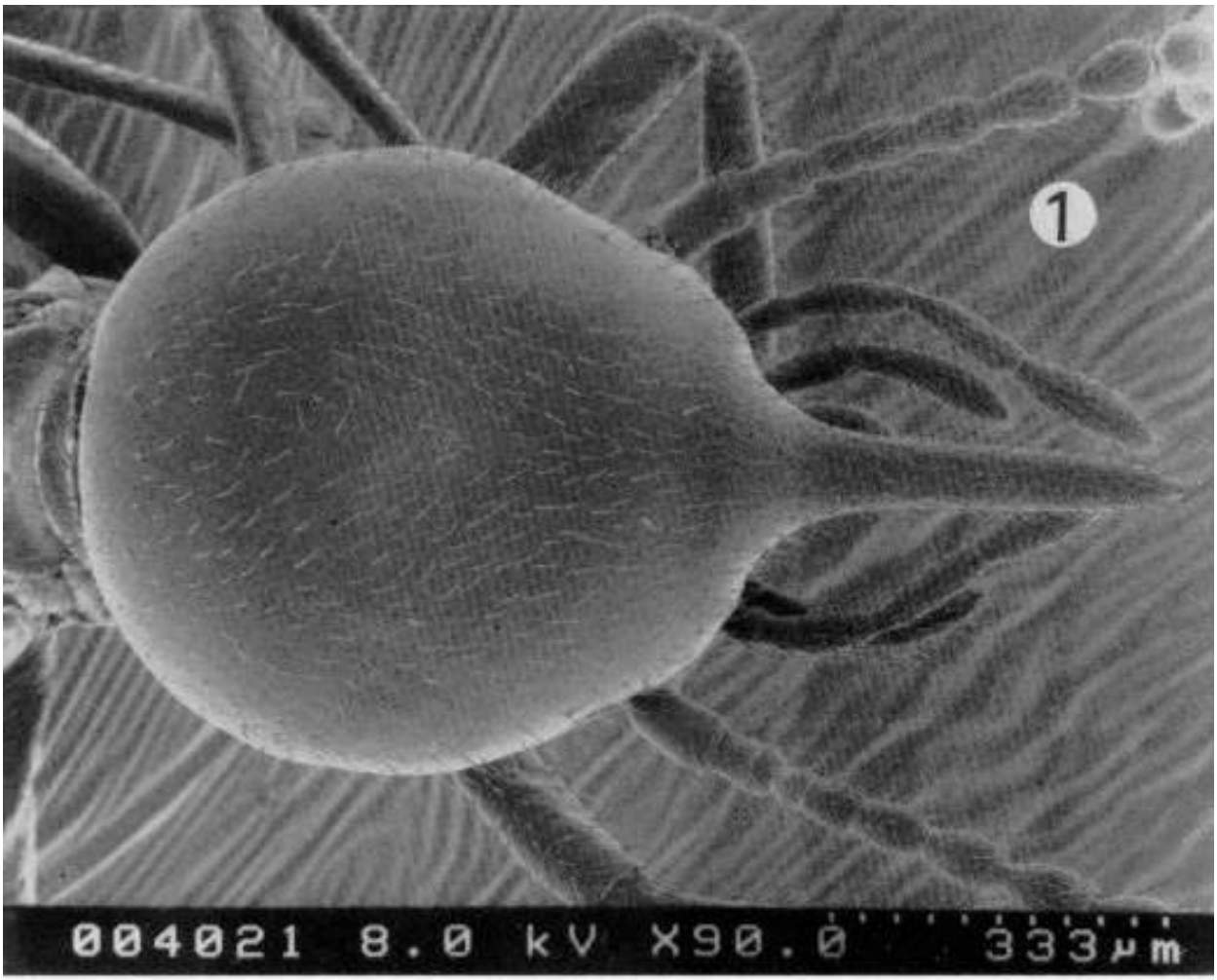
Mathews, A. G. A. 1977. Studies on termites from the Mato Grosso State, Brazil. 267 pp. Academia Bras. de Ciencias, Rio de Janeiro.

Nation, J. A. 1983. A new method using hexamethyldisilazane for the preparation of soft insect tissue for scanning electron microscopy. Stain Technol. 55: 347-352.

Roonwal, M. L. 1970. Measurements of termites (Isoptera) for taxonomic purposes. J. Zool. Soc. India 21: 9-66.

Sands, W. A. 1965. A revision of the termite subfamily Nasutitermitinae (Isoptera, Termitidae) from the Ethiopian Region. Bull. British Mus. Nat. Hist., Entomol. Suppl. 4: 1-172.

Snyder, T. E. 1949. Catalog of the termites (Isoptera) of the world. Smithson. Misc. Collect. 112: 1-490.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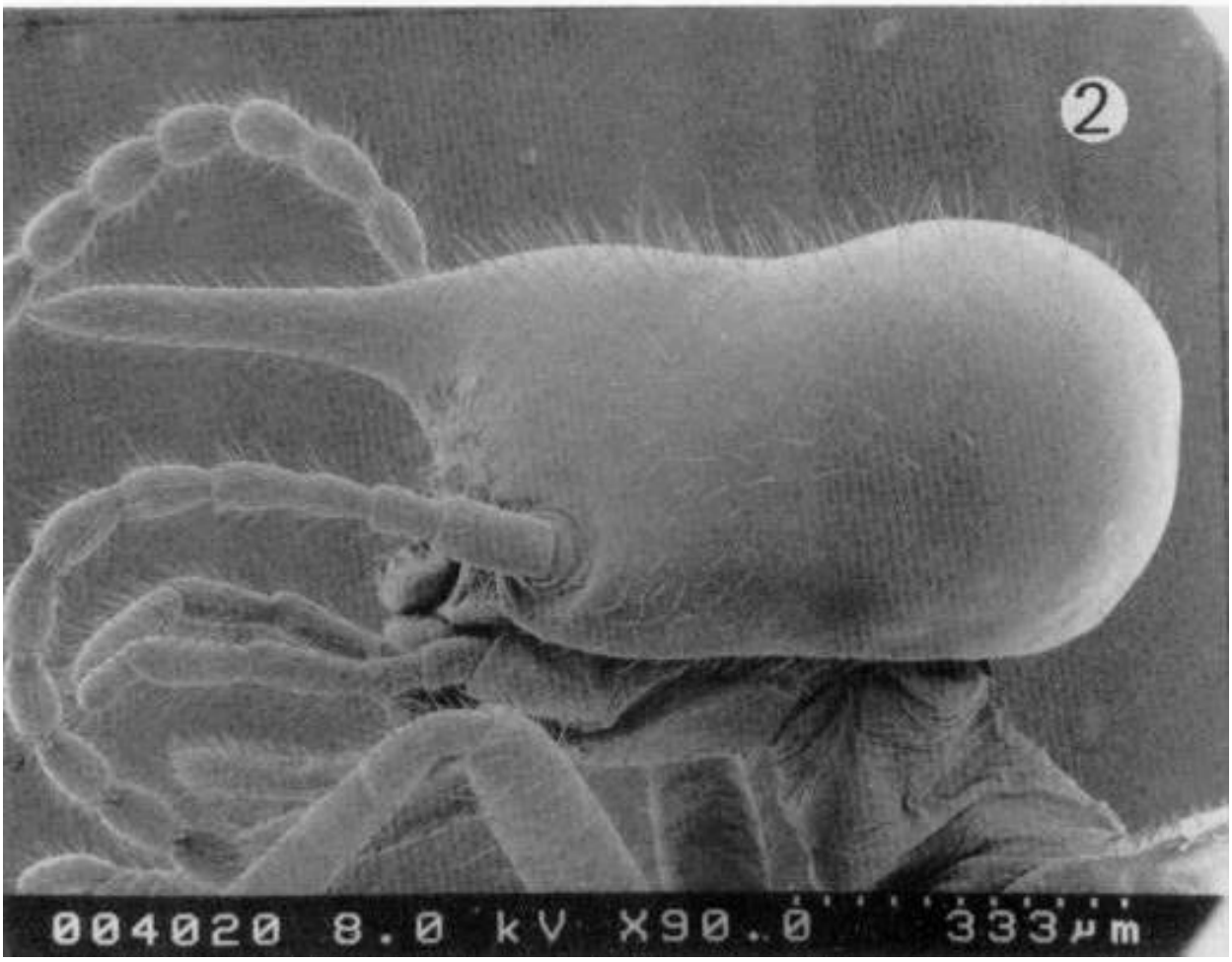
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