

NEOTERMES PLATYFRONS, A NEW DAMPWOOD TERMITE
(ISOPTERA, KALOTERMITIDAE) FROM THE DOMINICAN REPUBLIC

JAN KRECEK AND RUDOLF H. SCHEFFRAHN

Fort Lauderdale Research and Education Center
University of Florida, Institute of Food and Agricultural Sciences
3205 College Avenue, Fort Lauderdale, FL 33314

ABSTRACT

Neotermes platyfrons n. sp. is described from the winged imago and the small and large soldier castes. This species is endemic to Hispaniola and surveys of the Dominican Republic indicate the greatest populations occur in the far-eastern coastal woodlands.

Key Words: new species, taxonomy, West Indies, Greater Antilles, Caribbean

RESUMEN

Neotermes platyfrons sp. n., es descrita basándose en los adultos alados y las castas de soldados grande y pequeña. La nueva especie descrita es endémica de la Española y nuestros hallazgos sugieren que las mayores poblaciones se hallan en los bosques costeros del extremo oriental de la Isla.

Twenty-two species of *Neotermes* occur in the Neotropical Region (Constantino 1998). Several *Neotermes* spp. are common elements of the termite fauna of coastal woodland and mangrove habitats in southern Florida and the West Indies (Krecek et al. 2000; Scheffrahn et al. 1994; Scheffrahn et al. 2000). While conducting termite surveys in the Dominican Republic between 1992 and 1996, we collected numerous samples of a *Neotermes* sp. that were preliminarily identified as *N. (=Kaloterme)s jouteli* (Banks) (Harris 1955, 1971; Scheffrahn et al. 1994). We now recognize those specimens as a new species of *Neotermes* that is described herein for the first time.

MATERIALS AND METHODS

The description of *N. platyfrons* n. sp. is based on the examination of 27 colony samples, all in authors' collection, taken from 13 localities in the Dominican Republic (Fig. 1). Morphometric data from specimens preserved in 85% ethanol were obtained using a stereomicroscope fitted with an ocular micrometer. Measurements were adopted mainly from Roonwal (1970), while the color scheme of Sands (1965) was used. The terms "small" and "large" soldiers (Krishna 1961) are equal to the terms "short-headed" and "long-headed" soldiers (Banks & Snyder 1920), respectively. These terms are used to separate the two most common size morphs of soldiers occurring within some species of the Kalotermitidae (Nickle & Collins 1989).

Scanning electron micrographs (SEMs) were digitized at 600 dpi, the digital image outline traced using photograph-enhancing software

(Photo Magic, Micrografx, Inc., Richardson, TX), the background converted to black, and the scale bar digitally drawn. Collection localities were mapped (Fig. 1) using ArcView GIS version 3.0a software and relevant map data from Digital Map of the World version 1.0 (Environmental Systems Research Institute, Inc. Redlands, CA).

The holotype alate and a paratype soldier will be deposited in the American Museum of Natural History, New York. Additional paratype alates and soldiers will be deposited in the National Museum of Natural History (Smithsonian Institution), Washington, DC, and in the Florida State Collection of Arthropods, Florida Department of Agriculture and Consumer Services, Division of Plant Industry, Gainesville. Remaining paratypes are maintained in the authors' collection at the University of Florida Research and Education Center, Fort Lauderdale, FL.

Neotermes platyfrons, **New Species**

Kaloterme)s near jouteli Banks; Harris 1955 (Dominican Republic)

Neotermes jouteli (Banks); Harris 1971 (Dominican Republic)

Neotermes jouteli (Banks); Scheffrahn et al. 1994 (Dominican Republic records only)

Imago (Fig. 2 A-B, Table 1).

In dorsal view, body almost uniformly ferruginous with exception of darker chestnut brown V-shaped mark on frons and M-shaped mark on vertex. Mandibles chestnut brown at bases, almost

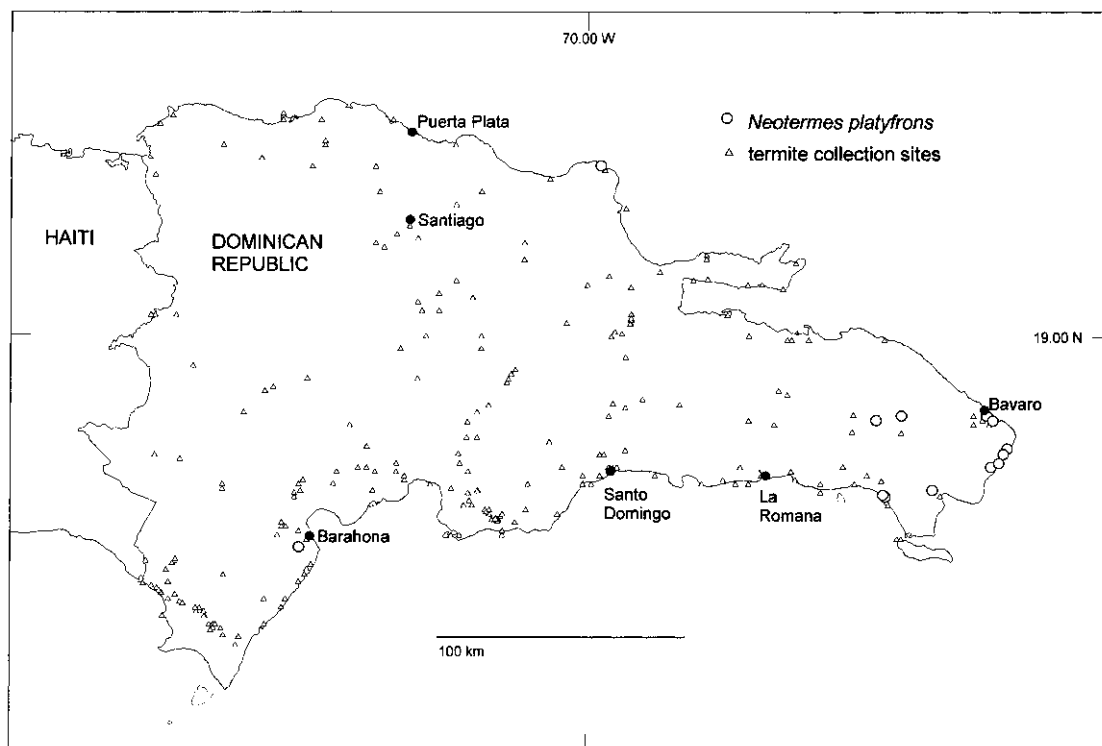


Fig. 1. *Neotermes platyfrons* localities and termite collection sites in the Dominican Republic from 1992-1996.

black distally. Anteclypeus pale yellow-orange. Antennae ferruginous with exception of darker chestnut-brown articles 2-4. Ocelli yellow-white, coloration contrasts conspicuously with head capsule. Pronotum chestnut-brown, periphery slightly darker and concolorous with distinct chevron pattern on wing scales of pterothorax. Femora pale yellow; tibiae and tarsi ferruginous. Arolia whitish.

In dorsal view, head capsule suboval; in ventral view, margins below eyes straight and convergent anteriorly. Frons moderately rugose, flat, and with shallow depression; surrounded on each side by ridges extending from ocelli to dorsal mandibular condyles. Frons rugosity terminates posteriorly as shallow median channel between ocelli. In lateral view, angle of slope between planes of frons and vertex $\approx 10^\circ$. Compound eyes large and protruding, subcircular or very slightly subreniform; margins along antennal sockets rectate or very faintly concave. Ocelli moderately large and slightly protruding, obliquely oval, and clearly separated from eyes. Basal striations on mandibles weak or absent. Epicranial depression weak or absent. Head with scattered short and fewer longer (≈ 0.2 -mm-long) erect setae. Pronotum with similar pilosity, but with proportionally more longer setae than short setae along margins. Fore wing scale and proximal portion of fore wing with few short setae. Antennae with 18-20 articles,

usually 19; relative length formula $2 = 3 > 4 = 5$ or $2 > 3 > 4 = 5$. Pronotum robust, with anterior margin deeply concave and peripheral rim elevated; median posterior margin faintly concave, and posterior corners subtruncate. Subcosta of fore wing closely parallels costal margin and joining costal margin at $\frac{1}{4}$ wing length from suture. Radius of fore wing intersects costal margin near midwing, and radial sector with 4-6 branches; branching commences proximal to midwing. Sclerotized media of fore wing with several very faint diagonal anterior branches intersecting radial sector, and with posterior branches that fade into membrane save one or two that reach wing margin. Wing membrane texture with faint nodulations.

Comparisons.

Alates of *Neotermes platyfrons* are intermediate in size between those of the smaller *N. jouteli* and the larger *N. mona* (Banks) with some overlapping measurements among the three species. The most distinguishing range of measurements for *N. jouteli*, *N. platyfrons*, and *N. mona*, respectively, are as follows: head length to postclypeus 1.34-1.54, 1.55-1.68, and 1.63-1.97 mm; head height without postmentum 0.88-1.05, 1.05-1.11, and 1.11-1.21 mm; pronotum maximum length 1.06-1.32, 1.29-1.47, and 1.49-1.68 mm; pronotum

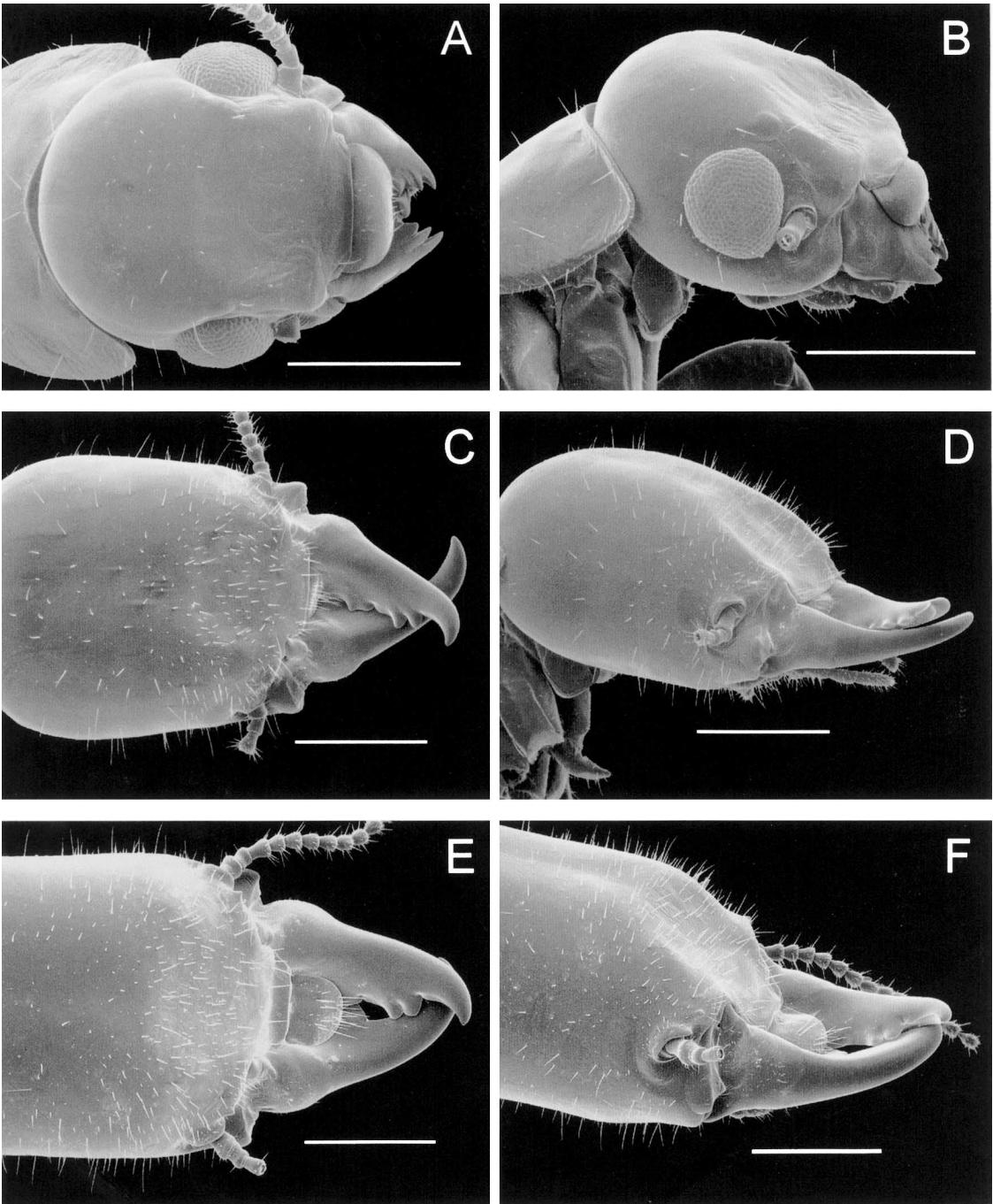


Fig. 2. Scanning electron micrographs of *Neoterмес platyfrons*: dorsal (A) and oblique (B) views of the imago head, dorsal (C) and lateral (D) views of the small soldier head, and dorsal (E) and lateral (F) views of the large soldier head. All specimens are from Punta Cana, La Altagracia Province, Dominican Republic. Antennae and palpi partially removed for clarity. Scale bar equals 1 mm.

maximum width 1.75-2.05, 2.00-2.22, and 2.22-2.47 mm, and head maximum width at eyes 1.59-1.81, 1.83-1.93, and 2.00-2.17 mm.

The distinct and darkened V- and M-shaped markings on the *N. platyfrons* imago head are absent on *N. jouteli* head. The long setae on the head

TABLE 1. MEASUREMENTS OF *NEOTERMES PLATYFRONS* IMAGO.

Measurement in mm (n = 6 males, 6 females from 4 colonies)	Range	Mean $\pm$ S.D.	Holotype
Head length with labrum	1.91-2.20	2.03 $\pm$ 0.11	1.95
Head length to postclypeus	1.55-1.68	1.60 $\pm$ 0.037	1.55
Head width, maximum at eyes	1.83-1.93	1.89 $\pm$ 0.029	1.83
Head height without postmentum	1.05-1.11	1.07 $\pm$ 0.018	1.08
Labrum width, maximum	0.67-0.77	0.72 $\pm$ 0.031	0.74
Eye diameter with sclerite, maximum	0.59-0.64	0.62 $\pm$ 0.015	0.63
Eye to head base, minimum from sclerite	0.25-0.32	0.32 $\pm$ 0.020	0.29
Ocellus diameter, maximum	0.19-0.25	0.22 $\pm$ 0.020	0.23
Ocellus diameter, minimum	0.15-0.18	0.16 $\pm$ 0.010	0.16
Eye sclerite to ocellus, minimum	0.01-0.06	0.03 $\pm$ 0.014	0.02
Pronotum, maximum length	1.29-1.47	1.40 $\pm$ 0.052	1.39
Pronotum, maximum width	2.00-2.22	2.08 $\pm$ 0.061	2.07
Total length with wings	16.47-18.74	17.76 $\pm$ 0.82	17.61
Total length without wings	7.95-10.22	9.06 $\pm$ 0.65	8.52
Fore wing length from suture	12.78-14.34	13.64 $\pm$ 0.51	13.49
Fore wing, maximum width	3.40-3.79	3.55 $\pm$ 0.13	3.43

and pronotum of *N. platyfrons* are about 0.2 mm long while those of *N. jouteli* are $>5\times$ shorter. The shallow depression centered at the intersection of the epicranial suture in *N. jouteli* and *N. mona* is faint or absent in *N. platyfrons*. The anterior margin of the pronotum is more concave in *N. platyfrons* than in *N. jouteli*. The posterior corners of the *N. platyfrons* pronotum are subtruncate, while in *N. mona* they are more rounded and more pilose.

The imago of the sympatric *N. castaneus* (Burmeister) is unlike that of *N. platyfrons*. The general color of the former is castaneous, while that of *N. platyfrons* is orange. The eyes of *N. platyfrons* are $\sim 1.5\times$ larger in diameter than those of *N. castaneus*, and the frons of *N. platyfrons* is flat-

tened and rugose while that of *N. castaneus* is convex and smooth.

Soldier. (Figs. 2 C-F, Tables 2-3).

Beyond size differences given in Tables 2 and 3, soldier caste dimorphism of this species is less distinctive when compared with some congeners. Consequently, the large and small soldier morphs are described together.

In dorsal view, head capsule, distal antennal articles, and labrum ferruginous except for chestnut brown anterior frons, postclypeus, frontal and antennal carinae, and 4 proximal antennal articles. Anteclypeus yellowish-white. Thorax and abdominal dorsum ferruginous orange. Mandibles

TABLE 2. MEASUREMENTS OF *NEOTERMES PLATYFRONS* SMALL SOLDIER.

Measurement in mm (n = 13 from 11 colonies)	Range	Mean $\pm$ S.D.
Head length to tip of mandibles	3.86-4.31	4.13 $\pm$ 0.16
Head length to postclypeus	2.57-3.02	2.85 $\pm$ 0.15
Head width, maximum	2.00-2.30	2.14 $\pm$ 0.077
Antennal carinae, outside span	1.78-2.03	1.92 $\pm$ 0.072
Head height, excluding postmentum	1.52-1.73	1.62 $\pm$ 0.072
Labrum, maximum width	0.51-0.60	0.55 $\pm$ 0.030
Postclypeus width, maximum	0.72-0.87	0.80 $\pm$ 0.042
Left mandible length, tip to most distant visible point of ventral condyle	1.89-2.01	1.97 $\pm$ 0.031
Postmentum, length in middle	1.68-2.14	1.91 $\pm$ 0.14
Postmentum, maximum width	0.72-0.83	0.77 $\pm$ 0.036
Postmentum, minimum width	0.38-0.47	0.43 $\pm$ 0.035
Pronotum, maximum width	2.30-2.52	2.39 $\pm$ 0.083
Pronotum, maximum length	1.22-1.50	1.36 $\pm$ 0.095
Hind tibia length	1.29-1.64	1.44 $\pm$ 0.096
Total length	8.66-10.93	9.98 $\pm$ 0.75

TABLE 3. MEASUREMENTS OF *NEOTERMES PLATYFRONS* LARGE SOLDIER.

Measurement in mm (n = 10 from 8 colonies)	Range	Mean $\pm$ S.D.
Head length to tip of mandibles	4.63-5.43	4.97 $\pm$ 0.26
Head length to postclypeus	3.22-3.96	3.58 $\pm$ 0.24
Head width, maximum	2.17-2.59	2.34 $\pm$ 0.13
Antennal carinae, outside span	2.00-2.39	2.18 $\pm$ 0.12
Head height, excluding postmentum	1.75-1.95	1.85 $\pm$ 0.074
Labrum, maximum width	0.52-0.64	0.58 $\pm$ 0.033
Postclypeus width, maximum	0.83-0.95	0.89 $\pm$ 0.040
Left mandible length, tip to most distant visible point of ventral condyle	2.05-2.30	2.17 $\pm$ 0.078
Postmentum, length in middle	2.41-2.77	2.55 $\pm$ 0.11
Postmentum, maximum width	0.83-0.95	0.87 $\pm$ 0.034
Postmentum, minimum width	0.44-0.52	0.48 $\pm$ 0.030
Pronotum, maximum width	2.47-3.13	2.76 $\pm$ 0.17
Pronotum, maximum length	1.38-1.71	1.57 $\pm$ 0.11
Hind tibia length	1.52-1.70	1.63 $\pm$ 0.071
Total length	8.66-13.35	10.91 $\pm$ 1.25

glossy, almost black except for very dark chestnut brown bases. Epicranial sutures faint. Eyes blackish or fainter dark pigmentation. Femora yellowish-white; tibiae pale ferruginous. Sternum pale ferruginous orange. Ferruginous postmentum contrasting with pale ferruginous orange genae. Large soldiers are slightly more pigmented than small soldiers.

In dorsal view, head capsule moderately elongate in small soldier; relatively more elongated in large soldier. Sides of head subparallel. In small soldier, sides faintly convex or converging to anterior; in large soldier, sides usually very faintly concave to middle. Head capsule with posterior corners evenly rounded; posterior margin narrowly rectate in small soldier; widely rectate in large soldier. Head capsule and pronotum relatively densely covered with $\approx$ 0.1-mm-long setae. Frons depressed or slightly concave. Frontal carinae each with small conical tubercle. Labrum, when exposed, linguiform. Mandibles robust; in large soldier slightly more stout than in small soldier; bases faintly humped and with few minute setae on large soldier; left apical tooth hooked $\approx$ 60°, dentition conspicuous. Antennae with 14-16 articles in small soldier, usually 14-15; 13-16 in large soldier, usually 15-16; relative length formula $2 < 3 > 4 = 5$. Third antennal article subclavate, proximal articles moniliform, distal articles slightly elongate. Pronotum large and relatively short, noticeably wider than head capsule. Anterior margin of pronotum broadly and shallowly concave; lateral margins convex; posterior margin widely subrectate, usually with very faint median emargination.

In lateral view, head capsule slightly dorsoventrally flattened. Plane of frons slopes $\approx$ 20° below plane of vertex in small soldiers; $\approx$ 30° in large soldiers. Eyes oval. Mandibles moderately curved upward in lateral view. Femora moderately broad in small soldier; noticeably swollen in large soldier.

Comparisons.

Morphometric differentiation of the small soldiers of *Neotermes platyfrons* and *N. jouteli* is very tenuous although hind tibia lengths are 1.29-1.64 mm and 1.54-1.72 mm, respectively. Less character overlap occurs in large soldiers but this morph is also difficult to differentiate by measurements. The maximum pronotum lengths of large soldiers range from 1.38-1.71 mm in *N. platyfrons* and 1.71-1.85 mm in *N. jouteli*, and the hind tibia lengths are 1.52-1.70 mm and 1.68-1.93 mm, respectively.

Both soldier morphs of *N. platyfrons* differ from those of *N. jouteli* with the former having proportionally more elongate head capsules and mandibles (e.g., head length/maximum head width ratio in minor soldiers is 1.35 in *N. platyfrons* and 1.2 in *N. jouteli*). The left apical tooth of *N. platyfrons* is noticeably hooked, while in *N. jouteli* it is only faintly hooked. The labrum of *N. platyfrons* is apically rounded while subtruncate in *N. jouteli*. Basal mandibular pilosity in *N. platyfrons* is almost absent while well developed in *N. jouteli*.

Compared to the sympatric *N. mona*, both small and large soldiers of *N. platyfrons* are smaller in the following respective measurements (mm): outer span of antennal carinae (small soldiers 2.18-2.80 vs. 1.78-2.03 and large soldiers 2.57-3.10 vs. 2.00-2.39), labrum maximum width (small 0.64-0.87 vs. 0.51-0.60 and large 0.72-0.83 vs. 0.52-0.64), left mandible length (small 2.24-2.84 vs. 1.89-2.01 and large 2.67-3.07 vs. 2.05-2.30), pronotum maximum length (small 1.63-2.02 vs. 1.22-1.50 and large 2.00-2.37 vs. 1.38-1.71), and pronotum maximum width (small 2.73-3.28 vs. 2.30-2.52 and large 3.37-3.96 vs. 2.47-3.13). The soldier head capsule, including the postmentum, pronotum, and legs of *N. mona*, is more pilose than those of *N. platyfrons*.

Both soldier morphs of *N. platyfrons* differ with those of the sympatric *N. castaneus* considerably. The *N. castaneus* soldier is significantly larger than that of *N. platyfrons*. The *N. castaneus* soldier has unpigmented eye spots, while the eyes of *N. platyfrons* are pigmented. The mandibles of *N. castaneus* are distinctly paler proximally than distally, while those of *N. platyfrons* are almost concolorous throughout.

Etymology.

The species name is derived from the Greek "*platys*" which refers to the depressed or rather planer character of the frons in imagos and soldiers.

Type Material.

Holotype. Dominican Republic. La Altagracia Province, 2.6 km S.W. of Punta Cana, 18.533°N 68.368°W, 6-XI-1996, J. Chase & J. Krecek, 1 male holotype alate, 5 paratype alates, 3 paratype small soldiers and 3 paratype large soldiers (DR 1480). Additional specimens from this colony used for SEMs (Fig. 2).

Paratypes. Dominican Republic. La Altagracia Province, 4.4 km N.W. of Boca de Yuma, 18.392°N 68.647°W, 5-XI-1996, J. Chase & J. Krecek, 2 alates, 1 small soldier, 1 large soldier (DR 1378); 1 km N.W. of Playa Bavaro, 18.665°N 68.409°W, 5-XI-1996, J. Chase & J. Krecek, 1 small soldier (DR 1389); 1 km W. of Playa Dominicus, 18.366°N 68.831°W, 6-XI-1996, J. Chase & J. Krecek, 1 large soldier (DR 1409); same data, 1 small soldier (DR 1410); 0.5 km W. of Club Med., 18.554°N 68.353°W, 6-XI-1996, J. Chase & J. Krecek, 1 small soldier, 1 large soldier (DR 1448); Bejucal, 18.667°N 68.867°W, 10-VI-1992, R. Scheffrahn, J. Chase, J. Mangold, and J. de la Rosa, 1 small soldier, 1 large soldier (DR 504); Bavaro, 18.683°N 68.433°W, 11-VI-1992, R. Scheffrahn, J. Chase, J. Mangold, and J. de la Rosa, 1 small soldier (DR 512); Juanillo, 18.483°N 68.417°W, 11-VI-1992, R. Scheffrahn, J. Chase, J. Mangold, and J. de la Rosa, 1 small soldier (DR 567); Playa Bavaro, 18.683°N 68.767°W, 1-IV-1993, J. Chase & J. de la Rosa, 1 large soldier (DR 827); Barahona Province, Camino a Santa Elena, 18.167°N 71.133°W, 30-III-1993, J. Chase & J. de la Rosa, 2 alates, 1 small soldier, 1 large soldier (DR 793); Maria Trinidad Sanchez Province, Cabo Frances, 19.667°N 69.950°W, 9-VIII-1992, J. Chase, 2 alates, 1 small soldier, 1 large soldier (DR 682).

Additional Material Examined. Same data as DR 512 above, 1 small soldier (DR 514), 1 small soldier each (DR 526 and DR 538); same data as DR 682, 1 small soldier (DR 680); same data as DR 1378, 1 small soldier, 1 large soldier (DR 1379), 1 large soldier (DR 1380); same data as DR 1448,

1 small soldier, 1 large soldier (DR 1445), 1 small soldier, 1 large soldier (DR 1446), 1 queen (DR 1449); same data as DR 1480, 1 small soldier (DR 1481), and 1 small soldier, 1 large soldier (DR 1482); La Altagracia Province, 0.5 km E. of Playa Bayahibe, 18.372°N 68.839°W, 6-VI-1992, J. Chase & J. de la Rosa, 1 king, 1 queen (DR 1423).

DISCUSSION

We postulate that *N. platyfrons* was first listed as *N. (=K.) jouteli* by Harris (1955) in an intercepted wood shipment from the Dominican Republic to England. Harris (1971), Araujo (1977), and Scheffrahn et al. (1994) also accepted this initial determination. Based on current records, *N. castaneus*, *N. mona*, and *N. platyfrons* are the only *Neotermes* recorded from the Dominican Republic. Collections of *N. platyfrons* have been most prominent in extreme eastern Dominican Republic although two remote locations, one southwestern and one north-central, have also yielded specimens (Fig. 1). *Neotermes mona* has a broader distribution in the Dominican Republic (Krecek et al. 2000) that encompasses the distribution of *N. platyfrons* in the extreme east. The distribution of *N. castaneus* in the Dominican Republic is also more widespread than *N. platyfrons*, but these two species have only been recorded to be sympatric near Barahona. Except for the first few instars, all castes of *N. platyfrons* exhibit some degree of wing bud formation.

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