

Dark Southern Drywood Termite (suggested common name) *Kalotermes approximatus* Snyder (Insecta: Isoptera: Kalotermitidae)¹

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Introduction

The termite genus *Kalotermes* was first described and named by Hagen (1853) (Krishna et al. 2013). The type species for *Kalotermes* is *Termes flavicolle* Fabricius, a species that is now known as *Kalotermes flavicollis* (Fabricius) (Fabricius 1793; Krishna et al. 2013). Based on Krishna et al. (2013), there are a total of twenty living species and seven fossil species of *Kalotermes* that have been described.

Extant *Kalotermes* species are present in many areas within temperate and subtropical zones throughout the globe. These areas include, but are not limited to: Australia, Bermuda, the southeastern United States, Tasmania, New Zealand, South Africa, Algeria, Egypt, Greece, Syria, France, Italy, Israel, Portugal, Spain, Turkey, Chile, Peru, Madagascar, and Sri Lanka (Krishna et al. 2013). Among all extant and extinct species of *Kalotermes*, two species in particular have garnered more attention within entomological literature when compared to other *Kalotermes* species (Krishna et al. 2013). Those species are *Kalotermes flavicollis* and *Kalotermes approximatus* Snyder (Krishna et al. 2013).

Distribution and History

Kalotermes approximatus was first described and named by Snyder (1920) based on specimens collected in Ortega, Florida, on March 5th, 1919. To date, *Kalotermes approximatus* has been found within Florida, Georgia, Louisiana, Texas, Virginia, North Carolina, South Carolina, and Bermuda (Snyder 1925; Weesner 1965; Araujo 1977; Scheffrahn et al. 1988; Scheffrahn et al. 1994; Nalepa 1998; Hathorne et al. 2001; Scheffrahn et al. 2001; Krishna et al. 2013) (Figure 1). Within the United States, *Kalotermes approximatus* is the only *Kalotermes* species that has been described to date (Krishna et al. 2013).

Within Florida, *Kalotermes approximatus* has been found in areas within central and northern Florida including but not limited to: Lake Kissimmee (Osceola County), Fruitland Park (Lake County), Gainesville (Alachua County), coastal Jacksonville (Duval County), and Tallahassee (Leon County) (Figure 2). *Kalotermes approximatus* may be undersampled within Florida and its overall range because of its low economic impact when compared to the economic impact of species such as *Cryptotermes brevis* (Walker) or *Coptotermes formosanus* Shiraki (Chouvenc et al. 2016).

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Figure 1. Localities for *Kalotermes approximatus* Snyder within Florida, Georgia, Louisiana, North Carolina, and Virginia. Each red dot present on the figure represents a single collection locality.

Credits: Rudolf H. Scheffrahn, data from University of Florida's termite collection

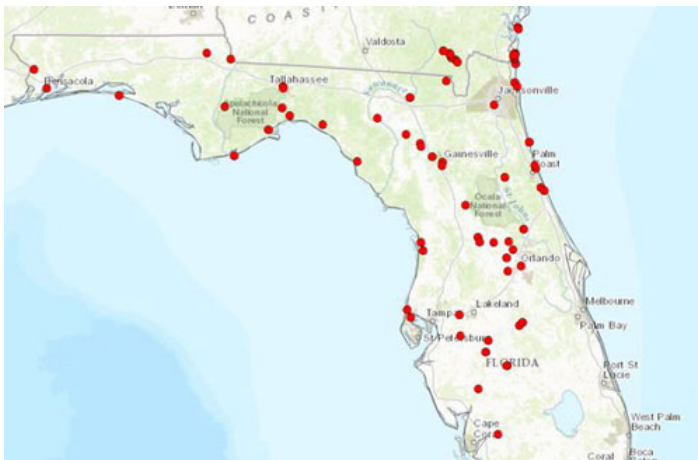


Figure 2. Localities for *Kalotermes approximatus* Snyder within Florida and southern Georgia. Each red dot present on the figure represents a single collection locality.

Credits: Rudolf H. Scheffrahn, data from University of Florida's termite collection

Identification

Soldiers

Similar to nearly all lower termite species, *Kalotermes approximatus* cannot be easily or reliably identified by examining members of the worker caste. Therefore, in order to identify *Kalotermes approximatus*, members of the soldier and/or reproductive caste must be examined.

Kalotermes approximatus soldiers are approximately 7.5 mm in length, described as medium-small size in comparison to other Kalotermitidae species present within their range, and exhibit morphological characters that are typically exhibited by species classified within

Kalotermitidae (Snyder 1920; Scheffrahn and Su 1994). These characters are a pronotum that is as wide or wider than the head capsule, and two or more marginal teeth visible on the interior margin of the left mandible (Snyder 1920; Scheffrahn and Su 1994) (Figure 3).

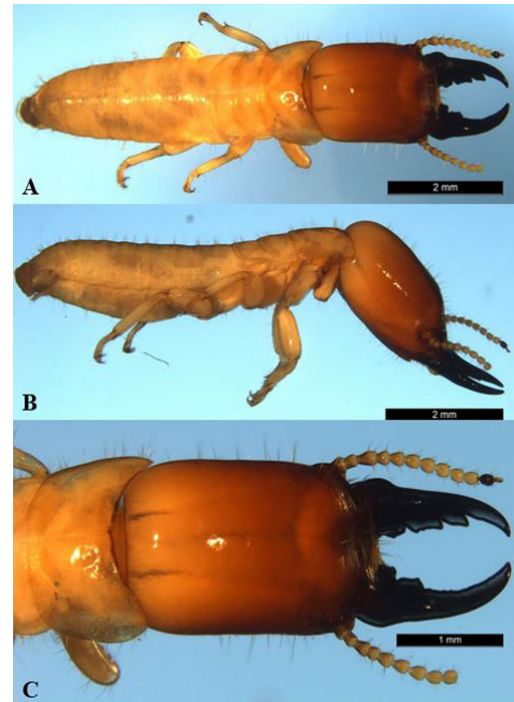


Figure 3. Dorsal view of a *Kalotermes approximatus* Snyder soldier (A). Lateral view of a *Kalotermes approximatus* soldier (B). Dorsal view of the pronotum and head capsule of a *Kalotermes approximatus* soldier (C).

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Kalotermes approximatus soldiers also exhibit morphological characters that are not present in all Kalotermitidae species. These characters include a third antennal segment that is longer than the second antennal segment but not as long as the fourth and fifth antennal segments combined, a straight or nearly straight posterior margin of the pronotum, an anterior margin of the pronotum that is not incised, approximately thirteen to fifteen antennal segments, and distinct humps or bumps near the posterolateral base of each mandible (Snyder 1920; Snyder 1925; Scheffrahn and Su 1994). Figure 4 depicts a *Kalotermes approximatus* soldier alongside a *Kalotermes flavicollis* soldier for comparison.

Alates

Kalotermes approximatus alates are approximately 8.5–10 mm in length with wings included, described as medium size in comparison to other Kalotermitidae species within their range, and exhibit morphological characters that are typically exhibited by species classified within Kalotermitidae (Snyder 1925; Scheffrahn and Su 1994). These

characters are three or more sclerotized veins visible in the costal margin, and multiple diagonal cross veins visible within the distal costal field (Snyder 1925; Scheffrahn and Su 1994) (Figure 5 and 8).



Figure 4. Dorsal view of a *Kalotermites approximatus* Snyder soldier (A) and a *Kalotermites flavicollis* soldier (Fabricius) (B). Credits: Joseph F. Velenovsky, University of Florida



Figure 5. Dorsal view of a *Kalotermites approximatus* Snyder alate (A). Lateral view of a *Kalotermites approximatus* alate (B). Ventral view of a *Kalotermites approximatus* alate (C). Credits: Joseph F. Velenovsky, University of Florida

Kalotermites approximatus alates also exhibit morphological characters that are not present in all Kalotermitidae species. These characters include the presence of an arolium between tarsal claws, head capsule setae that are longer than the diameter of the eye, approximately sixteen antennal segments, and limited cross veins that originate from the median vein (Snyder 1925; Scheffrahn and Su 1994) (Figure

6). *Kalotermites approximatus* alates may be reddish brown-dark reddish brown-black in coloration (Snyder 1925; Scheffrahn and Su 1994). Figure 7 depicts a *Kalotermites approximatus* alate alongside a *Kalotermites flavicollis* alate for comparison.

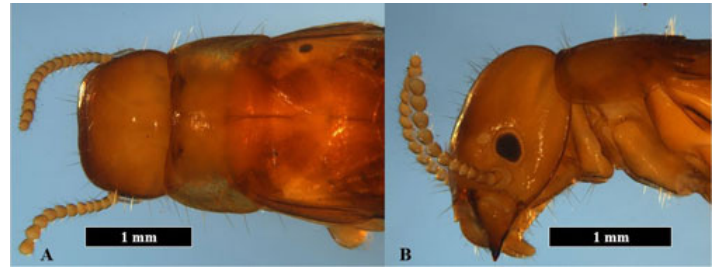


Figure 6. Dorsal view of the head capsule, pronotum, and first thoracic segment of a *Kalotermites approximatus* Snyder alate (A). Lateral view of the head capsule and pronotum of a *Kalotermites approximatus* alate (B).

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Figure 7. Dorsal view of a *Kalotermites approximatus* Snyder alate (left) and a *Kalotermites flavicollis* (Fabricius) alate (right). Note the characteristic coloration of the pronotum of the *Kalotermites flavicollis* alate pictured.

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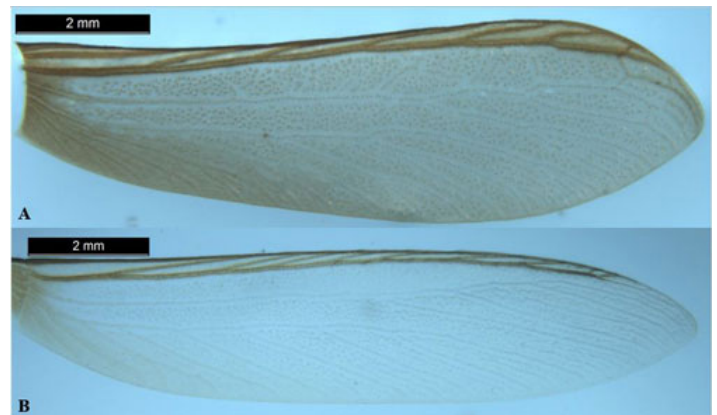


Figure 8. The right forewing of a *Kalotermites approximatus* Snyder alate (A). The right forewing of a *Kalotermites flavicollis* (Fabricius) alate (B). Credits: Joseph F. Velenovsky, University of Florida

Biology

Kalotermes approximatus, like all Kalotermitidae species, nest, feed, and live entirely within a single piece of wood (Eggleton 2011). In addition, similar to all Kalotermitidae species, *Kalotermes approximatus* colonies are composed of a reproductive caste (king, queen, and alates), a soldier caste, and a pseudergate (i.e., worker) caste (Eggleton 2011). *Kalotermes approximatus* alates have been observed swarming during the day (diurnal flights) from September to November (Scheffrahn and Su 1994). A few publications have reported *Kalotermes approximatus* alates diurnally swarming during times other than September–November (Snyder 1925; Nalepa 1998). The observed variability in swarming season for *Kalotermes approximatus* may be reflective of undersampling and/or the different climatic conditions throughout its range. For more information on general drywood termite biology, please see *Cryptotermes cavifrons* Banks and *Cryptotermes brevis* (Walker).

Throughout its range, *Kalotermes approximatus* has been found within a variety of different tree species. Snyder in 1919 found *Kalotermes approximatus* within dead stumps of sweetgum trees (*Liquidambar styraciflua* L.) located in Ortega, Florida (Snyder 1920). Additionally, in Florida, *Kalotermes approximatus* has been collected from a live black cherry tree (*Prunus serotina* Ehrh), a live pear tree (*Pyrus communis* L.), magnolia trees (*Magnolia* spp.), and oak trees (*Quercus* spp.) (Miller 1949; Hetrick 1961).

In North Carolina, *Kalotermes approximatus* has been found within the heartwood of a live red cedar tree (*Juniperus virginiana* L.), a black walnut tree (*Juglans nigra* L.), a white oak tree (*Quercus alba* L.), an elm tree (*Ulmus* sp.), sweetgum trees, and magnolia trees (Syren and Luykx 1981; Nalepa 1998). Snyder 1924 reported *Kalotermes approximatus* within a dead bald cypress tree (*Taxodium distichum* L.) located in Cape Henry, Virginia.

In South Carolina, *Kalotermes approximatus* has been found within dogwood trees (*Cornus* spp.), a maple tree (*Acer* sp.), a water tupelo tree (*Nyssa aquatica* L.), a sweetgum tree, a water oak tree (*Quercus nigra* L.), a laurel oak tree (*Quercus laurifolia* Michx.), a southern live oak (*Quercus virginiana* Mill.), and a post oak (*Quercus stellata* Wangenh.) (Hathorne et al. 2001).

Kalotermes approximatus, similar to most if not all *Kalotermitidae* species, is thought to be a generalist feeder (R. H. Scheffrahn, pers. comm.; Nalepa 1998). The number of tree species in which *Kalotermes approximatus* has been found is likely reflective of its generalist feeding behavior, wide

host range, and non-particularity in reference to host tree selection (R. H. Scheffrahn, pers. comm.; Nalepa 1998).

Pest Status

Kalotermes approximatus is classified as an uncommon structural pest, however, structural infestations of *Kalotermes approximatus* have been recorded within entomological literature (Scheffrahn and Su 1994; Potter 1997; Nalepa 1998). The uncommon structural pest status of *Kalotermes approximatus* may in part be explained by its higher moisture requirements relative to common drywood termite pest species such as *Cryptotermes brevis* (Collins 1969; Nalepa 1998). Active *Kalotermes approximatus* structural infestations should be contended with via standard drywood termite control methods. For more information on management of drywood termite structural infestations please see *Cryptotermes cavifrons* Banks and *Cryptotermes brevis* (Walker).

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