Family-Group Names for Termites (Isoptera)

MICHAEL S. ENGEL$^1$ AND KUMAR KRISHNA$^2$

ABSTRACT

Thirty-nine available family-group names are identified within the insect order Isoptera (termites). For all names the correct author, date, type genus, and combining stem are provided for the first time. This nomenclatural compilation is done to stabilize the usage of family-group names in the Isoptera in advance of a world catalog. Several problems of priority are identified and discussed. The little understood subfamily Foraminitermitinae is diagnosed; while generally believed by many authors to be a new, unnamed subfamily, it was in fact established by Holmgren nearly a century ago. The subfamilies Syntermitinae and Sphaerotermitinae are newly proposed for the mandibulate genera of nasute termites and for Sphaerotermitidae, respectively. The classification of Isoptera is briefly outlined.

INTRODUCTION

It has long been recognized that the current usage of family-group names in the classification of termites (Isoptera) is not fully in accord with the rules of zoological nomenclature (ICZN, 1999). Not only has the authorship and date of many names been incorrectly stated (e.g., by Snyder, 1949) and the Principle of Coordination (ICZN, 1999: Art. 36) ignored, but in many instances more critical issues of priority have not been followed, thereby jeopardizing the stability of termite classification. In fact, the numerous errors that appear in Snyder’s (1949) catalog have been perpetuated by subsequent authors, who, rather than checking the original literature and applying the rules of nomenclature, have lifted from Snyder or from other catalogs which were in turn derived from Snyder (e.g., Roonwal and Chhotani, 1989; Chhotani, 1997).

In our preparation of a revised catalog of

$^1$ Department of Ecology and Evolutionary Biology, and Division of Entomology, Natural History Museum, Snow Hall, 1460 Jayhawk Boulevard, University of Kansas, Lawrence, Kansas 66045–7523, e-mail: m.engel@ku.edu

$^2$ Division of Invertebrate Zoology, American Museum of Natural History; City College and the Graduate School, City University of New York. e-mail: krishn@amnh.org
the world termite fauna (Krishna and Engel, in prep.), we have gone to great lengths to attend to these nomenclatural difficulties (e.g., Engel and Krishna, 2001a, 2001b, in press a & b; Engel et al., 2003). In order to bring the usage of family-group names into accord with ICZN (1999) rules, we provide herein a catalog of all such names that have been applied in the Isoptera. This has been done to correct the various circulating errors, to highlight the most egregious problems, and to lay a standardized foundation for the forthcoming catalog. In addition, we have provided systematic descriptions for three subfamilies (two new), which are otherwise not employed by isopterists today but must be validated prior to the publication of the catalog (Krishna and Engel, in prep.). We have also included those published names that are otherwise unavailable at the end of the listing of available names. It must be noted that additional unavailable names have been used on internet sites and employed by GenBank, but none of these have met the criteria of valid publication. While being unavailable, like the three Holmgren names considered below, these names have not been published in the sense defined by the ICZN (1999) (unlike Holmgren’s names which were published in accordance with the ICZN) and are therefore excluded from this study.

**TAXONOMIC CATALOG**

Below we list in order of priority all family-group names proposed for termites. The names are presented in their original forms, regardless of present day rank or suffix. The type genus is provided along with the correct combining stem for composing a family-group name. Daggers (†) indicate names proposed for fossil taxa. Some names were believed to have been nomina nuda by Snyder (1949) when they were first proposed; however, prior to 1931 family-group names could be made available by simple formation from an available genus-group name (ICZN, 1999: Art. 12.2.4) and need not have had a formal description.

**AVAILABLE NAMES**

1. Termitina Latreille, 1802: 293. Type genus: *Termes* Linnaeus, 1758. Combining stem: *Termi*–. Note: Latreille (1805, 1810) subsequently changed the name of his “famille” to Termitinae but the name was made available in 1802 (ICZN, 1999: Art. 11.7).

2. Calotermitinae Froggatt, 1897: 516. Type genus: *Kalotermes* Hagen, 1853 [*Calotermes* Hagen, 1858 is an unjustified emendation; see Engel and Krishna, 2001a; ICZN, 2002]. Name emended to Kalotermitinae Froggatt, 1897, in accordance with ICZN (1999: Art. 29.1). Combining stem: Kalotermit–.


4. Rhinotermitinae Froggatt, 1897: 518. Type genus: *Rhinotermes* Hagen, 1858. Combining stem: Rhinotermit–.


8. Stolotermitinae Holmgren, 1910a: 285. Type genus: *Stolotermes* Hagen, 1858. Combining stem: Stolotermit–. Note: This name unfortunately has priority over Termopsidae Holmgren, 1911, a fact discovered too late to be included in the petition to conserve Termopsis and Termopsidae relative to Mastotermitidae (Engel et al., 2003). Therefore, a second petition was prepared to the ICZN to conserve Termopsidae relative to Stolotermitidae (Engel and Krishna, in press a), since it would be destabilizing for nomenclature to use Stolotermitidae in place of what is today referred to as Termopsidae.


12. Termitogetoninae Holmgren, 1910a:
286. Type genus: Termitogeton Desneux, 1904b. Combining stem: Termitogeton–.


14. Eutermitinae Holmgren, 1910b: 146. Type genus: Eutermes Heer, 1849. Combining stem: Eutermit±. Note: This name has priority over Nasutitermitinae, despite the synonymy of its type genus with Nasutitermes (ICZN, 1999: Art. 40.1). Eutermes should also take precedence over Nasutitermes, compounding the confusion. Use of Eutermitinae in place of Nasutitermitinae, however, would be destabilizing for termite nomenclature. A petition to the ICZN has been prepared to conserve Nasutitermes and Nasutitermitinae (Engel and Krishna, in press b). Current usage should be maintained until an authoritative decision is rendered.


21. Acanthotermitinae Sjöstedt, 1926: 8. Type genus: Acanthotermes Sjöstedt, 1900. Combining stem: Acanthotermit±. Note: This name has priority over Macrotermitinae; however, a petition has been submitted to conserve the usage of Macrotermitinae (Engel and Krishna, 2001b), which has been approved by the ICZN (2003). Macrotermitinae is to be used whenever Macrotermes and Acanthotermes are placed into the same family-group taxon.


24. Miro-capritermitinae Kenner, 1934: 166. Type genus: Mirocapritermes Holmgren, 1914. Combining stem: Mirocapritermit±. Note: Although Kenner (1934) hyphenated the name in its original spelling, the ICZN (1999) does not allow hyphenation and the family-group name must be considered a single word.


36. *Carinatermitinae* Krishna and Gri-


**Unavailable Names**

Some authors (e.g., Banks, 1920; Roonwal and Chhotani, 1989) have erroneously equated the following three names with some of the present families or subfamilies. All three are unavailable and therefore do not enter into zoological nomenclature and should not be used.

1. \textit{Metatermitidae} Holmgren, 1909: 99. Unavailable, as it was not based on an available genus-group name (ICZN, 1999: Art. 11.7.1.1).

2. \textit{Mesotermitidae} Holmgren, 1909: 100. Unavailable, as it did not include \textit{Mesotermes} Haase, 1890 (ICZN, 1999: Art. 11.7.1.1) and was therefore not based on a genus-group name. Note: This name was proposed as new again in Holmgren (1910a) and Holmgren (1910b). [\textit{Mesotermes} was an available genus-group name at that time, but recognized by Handlirsch (1906) as a neuropteran and not a termite. Holmgren (1909, 1910a) clearly did not intend this name to be based on the fossil neuropteran \textit{Mesotermes} but established it instead for a series of explicitly included, living termite genera (see Holmgren, 1910a, 1910b), which he believed to occupy an intermediate phylogenetic position in his scheme of termite relationships; thus, \textit{Mesotermes} was not included by inference of the generic stem of \textit{Mesotermitidae} (ICZN, 1999: Art. 11.7.1.1) and the name was never made available.]

3. \textit{Protermitidae} Holmgren, 1909: 100. Unavailable, as it was not based on an available genus-group name (ICZN, 1999: Art. 11.7.1.1). Note: This name was proposed as new again in Holmgren (1910a) and Holmgren (1910b). [A genus-group name, \textit{Protermes}, was not proposed until 1910, at which time Holmgren (1910a) did not include \textit{Protermes} in his \textit{Protermitidae}, placing it instead in \textit{Metatermitidae} (in fact, \textit{Protermes} was never included in \textit{Protermitidae}). \textit{Protermitidae} was used exclusively for what Holmgren considered to be the basal termites. Thus, \textit{Protermitidae} was not subsequently validated in the later publications of Holmgren.]

**Systematic Descriptions**

Below we provide descriptions for three little understood subfamilies of \textit{Termitidae}, one hitherto little understood and two new. The \textit{Foraminitermitinae} was originally proposed by Holmgren (1912) but has not been generally recognized. The genera \textit{Foraminitermes} and \textit{Labritermes}, however, have increasingly been recognized as distinctive and worthy of exclusion from \textit{Termitinae} (e.g., Krishna, 1963; Noirot, 2001; Bitsch and Noirot, 2002), where they had been placed. The subfamily is characterized here to make its diagnostic characters more widely understood. Similarly, the mandibulate genera of the nasute termites are excluded from \textit{Nasutitermitinae} and a new subfamilial name is required to accommodate this group (proposed as \textit{Syntermitinae}, below). Lastly, \textit{Sphaerotermites} is excluded from the \textit{Macrotermitinae} owing to a unique combination of plesiomorphic and apomorphic traits (see below).

Subfamily \textbf{Foraminitermitinae} Holmgren

\textit{Foraminitermitinae} Holmgren, 1912: 5. Type genus: \textit{Foraminitermes} Holmgren, 1912.

Combining stem: Foraminitermit\textpm.

**Diagnosis** [Derived from Krishna and Adams (1982)]: \textbf{Imago}. Head densely pilose; fontanelle punctiform, situated at tip of a cornical projection. Forecoxa with longitudinal ridge, without protuberance; tibial spurs 3–2–2. \textbf{Soldier}. Left mandible with upper, inner cutting edge finely serrated, and with blunt teeth appearing as crenulations below serrations; right mandible smooth, without teeth, base of molar region with one or
TABLE 1
Hierarchical Outline of Termite Classification
All family-group names indicated; synonymic names italicized.

<table>
<thead>
<tr>
<th>Order ISOPTERA Brullé, 1832</th>
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<tbody>
<tr>
<td>Family Mastotermitidae Desneux, 1904a</td>
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<tr>
<td>Family Kalotermitidae Froggatt, 1897</td>
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<tr>
<td>= Glyptotermitinae Froggatt, 1897</td>
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<tr>
<td>= †Electrotermitinae Emerson, 1942</td>
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<tr>
<td>Family Hodotermitidae Desneux, 1904a</td>
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<tr>
<td>Subfamily †Carinatermitinae Krishna and Grimaldi, 2000</td>
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<tr>
<td>Subfamily †Lutetitermitinae Schlüter, 1889</td>
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<tr>
<td>Subfamily Hodotermitinae Desneux, 1904a</td>
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<tr>
<td>Family Termopsidae Holmgren, 1911*</td>
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<tr>
<td>Subfamily †Cretatermitinae Emerson, 1968</td>
</tr>
<tr>
<td>Subfamily Porotermitinae Emerson, 1942</td>
</tr>
<tr>
<td>Subfamily Stolotermitinae Holmgren, 1910a [status: Engel and Krishna, in press]*</td>
</tr>
<tr>
<td>Subfamily Termopsinae Holmgren, 1911</td>
</tr>
<tr>
<td>Family Rhinotermitidae Froggatt, 1897</td>
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<tr>
<td>Subfamily †Archeorhinoitermitinae Krishna and Grimaldi, 2003</td>
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<tr>
<td>Subfamily Coptotermitinae Holmgren, 1910a</td>
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<td>= Leucotermitinae Holmgren, 1910a</td>
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<tr>
<td>Subfamily Prorhinoitermitinae Quinnecdy and Deligne, 1975</td>
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<td>Subfamily Psammotermitinae Holmgren, 1911</td>
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<td>Subfamily Stylotermitinae Holmgren and Holmgren, 1917</td>
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<tr>
<td>Subfamily Terminotermitinae Holmgren, 1910a</td>
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<td>Subfamily Rhinotermitinae Froggatt, 1897</td>
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<tr>
<td>Family Serriptermitidae Holmgren, 1910a</td>
</tr>
<tr>
<td>Family Termitidae Latreille, 1802</td>
</tr>
<tr>
<td>Subfamily Apicotermitinae Grassé and Noirot, 1954 [1955]</td>
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<tr>
<td>= Indotermitidae Roomwal and Sen Sarma in Roomwal, 1958</td>
</tr>
<tr>
<td>Subfamily Foraminitermitinae Holmgren, 1912</td>
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<tr>
<td>Subfamily Sphaerotermitinae Engel and Krishna, new subfamily</td>
</tr>
<tr>
<td>Subfamily Macrotermitinae Kemner, 1934</td>
</tr>
<tr>
<td>= Acanthotermitinae Sjöstedt, 1926 [see ICZN (2003) for priority]</td>
</tr>
<tr>
<td>Subfamily Syntermitinae Engel and Krishna, new subfamily</td>
</tr>
<tr>
<td>Subfamily Nasutitermitinae Hare, 1937*</td>
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<tr>
<td>= Eutermitinae Holmgren, 1910b [status: Engel and Krishna, in press]*</td>
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<tr>
<td>Subfamily Termitinae Latreille, 1802</td>
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<td>= Microcerotermitinae Holmgren, 1910b</td>
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<td>= Pseudomicrotermitinae Holmgren, 1912</td>
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<td>= Mirotermitini Weidner, 1956</td>
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<td>= Capritermitini Weidner, 1956</td>
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*† Fossil taxon.
* These names have problems of priority associated with them (e.g., Eutermitinae has priority over Nasutitermitinae; Stolotermitinae has priority over Termopsidae), and petitions for conservation of current usage have been made to the ICZN (Engel and Krishna, in press a & b). Present usage should be maintained until an authoritative opinion is rendered by the ICZN.
two very tiny, pointed, thornlike spines or projections. Labrum with hyaline tip. **Worker.** Gut with mixed segment absent; four malpighian tubules separately attached at transverse mesenteron-proctodeum junction, extending forward for short distance and then looping around toward hindgut; malpighian tubules swollen basally; first proctodeal segment (P_1) tubular and narrow proximally, almost same diameter as midgut, and dilated and saclike distally, with malpighian tubules forming jumbled mass (≈ pseudomalpighian knot of Noirot, 2001; Bitsch and Noirot, 2002).

**INCLUDED GENERA:** Foraminitermes Holmgren, 1912 and Labritermes Holmgren, 1914.

**COMMENTS:** This group was first recognized by Holmgren (1912), who had difficulty placing it with any other group of Termitinae (referring to it also as the “Foraminitermes-reihe”) (also recognized as distinctive by other authors; e.g., Krishna, 1963; Krishna and Adams, 1982; Noirot, 2001). Noirot (2001) suggested that Foraminitermes belonged to a new subfamily, while a family-group name had already been proposed for it nearly a century ago.

**SYNTERMITINAE,** new subfamily

**TYPE GENUS:** Syntermes Holmgren, 1909 (not 1910a as cited by Snyder, 1949; Constantino, 1995, 1998; and other authors).

**DIAGNOSIS:** Imago. Head with light, small, punctiform fontanelle. Labrum uniformly sclerotized, transparent; postclypeus with median line. **Soldier.** Head with sides rounded; inconspicuous fontanelle present in middle of head. Labrum with sides rounded, with hyaline point. Left mandible with a few serrations and blunt tooth near base; right mandible with inner cutting-edge smooth. Pronotum much narrower than head; anterior and lateral margins even, without projecting spines. **Worker.** Right mandible with 6–7 ridges on molar plate. Labrum uniformly sclerotized (Sands, 1998: lacking the transverse apical band of sclerotization seen in Macrotermitinae, e.g., Donovan et al., 2000); postclypeus strongly convex, with distinct median line. Gizzard with small pulvilli attached posteriorly on columns, crenulated crests of columns I and II poorly developed; setae of pulvilli poorly developed (Noirot, 2001). Conspicuous, backward-oriented bristles at the P_3-P_4 (paunch-colon) junction (Noirot, 2001) (unique among the Isoptera).

**INCLUDED GENERA:** Includes only Sphaerotermes Holmgren, 1912.

**SPHAEROTERMITINAE,** new subfamily

**TYPE GENUS:** Sphaerotermes Holmgren, 1912.

**DIAGNOSIS:** Imago. Head with light, small, punctiform fontanelle. Labrum uniformly sclerotized, transparent; postclypeus with median line. **Soldier.** Head with sides rounded; inconspicuous fontanelle present in middle of head. Labrum with sides rounded, with hyaline point. Left mandible with a few serrations and blunt tooth near base; right mandible with inner cutting-edge smooth. Pronotum much narrower than head; anterior and lateral margins even, without projecting spines. **Worker.** Right mandible with 6–7 ridges on molar plate. Labrum uniformly sclerotized (Sands, 1998: lacking the transverse apical band of sclerotization seen in Macrotermitinae, e.g., Donovan et al., 2000); postclypeus strongly convex, with distinct median line. Gizzard with small pulvilli attached posteriorly on columns, crenulated crests of columns I and II poorly developed; setae of pulvilli poorly developed (Noirot, 2001). Conspicuous, backward-oriented bristles at the P_3-P_4 (paunch-colon) junction (Noirot, 2001) (unique among the Isoptera).

**INCLUDED GENERA:** Includes only Sphaerotermes Holmgren, 1912.

**COMMENTS:** This is a remarkable subfamily sister to the Macrotermiteinae (e.g., three nymphal instars, unique worker instar, male workers larger than females) but unlike the macrotermitines, Sphaerotermes is not associated with Termitomyces fungi and lacks the transverse band of sclerotization across the labrum of the worker and the imago (Sands, 1998). While these are indeed plesiomorphies relative to Macrotermiteinae, Sphaerotermiteinae has some remarkable apomorphic traits that support its recognition [e.g., unique possession of conspicuous, backward-orient-
ed bristles at the P₃-P₄ (paunch-colon) junction: Noirot, 2001].

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Dudley, P.H. 1890. The termites of the Isthmus of Panama—Part II. Transactions of the New York Academy of Sciences 9: 157–180. [publication date June 1890, not 28 April 1890 as cited by Constantino (2002): results of 5 May 1890 meeting are published on same page as Dudley's article and date on top of facing page is date of previous Academy meeting, not of publication; journal cover indicates an earliest possible publication date of June 1890]


Froggatt, W.W. 1897. Australian Termitidae, Part


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