

KEYS TO SOLDIER AND WINGED ADULT TERMITES (ISOPTERA) OF FLORIDA

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ABSTRACT

Illustrated identification keys are presented for soldiers and winged adults of the following 17 termite species known from Florida: *Calcaritermes nearcticus* Snyder, *Neoterme castaneus* (Burmeister), *N. jouteli* (Banks), *N. luykxi* Nickle and Collins, *Kaloterme approximatus* Snyder, *Incisiterme milleri* (Emerson), *I. minor* (Hagen), *I. schwarzi* (Banks), *I. snyderi* (Light), *Cryptoterme brevis* (Walker), and *C. cavifrons* Banks, Family Kalotermitidae; *Coptoterme formosanus* Shiraki, *Reticuliterme flavipes* (Kollar), *R. hageni* Banks, *R. virginicus* (Banks), and *Prorhinoterme simplex* (Hagen), Family Rhinotermitidae; and *Amiterme floridensis* Scheffrahn, Mangold, & Su, Family Termitidae.

Key Words: Identification, Kalotermitidae, Rhinotermitidae, Termitidae

RESUMEN

Se presentan claves ilustradas de identificación para los soldados y los adultos con alas de las 17 especies de termes conocidas de la Florida, U.S.A.: *Calcariterme nearcticus* (Snyder), *Neoterme castaneus* (Burmeister), *N. jouteli* (Banks), *N. luykxi* Nickle y Collins, *Kaloterme approximatus* Snyder, *Incisiterme milleri* (Emerson), *I. minor* (Hagen), *I. schwarzi* (Banks), *I. snyderi* (Light), *Cryptoterme brevis* (Walker), y *C. cavifrons* Banks, Familia Kalotermitidae; *Coptoterme formosanus* Shiraki, *Reticuliterme flavipes* (Kollar), *R. hageni* Banks, *R. virginicus* (Banks), y *Prorhinoterme simplex* (Hagen), Familia Rhinotermitidae; y *Amiterme floridensis* Scheffrahn, Mangold, y Su, Familia Termitidae.

A number of identification keys have been published for the termites of the United States (Banks & Snyder 1920; Light 1934a,b; Snyder 1954; Weesner 1965), including four for the termites of Florida and the southeastern states (Emerson & Miller 1943, Miller 1949, Weesner 1965, Gleason & Koehler 1980). Additionally, Nickle & Collins (1989) have published a key to drywood termites (Kalotermitidae) of the eastern U.S., all of which occur in Florida. In fact, the only eastern Nearctic termite species not found in Florida are *Reticuliterme arenicola* Goellner known from Indiana and the Boston, Massachusetts, area (Dobson 1918, Snyder 1949) and *R. tibialis* Banks which extends its eastern range into Illinois and Indiana (Snyder 1954).

Unclear or sparse illustrations, illustrations not drawn to scale or lacking a scale, heavy reliance on morphometrics, use of obsolete names, and typographical errors have, in some earlier termite keys, led to confusion and incorrect identifications, especially by nonspecialists. The recent addition of three species to Florida's termite fauna, *Incisiterme minor* (Hagen) (Scheffrahn et al. 1988), *Amiterme floridensis* Scheffrahn et al. (1989), and *Neoterme luykxi* Nickle & Collins (1989), has further rendered previous keys obsolete.

The condition of a specimen will greatly affect the probability of a correct identification. Desiccated specimens are the most difficult to identify because of the resultant shrinkage, color change (usually darkening), and fragile nature resulting in lost or broken appendages. Usually only the wings and mandibles of dry specimens tend to remain relatively unaltered. Termites are best kept alive after collection and then killed by freezing just before being keyed. If specimens cannot be kept alive, they should be immersed in aqueous ethanol or isopropanol of at least 40% (i.e., 80-proof liquor or rubbing alcohol). For long-term museum storage, 85% ethanol has proven to be the best preservative (M.S. Collins, pers. comm.). The mandibles of dead soldiers are usually crossed and the labrum may be retracted or folded. Alate wings, especially in the critical costal region, may curl ventrally. Wings alone are often collected following a dispersal flight and can yield at least a generic identification using the adult key. Wings must be completely flat in order to see the costal venation in proper perspective. This can be accomplished by immersing the wing in a reservoir of water or alcohol, sliding it onto a microscope slide or other clear flat surface, covering it with another slide, and allowing it to dry. Alternatively, a dried wing can be flattened by laying the dorsal surface on a drop of water. Wing membrane texture can best be observed when dry. Because the winged adult key uses the forewing, several wings should be examined and keyed if detached from the body. Alates collected before dispersal flights may be incompletely sclerotized causing cuticle, wing membrane, and veins to be lighter in color than when fully mature for flight.

From a practical standpoint, correct identification is especially critical for pest taxa, such as termites, which may require very different control methods depending upon the target species. Although the morphological diversity among the termites of Florida is moderately broad, some species are not easily distinguished. Fortunately, the tentative identification of the soldier caste can be confirmed or refuted by independent identification of the winged adult (alate), and vice versa. Alates, however, are seasonal, may be difficult to find, and occur only in a mature colony.

In the following keys, we attempt to separate species by parsimonious use of the most recognizable and consistent characters even if resultant groupings are not taxonomically related (e.g., grouping by presence or absence of wing membrane pigmentation). Simple measurements are used to supplement couplets or when dimension provides a clear separation of a group or species. This reduces the confusion resulting from the presence of long- and short-headed soldier forms in some kalotermitid species (Nickle & Collins 1989) or size variations among conspecific soldiers due to colony size, age, or nutritional status. Adult measurements are less variable than those of soldiers. To further help in identification, we have incorporated the known Florida distribution, pest status, and dispersal flight data based on a previous survey (Scheffrahn et al. 1988) and unpublished records. These are given only as general guidelines and exceptions may occur (i.e. autumn flights by *Incisitermes snyderi* (Light) and *Reticulitermes* spp.). When available, generally accepted common names (Snyder 1954, R.H.S. unpublished) or accepted common names (ESA 1989) are also provided.

Several taxonomic issues must be addressed with respect to this work. The first and most troublesome, is the character overlap between *Neotermes jouteli* (Banks) and *Neotermes luykxi*. All measurements and characters provided in the description of *N. luykxi* soldiers and adults (Nickle & Collins 1989) fall within the range of those designated as *N. jouteli* in our reference collection. Apparently, the only diagnostic characters separating the two are their respective chromosome numbers and allozyme patterns (Luykx et al. 1990) neither of which can be obtained from preserved specimens. Chromosome number has been shown to vary within single insect species (Emmel et al. 1973) although it appears to be stable within species of Kalotermitidae

(Luykx 1990). Therefore, we cannot differentiate between these two *Neotermes* species in either key. Secondly, *Prorhinotermes simplex* (Hagen), the Florida "dampwood" termite, shares its habit of nesting in moist, decaying wood with the true dampwood termites (*Neotermes* spp.), although the former is actually a subterranean termite (Family Rhinotermitidae) which we have observed tunneling in soil. Thirdly, separating soldiers of *Reticulitermes* species is difficult. Although head and pronotum measurements and mandibular characters are useful, precise micromerements are required and some interspecific overlap may occasionally surface. In subsequent studys (Hostettler et al. 1995), labrum shape, although also subtle, has been found to be an effective additional character for separating soldiers of all three *Reticulitermes* species. Finally, an ongoing revision of Nearctic *Reticulitermes* suggests that an undescribed or erroneously synonymized species may occur in Florida's panhandle (T. Myles pers. comm.).

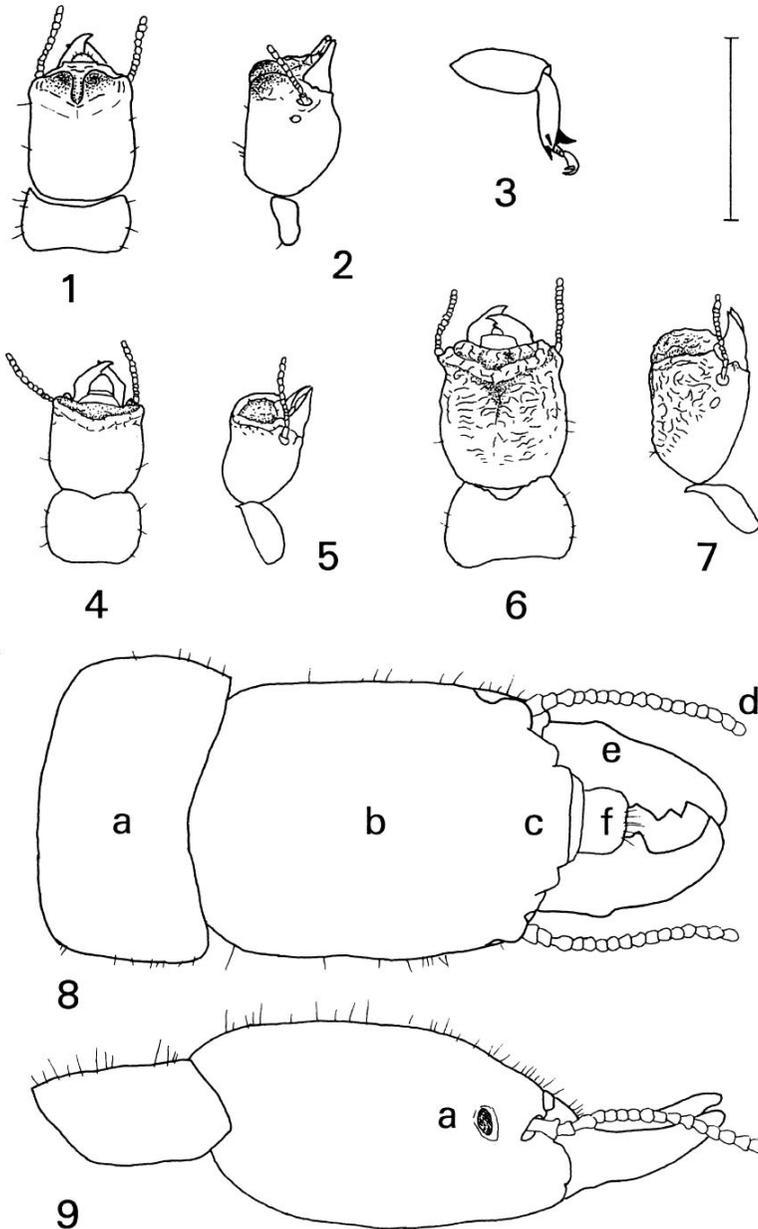
MATERIALS AND METHODS

Line drawings of specimens were prepared at 20-80x magnification with the aid of a camera lucida attached to an Olympus SZH light microscope. Measurements were made with an ocular micrometer. Scanning electron micrographs were made with a Hitachi S-4000 field emission microscope (6-8 kV). Specimens were dehydrated in absolute ethanol and 1,1,1,3,3,3- hexamethyldisilazane (Nation 1983) prior to sputter coating with gold.

Material examined for this key is from the authors' reference collection containing about 1,200 colony samples taken in Florida between 1985 and 1994 including 785 samples collected from structures in peninsula Florida (Scheffrahn et al. 1988), the Florida State Collection of Arthropods (Fla. Dept. Agric. Cons. Serv., Division of Plant Industry, Gainesville, Florida) and the E.M. Miller collection from the University of Miami on loan from P. Luykx containing 111 samples taken in Florida between 1930 and 1968.

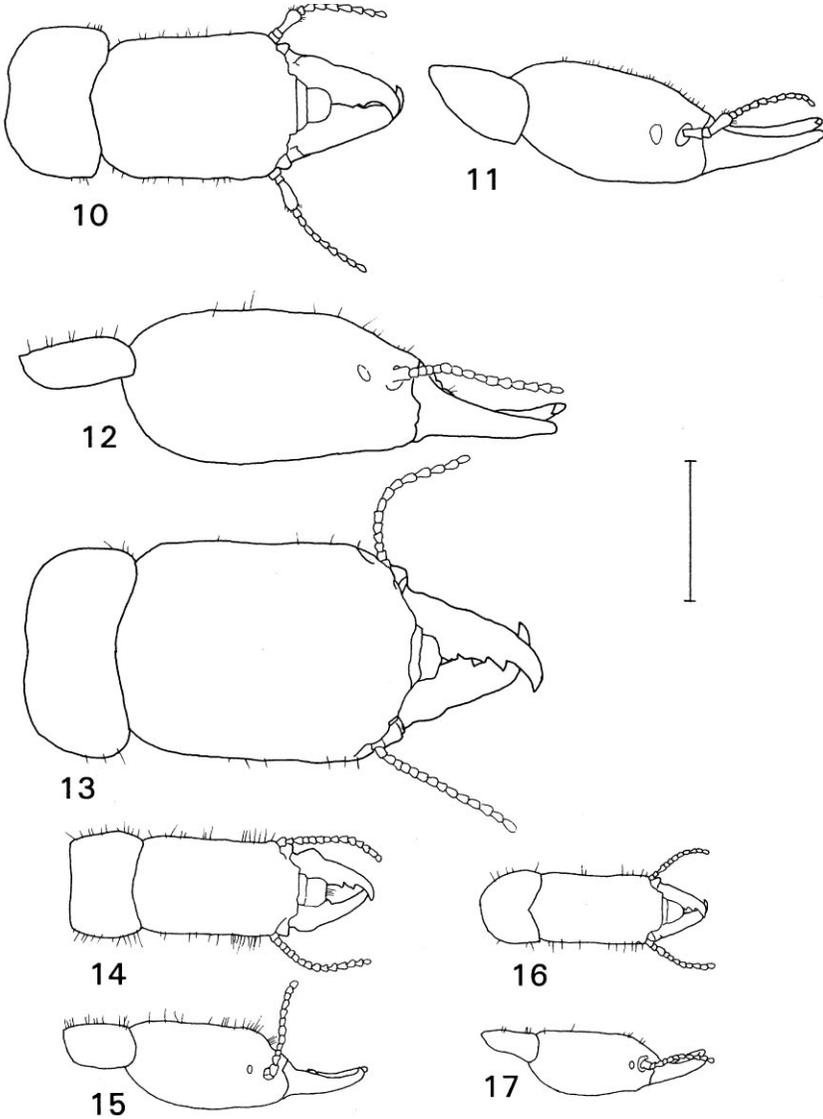
KEY TO TERMITE SOLDIERS OF FLORIDA

- 1 Pronotum (Fig. 8a) as wide or wider than width of head viewed from above (Figs. 1-20 dorsal views); for species with prominent mandibles, inner margin of left mandible (Fig. 8e) with two or more marginal teeth (Figs. 8-20 dorsal views). (*Drywood and dampwood termites*) Family Kalotermitidae 2
 - Pronotum width narrower than width of head viewed from above; each mandible with no exposed teeth or only one tooth visible on inner margin (Figs. 22-32 dorsal views). (*Subterranean termites*) Families Rhinotermitidae and Termitidae 11
- 2 Frons nearly vertical with deep furrow or rimmed above by a ridge; head plug-like; mandibles not prominent; head color deep reddish brown to black; (Figs. 1,2,4-7). (*Powderpost drywood termites*)..... 3
 - Frons (Fig. 8c) slopes more or less gradually from plane of vertex (Fig. 8b), surface smooth; head flattened, quadrate or elongate; mandibles project prominently; head color orange to reddish brown; (Figs. 8-21). (*Drywood and dampwood termites*) 5
- 3 Frons with deep furrow (Figs. 1,2); foretibia with one prominent spur at right angle to tibial axis and two small apical spurs (Fig. 3). (*Rare in structures, known from Clay Co. to Sebring.*) *Calcaritermes nearcticus*



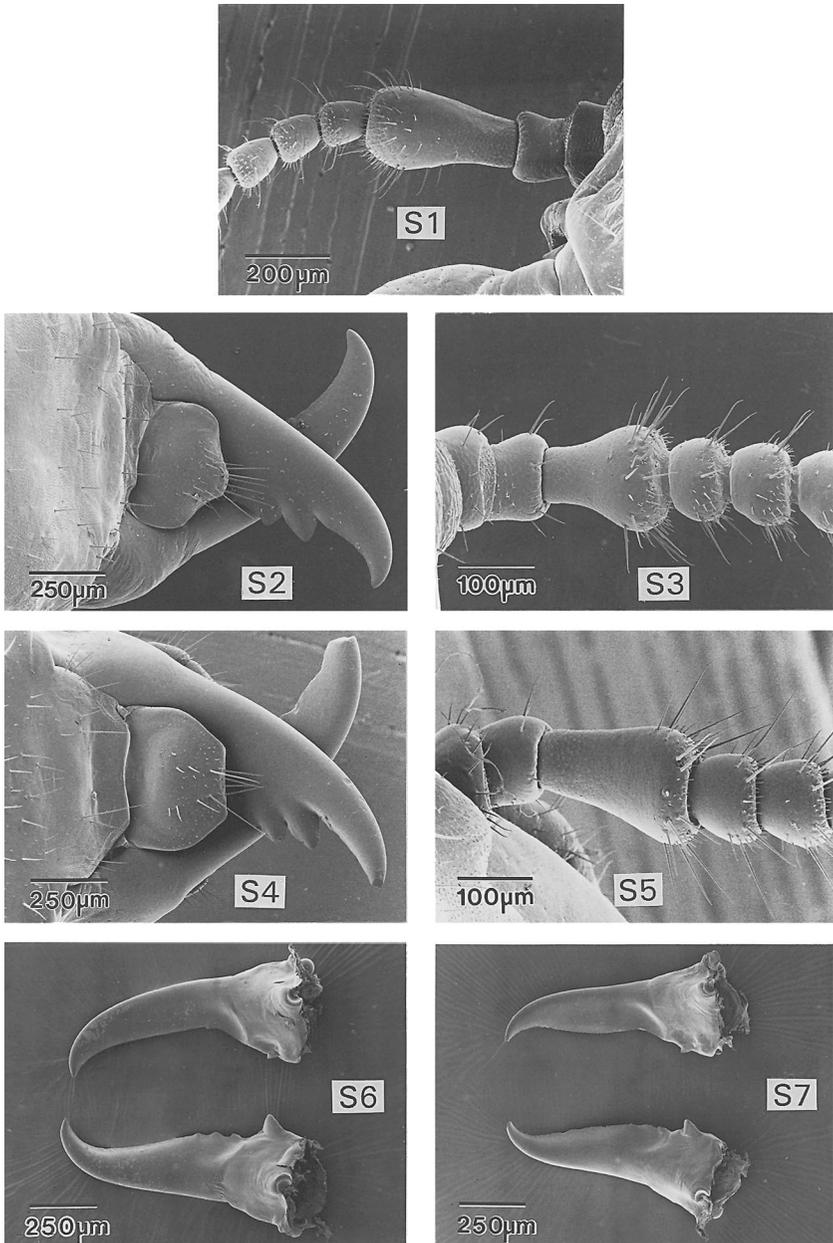
Figs. 1-9. Dorsal and lateral views of heads and pronota of termite soldiers from Florida: *Calcaritermes nearcticus*, Figs. 1-2 (foreleg, Fig. 3; bar = 3.2 mm); *Cryptotermes cavifrons*, Figs. 4-5; *Cryptotermes brevis*, Figs. 6-7; *Neotermes jouteli*, Figs. 8-9 (pronotum 8a, vertex 8b, frons 8c, antenna 8d, mandible 8e, labrum 8f, eyespot Fig. 9a). Bar = 2 mm.

- Ridge surrounding frons forming "bowl" (Figs. 5,7); foretibia lacking a prominent apical spur..... 4
- 4 Vertex smooth (Figs. 4,5); smaller species. (*Uncommon structural pest (moderate moisture requirement), known from St. Johns Co. south*)
..... *Cryptotermes cavifrons*^a
- Vertex rough, wrinkled, often concave (Figs. 6,7); larger species. (*Introduced species; common pest of structures and furniture statewide; never found in non-structural wood - West Indian powderpost termite.*)
..... *Cryptotermes brevis*
- 5 Eyespot (Fig. 9a) black; antennae with up to 19 segments; third antennal segment about as long as fourth and fifth combined; soldiers usually large (Figs. 8,9). (*Occasional pest in moisture-exposed wood, known from Ft. Pierce south*)..... *Neotermes jouteli*^b
- Eyespot hyaline or indistinct; number and size of antennal segments variable, soldier size variable..... 6
- 6 Third antennal segment greatly enlarged and club-like, as long or longer than fourth through sixth combined, and about twice as wide as fourth (Figs. 10,11,S1); larger species. (*Regularly introduced into Florida as a structural pest, may be permanently established in some areas - western drywood termite*) *Incisitermes minor*
- Third antennal segment shorter than fourth through sixth combined and less than twice as wide as fourth..... 7
- 7 Anterior margin of pronotum weakly and evenly concave; length of third antennal segment less than fourth and fifth combined (Figs. 12-15) 8
- Anterior margin of pronotum incised (Figs. 16,18,20); length of third antennal segment about equal to or greater than fourth and fifth combined (Figs. S3,S5) 9
- 8 Pronotum more than twice as wide as long, collar-like, posterior margin with rounded corners; third antennal segment equal to or slightly longer than second or fourth; lateral margins of mandibles widen near bases but do not constitute "humps"; large species (Figs. 12,13). (*Occasional pest in moisture-exposed wood and living trees, known from Lake Co. south.*) *Neotermes castaneus*^c
- Pronotum more square, less than twice as wide as long, posterior margin nearly straight with square corners; third antennal segment longer than second but shorter than fourth and fifth combined; lateral margins of mandibles with distinct "humps" near bases; medium-small species (Figs. 14,15). (*Uncommon structural pest, known from Sarasota north.*)
..... *Kalotermes approximatus*
- 9 Small species; antennae with 10-11 segments; pronotum about 1 mm wide, posterior margin rather evenly convex (Figs. 16,17). (*Known only from Florida Keys, pest status unknown*) *Incisitermes milleri*^f
- Medium species; antennae with 11-16 segments; pronotum 1.3-1.9 mm wide, posterior margin more straight or slightly concave in middle, corners rounded (Figs. 18,20) 10
- 10 Tip of labrum bluntly pointed (Fig. S2); third antennal segment as long as fourth and fifth combined (Fig. S3); antennae with 11-14 segments (Figs. 18,19). (*Common in structural wood statewide - southeastern drywood termite*)..... *Incisitermes snyderi*
- Tip of labrum truncate (Fig. S4); third antennal segment longer than fourth and fifth combined (Fig. S5); antennae with up to 16 segments (Figs. 20,21). (*Rare structural pest, known mostly from coastal south*) ...



Figs. 10-17. Dorsal and lateral views of heads and pronota of termite soldiers from Florida: *Incisitermes minor*, Figs. 10-11; *Neotermes castaneus*, Figs. 12-13; *Kalotermes approximatus*, Figs. 14-15; *Incisitermes milleri*, Figs. 16-17. Bar = 2 mm.

..... *Incisitermes schwarzzi*
 11 Teeth on inner margin of mandibles reduced to serrations at base and so usually hidden from view by labrum; head capsule not elliptical when viewed laterally (Figs. 24-33). Family Rhinotermitidae 12



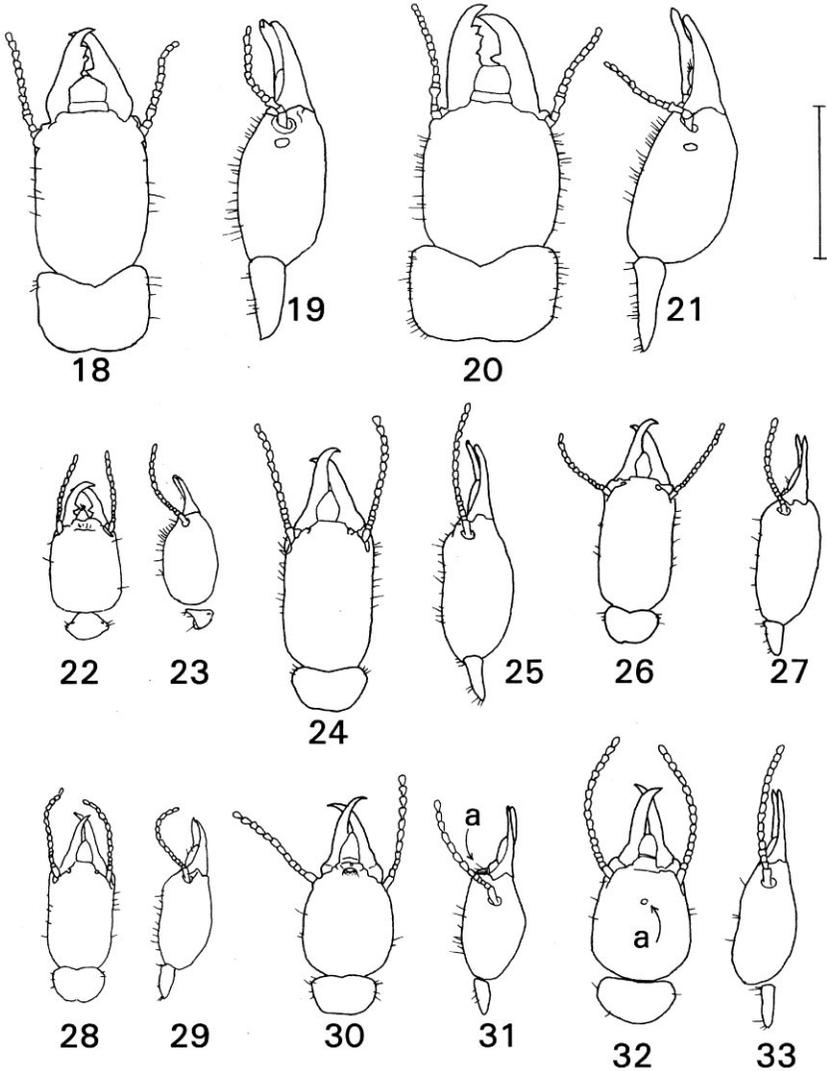
Figs. S1-S7. Scanning electron micrographs of *Incisitermes minor* soldier antenna, Fig. S1; *I. snyderi* soldier labrum, Fig. S2, and antenna, Fig. S3; *I. schwarzi* soldier labrum, Fig. S4 (mandible tips broken), and antenna, Fig. S5; *Reticulitermes virginicus* soldier mandibles, Fig. S6; *R. hageni* soldier mandibles, Fig. S7.

- One prominent triangular tooth on inner margin of each sickle-shaped mandible, head capsule elliptical when viewed laterally (Figs. 22,23); smallest soldier caste in Florida. Family Termitidae. (*Occasionally associated with structural lumber; known from west central Florida - Florida dark-winged subterranean termite*)..... *Amitermes floridensis*^a
- 12 Head outline rectangular from above, sides of head parallel (Figs. 24,26,28). (*Reticulitermes spp*)..... 13
- Head outline oval or egg-shaped from above, narrowing in front, sides of head convex (Figs. 30,32)..... 15
- 13 Pronotum width usually greater than 0.90 mm; head length with mandibles equal to or greater than 2.8 mm; points of mandibles, especially left, curved inward about 70-90° (Figs. 24,25). (*Widespread pest throughout state - eastern subterranean termite.*)..... *Reticulitermes flavipes*
- Pronotum width usually less than 0.85 mm; head length with mandibles less than or equal to 2.7 mm; curvature of mandible points 45-90° 14
- 14 Larger species (Figs. 26,27), pronotum width greater than 0.70 mm; points of mandibles, especially left, curved inward about 70-90°, points of mandibles broader (Fig. S6) than following species; basal serrations of left mandible, when exposed for viewing, more prominent (Fig. S6); distinct and gradual inward curvature of blade of right mandible (Fig. S6). (*Widespread pest throughout state - dark southern subterranean termite*)..... *Reticulitermes virginicus*
- Smaller species (Figs. 28,29), pronotum width less than or equal to 0.70 mm; points of mandibles, especially left, curved inward about 45°, points more slender (Fig. S7) than above species; basal serrations of left mandible, when exposed for viewing, less prominent (Fig. S7); blade of right mandible more straight before point (Fig. S7). (*Less common in structures statewide - light southern subterranean termite*).....
..... *Reticulitermes hageni*
- 15 Fontanelle consisting of a prominent, oval, anterior-facing opening arising from a mound on vertex and frons (Figs. 30,31a). (*Introduced species common in or near structures in certain areas of Broward, Dade, Hillsborough, and Orange Cos., and coastal panhandle - Formosan subterranean termite.*)..... *Coptotermes formosanus*
- Fontanelle consisting of a minute, circular, dorsal-facing opening on surface of vertex (Figs. 32a, 33). (*Occasionally in structures in Broward and Dade Cos. - Florida "dampwood" termite*).....
..... *Prorhinotermes simplex*^a

KEY TO WINGED ADULT TERMITES OF FLORIDA

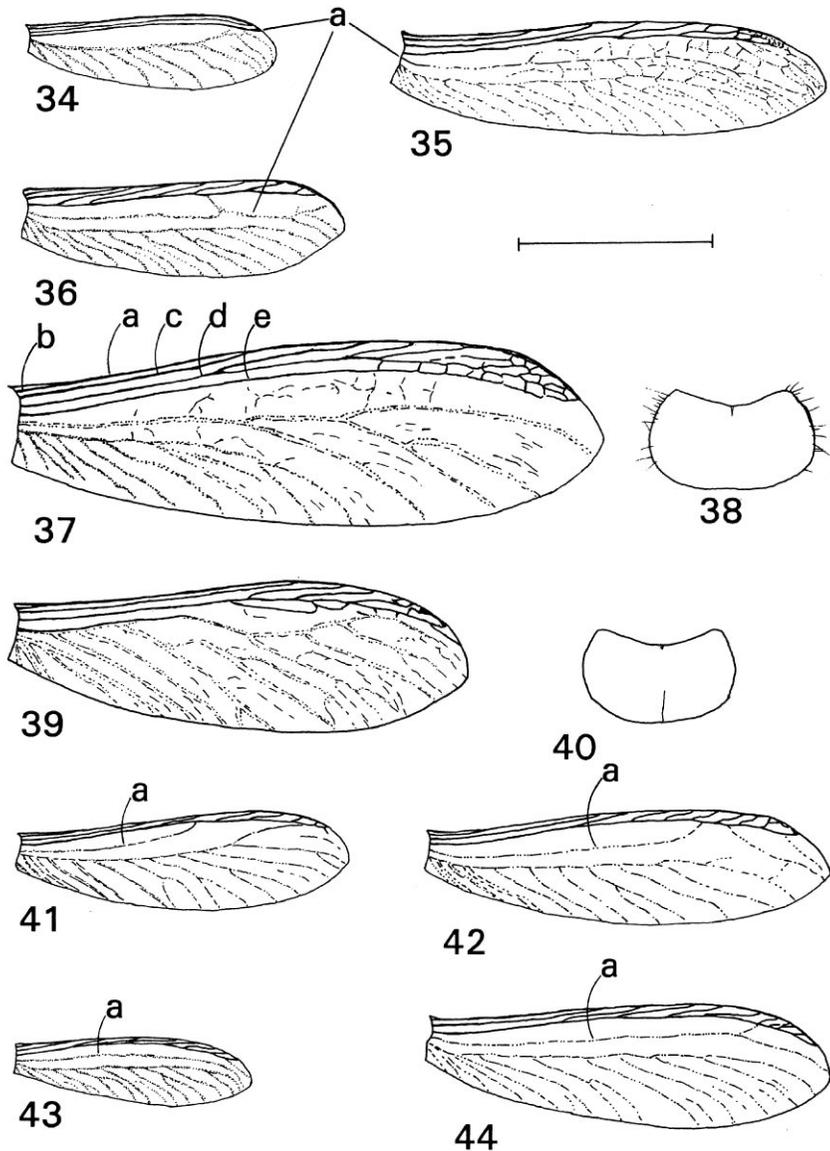
- 1 With wing unfolded and flattened between glass plates, three or more sclerotized veins in costal field (costal margin, subcosta, radius, radial sector, and, in some, median, e.g., Fig. 37a,c-e and Fig. 45a-c) at about one-third wing length from wing suture; in most species, numerous diagonal cross veins connecting two or more remaining veins in costal field along remaining length of wing (Figs. 34,35-37, 39,41-45). (*Drywood and true dampwood termites*)..... 2
- Two sclerotized veins in costal field (costal margin and radial sector, e.g., Fig. 46a-b) in foremargin of wings visible along entire length of wing

- and, in most species, connected by short vertical cross veins in distal third of wing (Figs. 46-48,50,52,54). (*Subterranean termites*)..... 10
- 2 When viewed over white background or with several wings overlapping as when folded over the abdomen, entire wing membrane translucently pigmented blackish; veins in costal field darker than membrane 3



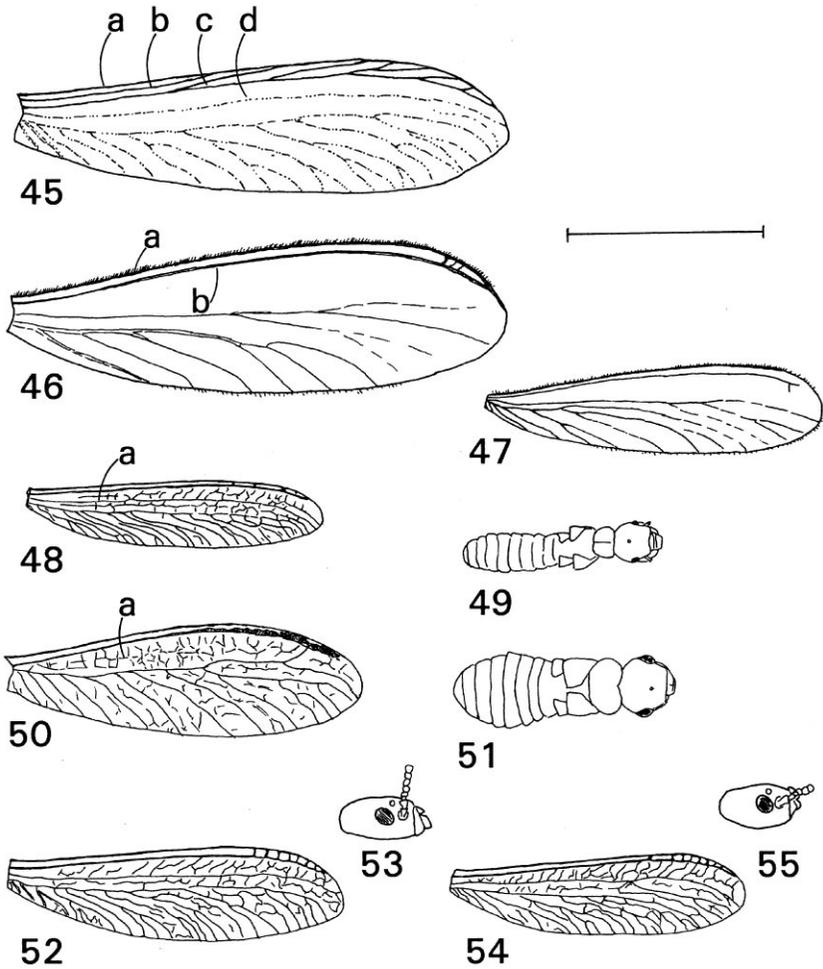
Figs 18-33. Dorsal and lateral views of heads and pronota of termite soldiers from Florida: *Incisitermes snyderi*, Figs. 18- 19; *I. schwarzi*, Figs. 20-21; *Amitermes floridensis*, Figs. 22-23; *Reticulitermes flavipes*, Figs. 24-25; *R. virginicus*, Figs. 26-27; *R. hageni*, Figs. 28-29; *Coptotermes formosanus*, Figs. 30-31 (fontanelle 31a); *Prorhinotermes simplex*, Figs. 32-33 (fontanelle 32a). Bar = 2 mm.

- Wing membrane unpigmented or very faintly yellow-brown, veins in costal field white to medium brown when viewed as above 5
- 3 In forewing, median vein is sclerotized and runs near veins in costal field (Fig. 34a), no diagonal cross veins connecting veins in costal field; wing membrane with distinct papillae or bumps; length with wings 7 mm. (*Rare in structures, known from Clay Co. to Sebring, midday flights March to May.*)..... *Calcaritermes nearcticus*^a
- In forewing, median vein is unsclerotized and runs midway between veins in costal field above, and cubitus below; diagonal cross veins between sclerotized veins in costal field (Figs. 35,36)..... 4
- 4 Head and pronotum orange-brown, abdomen dark brown; stout-bodied, medium-large species, length with wings 11-12.5 mm; hairs on head shorter than diameter of eye; arolium absent between tarsal claws; in forewing, few diagonal cross veins branching forward from radial sector (Fig. 35). (*Regularly introduced into Florida as a structural pest, may be permanently established in some areas, midday flights September to November - western drywood termite.*) *Incisitermes minor*
- Head, thorax, and abdominal tergites (plates) reddish brown; medium-small species, length with wings 8.5-10 mm; hairs on head longer than diameter of eye; arolium present between tarsal claws; in forewing, few cross veins branching forward from median vein (Fig. 36a). (*Uncommon in structures, from Sarasota north, daytime flights September to November*)..... *Kalotermes approximatus*
- 5 In forewing, four sclerotized veins in costal field (costal margin, radius, radial sector, and median, e.g., Fig. 37a, c-e, respectively) at about one-third wing length from body; sclerotized media running close to radial sector (Figs. 37,39); large, stout-bodied species. 6
- In forewing, three sclerotized veins in costal field (costal margin, radius, and radial sector, e.g., Fig. 45a-c, respectively) at about one-third wing length from body, media (Fig. 45d) not sclerotized and running midway between radial sector and cubitus (Figs. 41-45); size variable. 7
- (*Powderpost and drywood termites*) 7
- 6 Head, body, and veins in costal field chestnut brown; long erect hairs on head and pronotum (Fig. 38); largest alate caste in Florida, length with wings about 15-16 mm (forewing, Fig. 37). (*Occasional pest in moisture-exposed wood and living trees, known from Lake Co. south, evening flights peak in October and November.*) *Neotermes castaneus*^a
- Head, body, and veins in costal field light yellowish-brown to reddish-brown; very short hairs on pronotum (Fig. 40); wing membrane very faintly yellow-brown; length with wings 12-15 mm (forewing, Fig. 39). (*Occasional pest in moisture-exposed wood, known from Vero Beach south, evening flights Spring or Fall.*) *Neotermes jouteli*^{a,b}
- 7 In forewing, unsclerotized media curving near mid-wing to join veins in costal field (Figs. 41a,42a; note variations in *C. brevis* forewing veination in Scheffrahn et al. (1988, Fig. 2.); head and body brown..... 8
- In forewing, unsclerotized media running to near tip of wing even if branched along its course (Figs. 43a,44a,45d)..... 9
- 8 Small dull-brown species, length with wings 8-9 mm, wing membrane weakly tuberculate (pimply); head width (through eyes) 0.85-0.97 mm;



Figs. 34-44. Right forewing of termite adults from Florida: *Calcaritermes nearcticus*, Fig. 34 (median vein 34a); *Incisitermes minor*, Fig. 35 (median vein 35a); *Kaloterme approximatatus*, Fig. 36 (median vein 36a); *Neoterme castaneus*, Fig. 37 (costal margin 37a, subcostal vein 37b, radius 37c, radial sector 37d, and media 37e); and dorsal view of pronotum, Fig. 38; *N. jouteli*, Fig. 39, and dorsal view of pronotum, Fig. 40; *Cryptoterme cavifrons*, Fig. 41 (median vein 41a); *C. brevis*, Fig. 42 (median vein 42a); *Incisiterme milleri*, Fig. 43 (median vein 43a); *I. snyderi*, Fig. 44 (median vein 44a). Bar = 4 mm for forewings, 2.4 mm for pronota.

- antennae with 13-16 segments (forewing, Fig. 41). (*Uncommon structural pest (moderate moisture requirement), known from St. Johns Co. south, evening flights year-round.*) *Cryptotermes cavifrons*
- Medium dull-brown species, length with wings 10-11 mm; head width 1.05-1.15 mm; antennae with 14-18 segments (forewing, Fig. 42). (*Introduced species, common pest of structures and furniture statewide, never found in non-structural wood, evening and night flights April to July - West Indian powderpost termite*)..... *Cryptotermes brevis*
- 9 Head, thorax, and body dark brown; veins in costal field brown, wing membrane tuberculate; head width (through eyes) about 0.9 mm; ocellus more elliptical; small species, length with wings 7-8 mm; (forewing, Fig. 43). (*Known only from Florida Keys, pest status unknown, daytime flights April to July*) *Incisitermes miller*
- Head and body color pale yellow-brown to pale reddish brown; veins in costal field pale yellow-brown in distal half of wing; head width 1.20-1.35 mm; ocellus more round; medium species, length with wings 11-12 mm (forewing, Fig. 44). (*Common in structures statewide, evening flights May to August - southeastern drywood termite.*)
..... *Incisitermes snyderi*
- Head and body color medium brown; veins in costal field brown along entire length of wing; head width 1.40-1.52 mm; ocellus more elliptical; medium-large species, length with wings 13-15 mm (forewing, Fig. 45). (*Rare structural pest, known mostly from coastal south, small evening or night flights except during winter; peaking in April and May*)
..... *Incisitermes schwarz*
- 10 Wing membrane smooth between veins; wing surface and margin adorned with fine hairs (Figs. 46,47) 11
- Wing membrane net-like (reticulate) between veins, no hairs on wing surface or margin (Figs. 48,50,52,54) 12
- 11 Head and pronotum yellow-brown; wing membrane unpigmented; veins in costal field (Fig. 46a,b) yellowish brown at base to almost white at tip; large species, length with wings about 14 mm (forewing, Fig. 46). (*Introduced species common in or near structures in certain areas of Broward, Dade, Hillsborough, and Orange Cos., and coastal panhandle, late afternoon and evening flights April to July- Formosan subterranean termite*)
..... *Coptotermes formosanus*
- Head and pronotum dark brown; wing membrane dark with black interior veins (Fig. 47); small species with wings long in proportion to body length; length with wings about 9 mm. (*Occasional structural and outdoor nuisance (large swarms), known from west central Florida, daytime flights following rain June to September - Florida dark-winged subterranean termite (Family Termitidae)*).....
..... *Amitermes floridensis*
- 12 Body color pale brown to light reddish brown 13
- Body color dark brown to black 14
- 13 Forewing not broad in middle, costal margin not convex, median vein runs uninterrupted below veins in costal field (Fig. 48a); thorax and abdomen narrow (Fig. 49); small species, length with wings 7-8 mm. (*Less common in structures statewide, midday flights in sunshine December to April - light southern subterranean termite.*)
..... *Reticulitermes hageni*



Figs. 45-55. Right forewing of termite adults from Florida: *I. schwarzi*, Fig. 45 (costal margin 45a, radius 45b, radial sector 45c, and media 45d); *Coptotermes formosanus*, Fig. 46 (costal margin 46a and radial sector 46b); *Amitermes floridensis*, Fig. 47; *Reticulitermes hageni*, Fig. 48 (median vein 48a), and dorsal view of body, Fig. 49; *Prorhinotermes simplex*, Fig. 50 (median vein 50a), and dorsal view of body, Fig. 51; *R. flavipes*, Fig. 52, lateral view of head, Fig. 53; *R. virginicus*, Fig. 54, lateral view of head, Fig. 55. Bar = 4 mm for forewings, 2.4 mm for heads and bodies.

- Forewing broad in middle, costal margin convex, median vein disjointed, indistinct (Fig. 50a); thorax and abdomen broader than above (Fig. 51); medium-small species, length with wings 9-10 mm. (Occasionally in structures in Broward and Dade Cos., evening and night flights October to January - Florida "dampwood" termite.) *Prorhinotermes simplex*²

- 14 Medium-small species, length with wings 8.5-10.5 mm; ocellus about one time its diameter or more from compound eye (Fig. 53); veins in costal field of wing light brown, membrane faintly yellow-brown (forewing, Fig. 52). (*Widespread pest throughout state, midday flights in sunshine January to April - eastern subterranean termite*)
 *Reticulitermes flavipes*
- Small species, length with wings 7.0-9.5 mm, usually 7.0-8.0 mm; ocellus less than its diameter from compound eye (Fig. 55); veins in costal field of wing whitish or hyaline except near base, membrane hyaline (forewing, Fig. 54). (*Widespread pest throughout state, midday flights in sunshine March to May - dark southern subterranean termite.*)
 *Reticulitermes virginicus*

FOOTNOTES FOR KEYS

- ^a In the United States, known only from Florida.
- ^b Indistinguishable from *Neotermes luykxi*. See introduction.
- ^c For additional characters see Hostettler et al. (1995).

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