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New Fossil Species of Termites of the Subfamily Nasutitermitinae from Dominican and Mexican Amber (Isoptera, Termitidae)

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ABSTRACT

Three new fossil species of termites, *Constrictotermes electroconstrictus* and *Nasutitermes electronasutus* from Dominican amber and *Nasutitermes electrinus* from Mexican amber, are described. These are the first fossil records of the genera *Constrictotermes* and *Nasutitermes* and of the subfamily Nasutitermitinae and the first fossil

record from the tropics of the family Termitidae. It is also the first described species of the genus *Constrictotermes* from the Caribbean. The subspecies *Gnathamitermes magnocolus rousi* Pierce is elevated to species rank, *G. rousi*, new combination.

INTRODUCTION

Since the Termitidae is the largest family of Isoptera, with about three-fourths of the approximately 2000 living species, one would expect a proportionately large number of fossils to be reported from this group. However, only four species of this advanced family have been described. Of the 74 recognized fossil species of termites (69 Tertiary [Eocene and later]; 5 Mesozoic [Cretaceous]), the great majority (70 species) belong to the smaller, relatively primitive families: Mastotermitidae, Kalotermitidae, Termopsidae, Hodotermitidae, and Rhinotermitidae. Today the

Termitidae is the dominant group in the tropics, with the largest number of species, and with very few species in the temperate regions. Since termite fossils have mainly been preserved from temperate areas, the paucity of fossil Termitidae might result in part from the family's poor adjustment to temperate, warm temperate, or subtropical conditions.

The purpose of this paper is to describe three new fossil species of the subfamily Nasutitermitinae, family Termitidae, one belonging to the genus *Constrictotermes*, from Dominican Republic amber, and two be-

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longing to the genus *Nasutitermes*, in amber from the Dominican Republic and the Chiapas region of Mexico. The genera and the subfamily have not been reported before in the fossil record. This is also the first fossil record of the family Termitidae from the tropics.

The Termitidae in Tertiary strata (see list in Snyder, 1949: 367–371) have been inadequately studied and substantiated, and all assignments to genera are tentative. Part of the reason may be poorly preserved specimens or the difficulty of generic determination on the basis of specimens consisting of wings only. Pierce (1958) assigned a wing fragment from Miocene nodules from the Calico Mountains of California to a subspecies of a living species of Termitinae: *Gnathamitermes magnocolus rousi* Pierce. Snyder (1949: 128) treated *G. magnocolus* Light as a synonym of *G. perplexus* (Banks), and the present author agrees with Snyder. The wing venation described by Pierce (1958: 22) is variable within the species, and no reliance can be placed on such distinctions for generic, species, or subspecies determination. Nevertheless, the Miocene fauna of southern California might contain a species of *Gnathamitermes*, as this area is temperate and the genus is presently found there, so this determination should stand until more specimens and data are collected. However, it is improbable that this is a subspecies of a living species. The present author is therefore elevating the subspecies to species rank: *Gnathamitermes rousi*, new combination. The width of the holotype forewing of *G. rousi* is 0.52 mm (measured by A. E. Emerson in 1966), and its length, estimated by Pierce, is 8.80 mm.

Termes was the first termite genus that was described (Linnaeus, 1758) and over the years the name, as used by Armbruster (1941) and others, has been a catchall and should not be equated with the taxon *Termes* as used by modern taxonomists (Emerson, 1971). The following additional fossil species of the family Termitidae, whose specific, generic, and family designations are questionable, have been reported in the literature; further examination might show that some belong to the family Termitidae and that many do not.

Termes pristinus Charpentier, 1843, from Miocene, Radoboj, Croatia, placed in *Odontotermes* by Armbruster, 1941, and in *Macrotermes*, tentatively, by Snyder, 1949.

Termes scheuthlei Armbruster, 1941, from Upper Miocene, Randeck, Württemberg, Germany, redescribed by Weidner, 1986, and placed in *Macrotermes*, subfamily Macrotermitinae.

Microcerotermes sp. Weidner, 1967, Pliocene, Willershausen, Germany.

Termes sirugi Nel, 1984, from Lower Oligocene, Aix-en-Provence, southern France, placed in the subfamily Termitinae.

"Species A," Middle Oligocene, Isle of Wight, England, mentioned by Jarzembowski, 1980, as belonging to the family Termitidae, without assignment to any genus.

Termes buchii Heer, 1865, Miocene, Germany.

Termes (Eutermes) croaticus Heer, 1849, Miocene, Croatia.

Termes drabatyi Armbruster, 1941, Miocene, Germany.

Eutermes fraasi Von Rosen, 1913, Miocene, Germany.

Termes giganteus Heer, in Hagen, 1858, Miocene, Croatia, nomen nudum.

Termes hauffi Armbruster, 1941, Miocene, Germany.

Termes korschefskyi Armbruster, 1941, Miocene, Germany.

Eutermes nickeli Armbruster, 1941, Miocene, Germany.

Termes (Eutermes) obscurus Heer, 1849, Miocene, Croatia.

Termes rutoti Meunier, 1900, Belgian (Lanenien de Leau [Eocene]) and Baltic amber.

Eutermes sachelebini Armbruster, 1941, Miocene, Germany.

Termes scheeri Armbruster, 1941, Miocene, Germany.

Termes schleipi Armbruster, 1941, Miocene, Germany.

Termes sitzi Armbruster, 1941, Miocene, Germany.

Termes weismanni Armbruster, 1941, Miocene, Germany.

Architermes simplex Haupt, 1956, Eocene, Germany.

Metatermites statzi Armbruster, 1941, Miocene, Germany.

Heer (1849) described *Eutermes debilis* from "amber," without mentioning a locality. Hagen (1858) examined Heer's types from the Zurich Museum, redescribed the species, and declared the "amber" to be copal, a determination with which Heer agreed. The co-

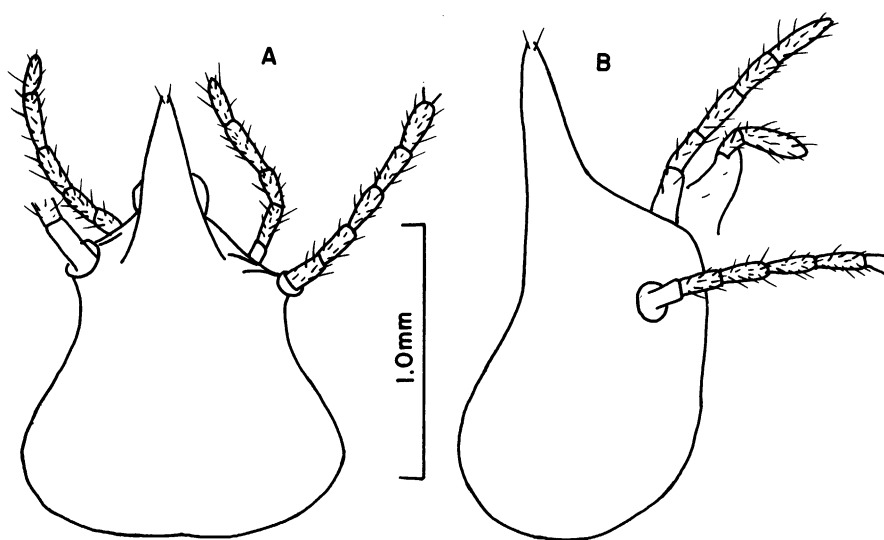


Fig. 1. Holotype soldier of *C. electroconstrictus*, new species, from Dominican Republic amber. A. Dorsal view of head; B. lateral view of head.

pal was most likely from East Africa, the source of most copal at the time. Snyder (1949) placed this species in the genus *Microcerotermes*. This species is also reported by Handlirsch (1908), from Oligocene Baltic amber, a very questionable identification. Rosen (1913) mentioned and named 11 species from gum copal from East Africa and the Gold Coast, belonging to various genera of the family Termitidae, none of which are described. In contrast to amber, gum copals react readily with organic solvents, indicating that they are barely polymerized and therefore Recent—according to Burleigh and Whalley (1983) and Grimaldi (unpublished)—some even less than 100 years old.

GENUS *CONSTRICOTERMES* HOLMGREN

The genus *Constrictotermes* includes three living species, all confined to the Neotropics: *cavifrons* (Holmgren), from Bolivia, Brazil, Guyana (British Guiana), Surinam, and Venezuela; *cyphergaster* (Silvestri), from Argentina, Bolivia, and Brazil; and *latinotus* (Holmgren), from Colombia and Ecuador. No living species of *Constrictotermes* have been described from Central America or the Caribbean. This fossil species is the first de-

scribed species of the genus from the Caribbean.²

Constrictotermes electroconstrictus, new species³

DIAGNOSIS: See comparisons and figures.

IMAGO: Unknown.

SOLDIER (figs. 1–3): Head capsule brown, rostrum dark brown, darker than head capsule; antennae, legs, and palpi brown, about same color as head capsule; pronotum, mesonotum, and metanotum yellowish brown. Head with no bristles or hairs visible, probably due to lack of preservation; rostrum with two or three bristles at tip; pronotum with a few indistinct hairs and bristles. Head constricted, characteristic of this genus; in profile upper margin from posterior bulge to ro-

² Scheffrahn, et al. (1994) mention an undescribed species "*Constrictotermes* n.sp.?" from Cuba, which is in the process of being described by these authors.

³ Schlee (1978) has a cover photograph of a nasute soldier in Dominican amber, which, based on the photograph, the present author places in the genus *Constrictotermes*. Most likely it is *electroconstrictus*, but not having examined the specimen, which is in the Natural History Museum, Stuttgart, the author cannot be certain that it belongs to the species described here.

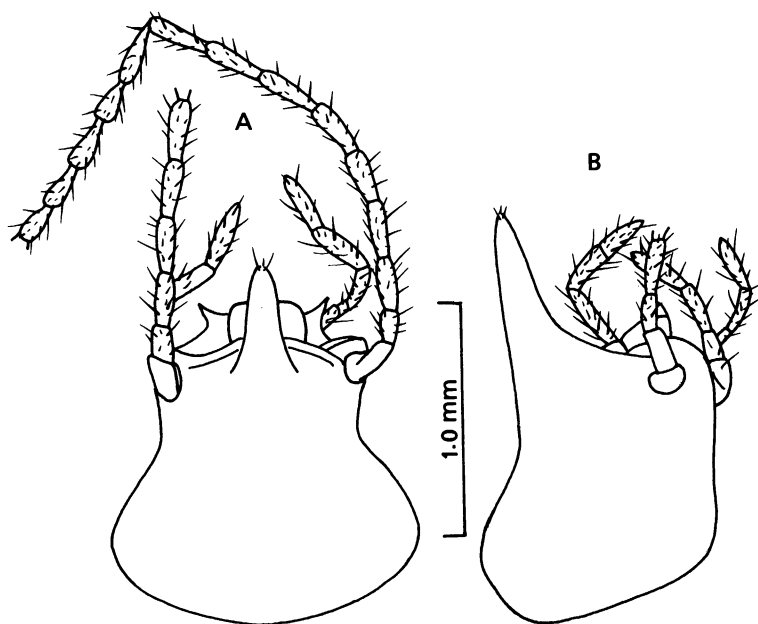


Fig. 2. Paratype soldier of *C. electroconstrictus*, new species, from the British Museum (Natural History). A. Dorsal view of head; B. lateral view of head.

trum not so sharp as in *cavifrons*, *cyphergaster*, and *latinotus*; lateral margins posterior to constriction sharply curved; posterior margin broadly rounded; rostrum short and thick in profile. Mandibles with long points. Antennae with 14 articles, third longer than second; third, fourth, and fifth almost equal. Pronotum distorted, but with distinct anterior lobe, posterior margin evenly rounded.

COMPARISONS: The soldier of *Constrictotermes electroconstrictus*, n. sp., most closely resembles that of *C. cyphergaster* (fig. 5), but in *electroconstrictus* the nasus is longer and in profile wider at the base, the length of the head behind the constriction is shorter, and the upper margin of the head in profile is not so sinuate or curved. *Constrictotermes cavifrons* (fig. 4) has a shorter and narrower head than *electroconstrictus*, a longer nasus relative to the rest of the head capsule, the nasus sharply turned upward in profile, and the posterolateral margins sinuous (evenly rounded in *electroconstrictus*). *Constrictotermes latinotus* has a smaller head in all measurements and a sharply curved, upturned nasus (fig. 6).

SPECIMENS AND TYPE LOCALITY: Soldier (holotype), AMNH no. DR-14-584, Dominican Republic amber, specific locality not known; soldier (paratype), AMNH no. DR-

14-585, Dominican Republic amber, specific locality not known; soldier (paratype), British Museum (Natural History), Paleontology Department, no. In. 64610, Dominican Republic amber, specific locality not known. Dominican amber is assigned to Upper Oligocene–Lower Miocene (Sanderson and Farr, 1960; Krishna and Grimaldi, 1991; Grimaldi, 1995).

The holotype and paratype soldiers are deposited in the American Museum of Natural History, New York. A paratype soldier is in the British Museum (Natural History), London.

ETYMOLOGY: *Electro* is from the Greek *ēlektron* (amber); *constrictus* (Latin) refers to the constricted head of the soldier.

GENUS *NASUTITERMES* DUDLEY

The bibliography of this genus is very large. Some of the major references and synonymies can be found in Snyder (1949: 265) and Sands (1965: 15).

Type Species: *Nasutitermes corniger* (Motschulsky)

Dudley, in Dudley and Beaumont (1890: 158), named the genus *Nasutitermes*, giving

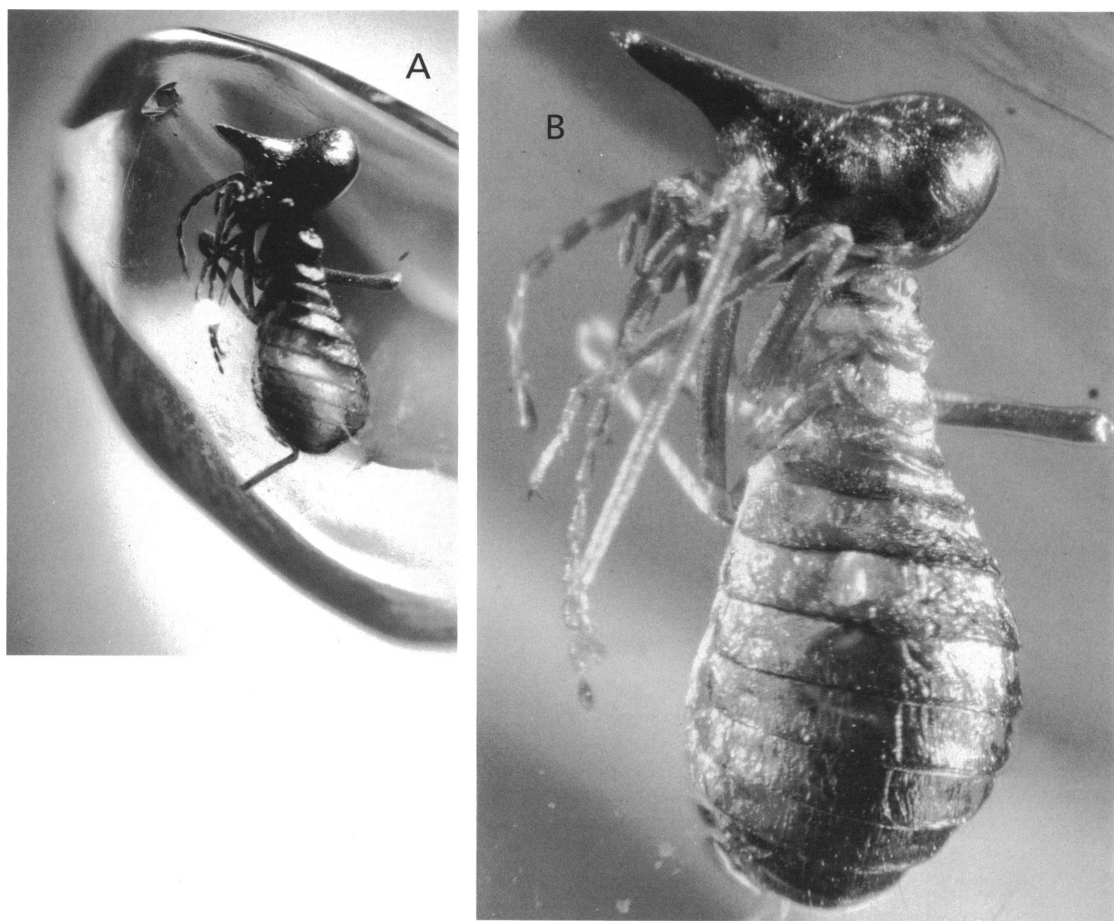


Fig. 3. Photomicrograph of holotype soldier of *C. electroconstrictus*, new species, from Dominican Republic amber. A. Lateral view of soldier; B. enlarged lateral view of soldier.

the brief description "soldiers with beak," but did not designate a type species or include any nominal species in the genus. Sands (1965) is correct in stating that Dudley (1890) is the author of this genus and not Banks (*in* Banks and Snyder, 1920), as maintained by Prashad and Sen-Sarma 1959), since even a meager statement constitutes a description, according to articles 12 and 16 (a,i) of the International Code.

There has also been a debate over the type species of *Nasutitermes*. Banks (1918) mentioned *Nasutitermes* for the first time since Dudley and included in it three described species from Panama—*N. cornigera* (Motschulsky), [subsequently changed to *corniger*, to agree in gender with the masculine generic name], *N. pilifrons* (Holmgren) [now = *N. nigriceps* (Haldeman)], and *N. ephratae*

(Holmgren)—and two new species from British Guiana, *N. octopilis* Banks and *N. holmgreni* Banks. Banks (1919) mentioned *Nasutitermes* for the second time since Dudley and included in it six species: *N. pilifrons* (Holmgren), *N. ripperti* (Rambur), *N. lividus* (Burmeister), *N. creolina* Banks, *N. intermedius* Banks, *N. hubbardi* Banks, *N. morio* (Latreille) [now = *N. costalis* (Holmgren)], and *N. sanchezi* (Holmgren) [now = *N. costalis*]. Banks (*in* Banks and Snyder, 1920) incorrectly designated *N. morio* (Latreille), from his 1919 list, as the type species, when he should have selected the type species from one of the three described species mentioned in his 1918 paper, according to article 69(a), clause i(1) of the Code, which states "If no nominal species was included at the time the nominal genus or subgenus was established,

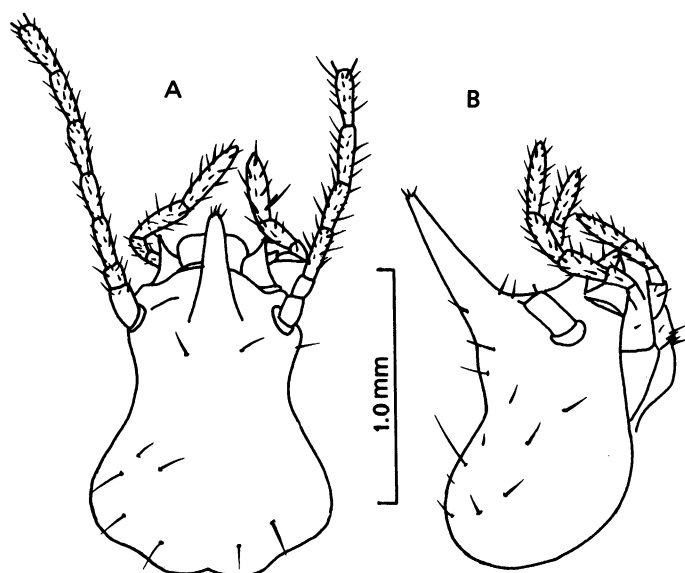


Fig. 4. Soldier of *C. cavifrons* (Holmgren), from Tumatumari, Potaro River, Guyana, 28.vi.1927, determined by A. E. Emerson. A. Dorsal view of head; B. lateral view of head.

the nominal species that were *first* [italics mine] subsequently and expressly included in it in any of the ways referred to in this Sub-section are deemed to be the only originally included nominal species." Snyder (1949) correctly designated *N. corniger* as the type species, but without mentioning Banks' 1918 paper, an oversight that has led subsequent investigators to question the validity of Sny-

der's designation. Sands (1965) rejected Snyder's (1949) designation of *N. corniger* as the type species of *Nasutitermes*, on the grounds that, even though the termitophile *Termitogaster insolens* Casey mentioned by Dudley (1890) was later found to be host specific to *N. corniger* (Motschulsky, 1855), and though Dudley probably had *N. corniger* in front of him when he established the genus *Nasuti-*

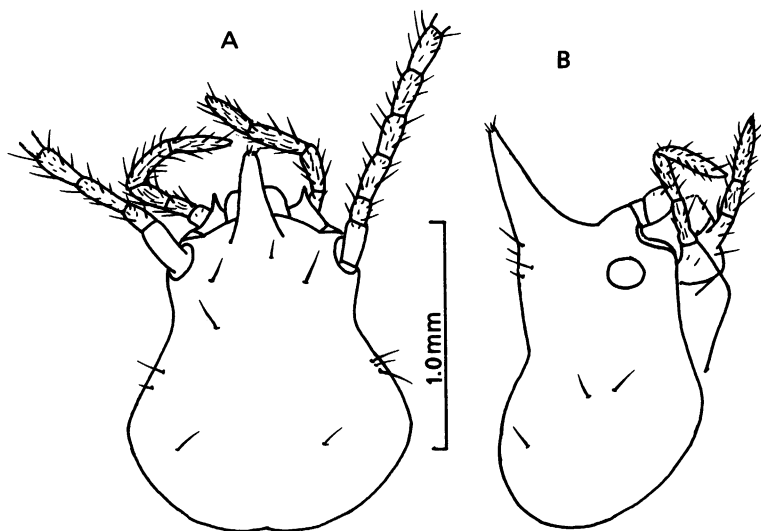


Fig. 5. Soldier of *C. cyphergaster* (Silvestri), from Urucumbe de Corumba, Corumba, Matto Grosso, Brazil, collected by K. P. Schmidt, 20.viii.1926. A. Dorsal view of head; B. lateral view of head.

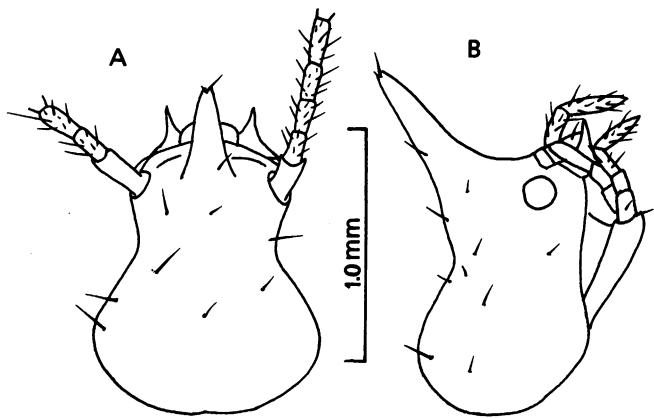


Fig. 6. Soldier of *C. latinotus* (Holmgren), from Rio Guaviare, 150 km from San Jose de Guaviare on the Kinca of Captain Series, Colombia, 71°W, 2°45'N, collected by S. Weinstein, xii.1957. A. Dorsal view of head; B. lateral view of head.

termes, this did not constitute a valid citation of the species under article 69(a) of the Code. However, Sands (1965), as well as Araujo (1977), Prashad and Sen-Sarma (1959), and Emerson (1925), also seems to have overlooked the 1918 paper by Banks. Therefore, the designation by Emerson (1925) and Prashad and Sen-Sarma (1959: 2) of *N. costalis* (Holmgren) [= *Termes morio* Latreille (1805), preoccupied by *Termes morio* Fabricius, which is a synonym of *Coptotermes testaceus* Linnaeus)] as type species and the designation by Sands (1965: 15–16) and Araujo (1977: 40) of *N. sanchezi* [= *N. costalis*] are both invalid, and the designation by Snyder (1949: 265) of *N. corniger* as the type species is correct.

The genus *Eutermes*, originally described by Heer in 1849 as the typical subgenus of

the genus *Termes*, is invalid, as the International Code stipulates that the typical subgenus should have the same name as the genus (Snyder, 1949). Though most of the living species placed in the now invalid *Eutermes* were later placed in *Nasutitermes* or other genera of the subfamily Nasutitermitinae, none of the fossil species originally placed in *Eutermes* are *Nasutitermes* or *Nasutitermitinae*. The following two species are therefore the first fossil species to be described under the genus *Nasutitermes*.

The genus *Nasutitermes* is found in all the tropical regions of the world, with the exception of a few oceanic islands. It has not been recorded in the Nearctic or Palaearctic regions. Some species extend south of the Tropic of Capricorn, and others are occasionally found up to 29 to 30° north of the

TABLE 1
Measurements (mm) of Soldiers of Four Species of *Constrictotermes*, Three Living and One Fossil: *C. electroconstrictus*, new species

	<i>electroconstrictus</i> (Holotype)		<i>cavifrons</i>	<i>cypher-gaster</i>	<i>latinotus</i>
Lateral length of head with nasus	1.75	1.60-1.75	1.56-1.64	1.68-1.80	1.48-1.52
Lateral length of nasus	0.65	0.56-0.65	0.56-0.60	0.52-0.60	0.44
Width of head	1.10	1.90-1.20	1.00-1.09	1.04-1.20	0.92
Height of head	0.78	0.75-0.78	0.70-0.80	0.76-0.92	0.68-0.70
Maximum length of pronotum	0.32	0.32	0.32-0.36	0.32-0.40	0.32-0.34
Width of pronotum	0.60	0.60	0.60-0.64	0.60-0.68	0.60-0.62
Length of hind tibia	1.83	1.83-1.85	1.76-2.12	1.68-2.00	1.92

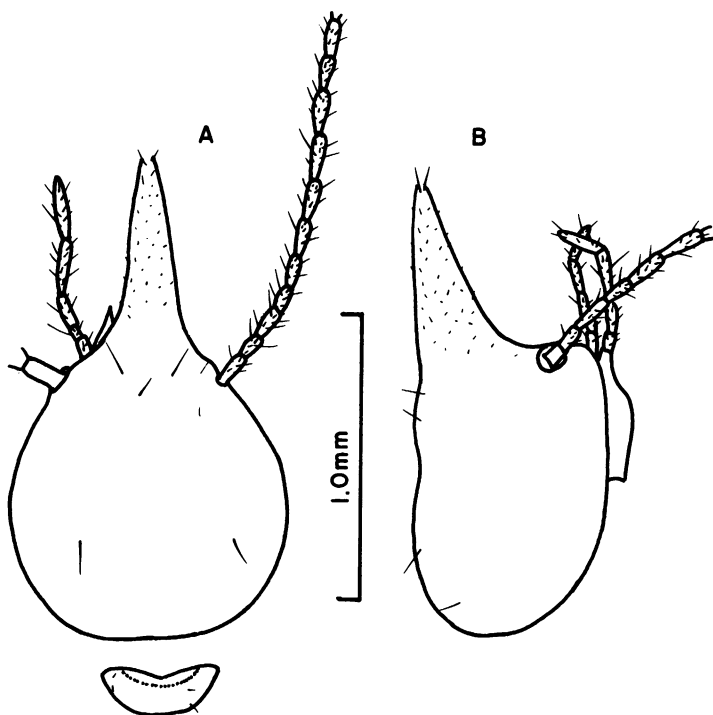


Fig. 7. Soldier of *N. electronasutus*, new species, from Dominican Republic amber. A. Dorsal view of head and pronotum of holotype; B. lateral view of head of paratype, AMNH no. DR-14-587.

Tropic of Cancer, but only in regions that are essentially tropical in their fauna and flora. Up to the present, there are 248 (224 described + 24 undescribed) living species: 90 Neotropical (75 described + 15 undescribed), 96 Oriental, 15 Australian, 8 Malagasy, 24 Papuan (17 described + 7 undescribed), and 15 Ethiopian (13 described + 2 undescribed). In recent years a great number of species have been added to the genus from the Oriental region, particularly from China. This author has not examined specimens of these species; most likely, some will prove to be synonyms.

The presence of the more primitive genera of the subfamily Nasutitermitinae only in the Neotropical region provides circumstantial evidence for the origin of *Nasutitermes* in the Neotropics and a distribution to other regions of the world. These data and their interpretations would lead to the expectation that *Nasutitermes* was an abundant genus in the tropics of Mexico and the Dominican Republic during Tertiary times and earlier. The genus is among the most advanced termites

in the evolution of the peculiar specialization of the nasute soldier. The reasons no fossils have been assigned to *Nasutitermes* in the modern classification of the Isoptera are (1) the genus is rather strictly tropical in its climatic adjustments, where fossil deposits, including those of amber, are rare, and (2) the imago caste is not easily distinguishable from that of a number of other advanced genera, particularly when the specimen is fragmentary. However, soldier castes of the nasute genera have now been discovered in Dominican Republic amber, which make accurate identification and placement possible.

Nasutitermes electronasutus,
new species

DIAGNOSIS: See comparisons and figures.

IMAGO: Unknown.

SOLDIER (figs. 7, 8): Head capsule brown to dark brown, antennae same color as head capsule, pronotum and legs brown, lighter than head capsule or antennae. Head with

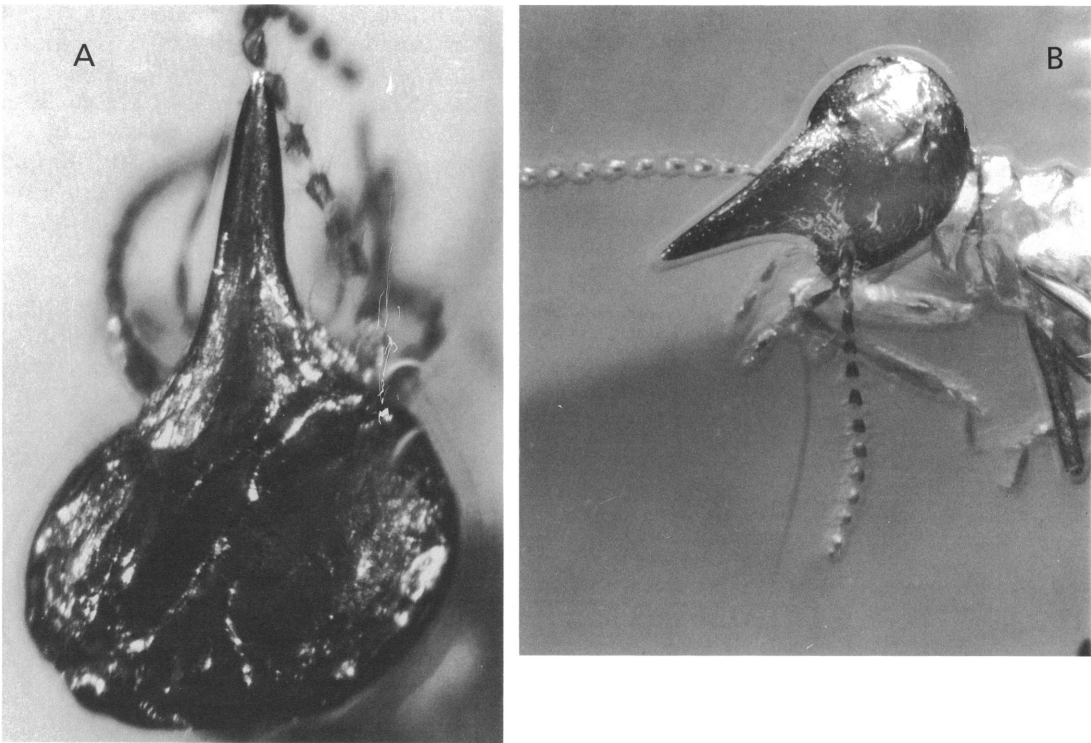


Fig. 8. Photomicrographs of holotype soldier of *N. electronasutus* from Dominican Republic amber. A. Dorsal view of head; B. lateral view of head.

four to five long bristles, two at tip of nasus, along with very fine setae or hairs (clearly visible in paratype specimens), tergites with very fine, short, barely visible hairs. Head (fig. 7) in profile sinuate. Mandibles with points. Antennae broken in specimens, with 12+ articles, third longer than second or

fourth, second subequal to fourth. Pronotum with anterior margin moderately emarginate, posterior margin evenly rounded.

COMPARISONS: Only two living species of *Nasutitermes*, *N. costalis* (based on the imago and soldier castes) and *N. lividus* (based on the imago caste only) have been reported from

TABLE 2
Measurement (mm) of Five Soldiers of *Nasutitermes electronasutus*, new species

	Holotype	Range	Mean
Length of head with nasus	1.60	1.60-1.68	1.64
Length of nasus	0.67	0.65-0.67	0.66
Width of head	0.93	0.92-1.03	0.95
Height of head without gula	0.60	0.60-0.65	0.62
Maximum length of pronotum	0.21	0.20-0.21	0.21
Width of pronotum	0.43	0.43-0.45	0.44
Length of hind tibia	1.40	1.40-1.43	1.43

the Dominican Republic and Haiti. However, *Nasutitermes electronasutus* very closely resembles *N. ephratae*, a species which has never been reported from the Dominican Republic or Haiti. It differs from *ephratae* in having a longer nasus, with very short setae or hairs (absent in *ephratae*), and a longer third antennal segment. *Nasutitermes costalis* and *N. corniger* have a narrower head, with a shorter nasus, tergites with a distinct row of short bristles (absent in *electronasutus*), and a shorter third antennal article.

SPECIMENS AND TYPE LOCALITY: Soldier (holotype), AMNH no. DR-14-586, Dominican Republic amber, specific locality not known; soldier (paratype), AMNH no. DR-14-587, Dominican Republic amber, specific locality not known; three soldiers (paratypes), all in the same piece, AMNH no. DR-14-589, Dominican Republic amber, specific locality not known. Dominican Republic amber, as mentioned above, is dated as Upper Oligocene–Lower Miocene.

The holotype and paratype soldiers are deposited in the American Museum of Natural History, New York.

ETYMOLOGY: *Electro* is from the Greek *ēlektron* (amber); *nasutus* (Latin) refers to the nasus of the soldier.

Nasutitermes electrinus,
new species

Three specimens of imagoes from tropical Mexican amber, all fragmentary, are assigned to this species. Because a composite of characters found in all three is important in making the generic assignment of the species, all three specimens are described individually. Measurements are in millimeters unless noted otherwise.

HOLOTYPE IMAGO (B-7047-29): Head abundantly covered with many short hairs and some long bristles (longest 0.11), the short hairs, however, not sufficient to be called a thick mat; general pilosity of the pronotum not easily seen, but the longest bristle 0.09; longest bristle on forewing scale 0.09; inner and costal margins of wings with many short hairs (longest 0.04), membranes and veins of outer portion of wing with numerous hairs (perhaps as many as five hairs in a square 0.15×0.15). Fontanelle not sufficiently clear to determine its shape, but definitely not large

and conspicuous. Eye comparatively large and round, but only its width can be measured accurately. Ocellus oval, with the upper edge moderately raised above surface of head, removed from eye by about half its width. Antennae with 15 articles, second about equal to third, fourth a little longer than third, terminal article 0.16 long. Postclypeus of medium length, strongly arched in profile, with median line in a longitudinal groove below surface of convex lateral portions; width appears to be about twice its length, although this proportion cannot be seen accurately. Portion of pronotum visible, but not sufficiently clear for description. Wing scales seem to be proportionate size of Termitidae, but hind wing scale not clear enough to be measured; humeral suture of forewing seems evenly and slightly curved; wing membranes covered with many fine chitinous punctations that show short rayed asters under high power; wing venation typical of most genera of Termitidae, with a strong costal margin and a parallel and equally strong R_s ; M and Cu too weak for description in this specimen. Approximate length of head to front of postclypeus 0.66; width of head roughly 0.86; width of eye approximately 0.29; ocellus from ocular suture 0.03; length of ocellus 0.09; width of ocellus 0.06; length of extended antenna about 1.77; length of forewing scale at costal margin about 0.40; approximate width of forewing 1.83 (folded).

PARATYPE FEMALE DEALATE IMAGO (B-4117-14): Specimen broken and fragmentary, with tufts of mold obscuring some portions of head and pronotum. General pilosity of head not clear, but some hairs visible on head capsule and postclypeus; longest bristle on pronotum 0.09; lateral and posterior portions of tergites with many hairs and some short bristles, the longest 0.09; pilosity of sternites very clear, close to that of tergites, except bristles longer, longest bristle on seventh sternite 0.16, short hairs and several sternites 0.01–0.07. Eye facets not clearly visible, but outline of eye large and widely oval, nearly round. Ocellus clear, oval, with upper edge slightly raised above level of head. Postclypeus strongly arched, convex in profile, with depressed longitudinal line in middle. Pronotum with front portion and one side very clear, flatly saddle-shaped, typical of the genus *Nasutitermes* and several other ad-

vanced Termitidae; although broken, estimated length a little more than half its width; front margin evenly and slightly concave; sides broadly rounded, converging toward the rear in a rather flat curve posterior to widest and more strongly curved portion. Presumed middle and hind legs visible, but tibial spur formula not clear. Cerci two-jointed. Length of eye 0.29; width of eye approximately 0.27; ocellus from eye 0.04; length of ocellus 0.09; width of ocellus 0.07; median length of postclypeus about 0.13; estimated length of pronotum 0.52; width of pronotum 0.75.

PARATYPE IMAGO (B-8425-63): This specimen has the wings, part of the thorax, and the abdomen preserved. Pilosity of sternites not clear, but seems similar to that of B-4117-14; wings with many hairs on margins and also on membranes and veins in outer half, fewer on basal half. Wing membrane with fine punctations; venation similar to that of B-7047-29. Legs partially visible, but unclear. Length of middle tibia approximately 0.63; length of hind tibia approximately 0.66; length of forewing estimated at 6.58; width of forewing estimated at 1.71.

COMPARISONS: If the three specimens belong to the same species and the characters of each are combined, it is possible to eliminate nearly every New World genus of the Termitidae except *Nasutitermes*, *Subulitermes*, and *Amitermes*. The pilosity, the size, the 15 articles of the antenna together with the proportions of the antennal articles, the eye, the ocellus, the postclypeus, and the pronotum all fit *Nasutitermes* better than any other genus, though some species of the other genera overlap with the combination of observed characters of *Nasutitermes electrinus*. Nearly all the species on the *Subulitermes* branch of the Nasutitermitinae of the New World have 14 articles in the antenna, while *Amitermes* (Termitinae) differs in the characters of the postclypeus. Also, *Amitermes* has a tibial spur formula of 3:2:2 (compared to 2:2:2 in the advanced Termitidae, such as *Nasutitermes*). Further, *Amitermes* is not a common genus in humid forested areas, but is more characteristic of both temperate and tropical grasslands and deserts. Therefore, it would seem most probable that the genus is *Nasutitermes* for a number of reasons, including morphology, ecology, and geography, but it should be emphasized that fragmentary

fossils of the advanced termites are very difficult to identify to genus. The species characters, in contrast, are far more definitive. The question of whether this species should be named at all was considered, but in view of the fact that fossil Tertiary Termitidae are rare, that numerous species characters in these specimens can be seen accurately, and that the most probable genus could be determined, it seemed best to provide a reference name for the data awaiting the discovery of more specimens.

SPECIMENS AND TYPE LOCALITY: The fragmentary holotype imago is in a small piece of amber from the Simojovel region (18°14'N, 92°40'W), Chiapas, Mexico, no. B-7047-29, purchased by Frans Bloom in 1958, exact derivation unknown. A fragmentary paratype female dealate imago is in a small piece of amber from the same region as the holotype, no. B-4117-14, purchased by John Chemsak in 1958. Another very fragmentary paratype imago is in a small piece of amber from Sigüahuatan (Ciguahuatan) (17°01'N, 92°02'W), Chiapas, Mexico, no. B-8425-63, Frans Bloom Collection, 1959. The age of the amber-bearing formation is assigned as Upper Oligocene–Lower Miocene (Langenheim, 1969, Frost and Langenheim, 1974).

The three specimens are deposited in the Museum of Paleontology, University of California, Berkeley.

ETYMOLOGY: *Electrinus* is from the Latin *ēlēctrum* (amber).

BIOGEOGRAPHY

Nasutitermes is the largest genus of Isoptera in number of species and is ecologically dominant in the tropics throughout the world. The genus is badly in need of a revision, particularly of the species from the Neotropical region. Of the following nine living species from the Caribbean islands—*Nasutitermes acajutlae*,⁴ *N. costalis*, *N. ephratae*, *N. guayanae*, *N. hubbardi*, *N. intermedius*, *N. lividus*, *N. nigriceps*, *N. ripperti*—only two, *N. costalis* and *N. lividus*, occur in Hispaniola (Haiti and the Dominican Republic). *Nasutitermes costalis*, *N. hubbardi*, *N. lividus*, and *N. ripperti* are confined to the Caribbean, and the other

⁴ This species, which was considered a synonym of *N. nigriceps*, has been resurrected (Thorne et al., 1994, 1996).

five have a wider distribution (Mexico and Central and South America).

Very little is known about the phylogeny of Isoptera at the species level. Many termite species have been delineated mainly by measurements, and the polarity of measured characters is difficult to determine. Only when the species of the genus *Nasutitermes* have been more carefully studied and more qualitative characters are used in distinguishing species, will it be determined whether the new fossil species *N. electronasutus* is closely related to the other Caribbean species and whether all species from the Caribbean are closely related and form a clade.

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