**Supplementary materials of**

**Loss of pair formation predates the evolution of male-less society in *Glyptotermes* termites**

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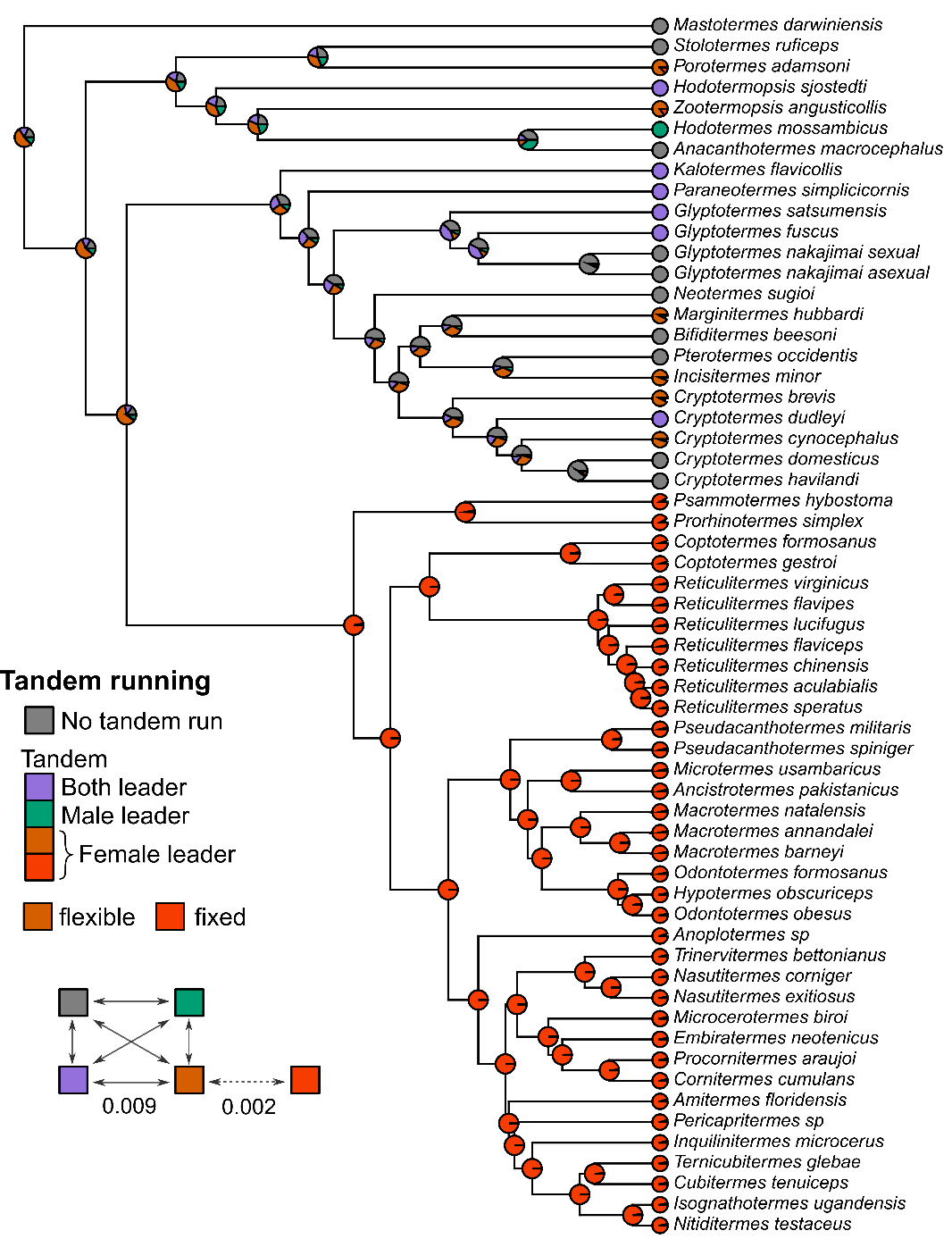
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This file includes

Figure S1

Table S1-S4

References for supplementary materials

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**Figure S1.** The full ancestral state reconstruction of tandem running behavior. We used the hidden rate model, where the female leader has two hidden states: a flexible state (orange) that can change to another state and a fixed state (red) that cannot change to another state. The state of female leaders was also assessed in extant species (phylogenetic tips).

**Table S1. Composition of reproductives in *Glyptotermes fuscus* and *G. satsumensis*.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Species** | **Colony code1** | **Location** | **PQ** | **PK** | **SQ** | **SK** |
| Incipient colony |  |  |  |  |  |  |
| *G*. *fuscus* | KN150225FB | Kunigami, Okinawa Is., Japan | 1 | 1 | 0 | 0 |
|  | TN150224FB | Tanodake, Okinawa Is., Japan | 1 | 1 | 0 | 0 |
|  | OG151015FA | Chichijima, Ogasawara Isis., Japan | 1 | 1 | 0 | 0 |
|  |  |  |  |  |  |  |
| *G*. *satsumensis* | TI160324SA | Toi, Miyazaki, Kyushu, Japan | 1 | 1 | 0 | 0 |
|  | ST160303SA | Sata, Kagoshima, Kyushu, Japan | 1 | 1 | 0 | 0 |
|  | ST160304SA | Sata, Kagoshima, Kyushu, Japan | 1 | 1 | 0 | 0 |
|  | ST160323SD | Sata, Kagoshima, Kyushu, Japan | 1 | 1 | 0 | 0 |
|  |  |  |  |  |  |  |
| Mature colony |  |  |  |  |  |  |
| *G*. *fuscus* | AS141111FA | Ashizuri, Kochi, Shikoku, Japan | 0 | 1 | 1 | 0 |
|  | TI150728FA | Toi, Miyazaki, Kyushu, Japan | 2 | 2 | 0 | 0 |
|  | SB150729FA | Shibushi, Kagoshima, Kyushu, Japan | 2 | 1 | 0 | 0 |
|  | YK150516FA | Yakushima, Kagoshima, Kyushu, Japan | 2 | 2 | 0 | 0 |
|  | AM150527FA | Setouch, Amami-Oshima Is., Japan | 2 | 2 | 0 | 0 |
|  | AM150527FB | Setouch, Amami-Oshima Is., Japan | 9 | 8 | 0 | 0 |
|  | KN150225FA | Kunigami, Okinawa Is., Japan | 2 | 1 | 0 | 0 |
|  | KN150225FC | Kunigami, Okinawa Is., Japan | 1 | 1 | 0 | 0 |
|  | KN150225FD | Kunigami, Okinawa Is., Japan | 1 | 1 | 0 | 0 |
|  | TN150224FA | Tanodake, Okinawa Is., Japan | 2 | 1 | 0 | 0 |
|  | NG150224FA | Nagodake, Okinawa Is., Japan | 3 | 3 | 0 | 0 |
|  | NG150224FB | Nagodake, Okinawa Is., Japan | 1 | 1 | 0 | 0 |
|  | OG151015FB | Chichijima, Ogasawara Isis., Japan | 10 | 10 | 0 | 0 |
|  | OG151015FC | Chichijima, Ogasawara Isis., Japan | 1 | 1 | 0 | 0 |
|  | OG151015FD | Chichijima, Ogasawara Isis., Japan | 1 | 1 | 0 | 0 |
|  |  |  |  |  |  |  |
| *G*. *satsumensis* | AS141111SA | Ashizuri, Kochi, Shikoku, Japan | 2 | 3 | 0 | 0 |
|  | TI150728SA | Toi, Miyazaki, Kyushu, Japan | 1 | 1 | 0 | 0 |
|  | TI150728SB | Toi, Miyazaki, Kyushu, Japan | 1 | 1 | 0 | 0 |
|  | ST160322SA | Sata, Kagoshima, Kyushu, Japan | 1 | 1 | 0 | 0 |
|  | ST160322SB | Sata, Kagoshima, Kyushu, Japan | 1 | 1 | 0 | 0 |
|  | ST160323SA | Sata, Kagoshima, Kyushu, Japan | 1 | 1 | 0 | 0 |
|  | ST160323SB | Sata, Kagoshima, Kyushu, Japan | 3 | 3 | 0 | 0 |
|  | ST160323SC | Sata, Kagoshima, Kyushu, Japan | 2 | 2 | 0 | 0 |
|  | ST160323SE | Sata, Kagoshima, Kyushu, Japan | 0 | 0 | 1 | 1 |

PQ: primary queen, PK: primary king, SQ: secondary queen, SK: secondary king. Primary indicates alate derived. Secondary indicates neotenic.

1Colony codes reflect both the location and date at which colonies were collected. For example, colony KN150225FB was collected in Kunigami on 25 February 2015.

**Table S2. Information on mating types in termites with available tandem running data.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Genus | Species | Incipient | Mature | Evidence type | Ref |
| *Zootermopsis* | *angusticollis* | monogamous | monogamous | genetics | [1] |
| *Anacanthotermes* | *ochraceus* | NA | NA | NA | NA |
| *Anacanthotermes* | *macrocephalus* | multiple | NA | field | [2] |
| *Hodotermes* | *mossambicus* | monogamous | NA | behavior | [3] |
| *Porotermes* | *adamsoni* | monogamous | monogamous | field | [4] |
| *Stolotermes* | *ruficeps* | monogamous | monogamous | field | [5] |
| *Hodotermopsis* | *sjostedti* | monogamous | NA | field | NA1 |
| *Mastotermes* | *darwiniensis* | NA | NA | NA | NA |
| *Bifiditermes* | *beesoni* | NA | NA | NA | NA |
| *Cryptotermes* | *brevis* | monogamous2 | NA | behavior | [6] |
| *Cryptotermes* | *havilandi* | monogamous | NA | behavior | [7] |
| *Cryptotermes* | *domesticus* | NA | NA | NA | NA |
| *Cryptotermes* | *cynocephalus* | NA | NA | NA | NA |
| *Cryptotermes* | *dudleyi* | monogamous | NA | field | [8] |
| *Incisitermes* | *minor* | NA | monogamous | field | [9] |
| *Kalotermes* | *flavicollis* | NA | NA | NA | NA |
| *Marginitermes* | *hubbardi* | NA | monogamous | field | [9] |
| *Neotermes* | *sugioi* | monogamous | monogamous | field | [10] |
| *Paraneotermes* | *simplicicornis* | monogamous | monogamous | field/behavior | [11,12] |
| *Pterotermes* | *occidentis* | NA | monogamous | field | [9] |
| *Glyptotermes* | *satsumensis* | monogamous | multiple | field | Table S1 |
| *Glyptotermes* | *nakajimai\_sexual* | NA | multiple | field | [13] |
| *Glyptotermes* | *nakajimai\_asexual* | multiple | multiple | field | [13] |
| *Glyptotermes* | *fuscus* | monogamous | multiple | field | Table S1 |
| *Coptotermes* | *formosanus* | monogamous | monogamous | genetics | [14] |
| *Coptotermes* | *gestroi* | monogamous | monogamous | genetics | [14] |
| *Prorhinotermes* | *simplex* | NA | NA | NA | NA |
| *Psammotermes* | *hybostoma* | NA | NA | NA | NA |
| *Reticulitermes* | *speratus* | monogamous | monogamous | field | [15] |
| *Reticulitermes* | *flavipes* | monogamous | monogamous | genetics | [16] |
| *Reticulitermes* | *virginicus* | monogamous | monogamous | genetics | [16] |
| *Reticulitermes* | *flaviceps* | NA | NA | NA | NA |
| *Reticulitermes* | *chinensis* | monogamous | monogamous | genetics | [17] |
| *Reticulitermes* | *aculabialis* | monogamous | monogamous | genetics | [18] |
| *Reticulitermes* | *lucifugus* | monogamous | monogamous | genetics | [19] |
| *Ancistrotermes* | *dimorphus* | NA | monogamous/multiple | field | [20] |
| *Ancistrotermes* | *pakistanicus* | NA | NA | NA | NA |
| *Hypotermes* | *obscuriceps* | NA | NA | NA | NA |
| *Macrotermes* | *natalensis* | monogamous | NA | behavior | [21] |
| *Macrotermes* | *annandalei* | NA | NA | NA | NA |
| *Macrotermes* | *barneyi* | monogamous | monogamous/multiple | unclear3 | [22] |
| *Macrotermes* | *convulsionarius* | NA | NA | NA | NA |
| *Microtermes* | *usambaricus* | NA | NA | NA | NA |
| *Microtermes* | *unicolor* | NA | NA | NA | NA |
| *Odontotermes* | *formosanus* | monogamous/multiple | monogamous/multiple | field | [23] |
| *Odontotermes* | *obesus* | monogamous | monogamous4 | field | [24] |
| *Odontotermes* | *distans* | NA | monogamous2 | field | [25] |
| *Odontotermes* | *brunneus* | NA | monogamous | field | [26] |
| *Odontotermes* | *assmuthi* | NA | NA | NA | NA |
| *Pseudacanthotermes* | *spiniger* | NA | multiple2 | field | [27] |
| *Pseudacanthotermes* | *militaris* | NA | NA | NA | NA |
| *Anoplotermes* | *sp* | NA | monogamous | field | [28] |
| *Cubitermes* | *tenuiceps* | NA | NA | NA | NA |
| *Isognathotermes* | *ugandensis* | NA | NA | NA | NA |
| *Nitiditermes* | *testaceus* | NA | NA | NA | NA |
| *Ternicubitermes* | *glebae* | NA | NA | NA | NA |
| *Cornitermes* | *bequarerti* | NA | NA | NA | NA |
| *Cornitermes* | *cumulans* | monogamous | monogamous5 | field | [29] |
| *Embiratermes* | *neotenicus* | monogamous | monogamous | genetics | [30] |
| *Procornitermes* | *araujoi* | NA | NA | NA | NA |
| *Nasutitermes* | *corniger* | monogamous | monogamous/multiple | genetics | [31] |
| *Nasutitermes* | *nigriceps* | monogamous | monogamous | field/genetics | [32,33] |
| *Nasutitermes* | *ephratae* | NA | monogamous | field | [34] |
| *Nasutitermes* | *costalis* | NA | monogamous/multiple | field | [35,36] |
| *Nasutitermes* | *exitiosus* | NA | monogamous/multiple | field/genetics | [37,38] |
| *Trinervitermes* | *suspensus* | NA | NA | NA | NA |
| *Trinervitermes* | *bettonianus* | NA | NA | NA | NA |
| *Amitermes* | *floridensis* | NA | NA | NA | NA |
| *Amitermes* | *atlanticus* | monogamous | monogamous | field | [39] |
| *Amitermes* | *wheeleri* | NA | NA | NA | NA |
| *Inquilinitermes* | *microcerus* | NA | NA | NA | NA |
| *Microcerotermes* | *biroi* | NA | monogamous | field | [40] |
| *Microcerotermes* | *edentatus* | NA | NA | NA | NA |
| *Pericapritermes* | *sp* | NA | monogamous2,6 | field | [41] |

1 NM personal observations;

2 limited sample size;

3 based on the citation of “Li, G.X., Z.R. Dai & D. Li 1989. Termite and Its Control in China. Science Press, Beijing (in Chinese)” in [22], which observed the reproductive composition. But we could not locate the original article.

4 but exceptionally multiple reproductives, see [42].

5 occasionally multiple reproductives

6 *nitobei*

**Table S3. Simplified list of samples used for reconstructing phylogeny. See XXX for full information.**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Family** | **Subfamily** | **Genus** | **Species** | **Code** | **GenBank** | **Reference** | **Notes** |
| Blattidae | NA | *Periplaneta* | *fuliginosa* | NA | AB126004 | [43] | a |
| Cryptocercidae | NA | *Cryptocercus* | *kyebangensis* | Cryp | ON059753 | [44] | a |
| Mastotermitidae | NA | *Mastotermes* | *darwiniensis* | MD-RNA-1 | OM646554 | [44] | b |
| Archotermopsidae | NA | *Zootermopsis* | *angusticollis* | US1615 | OQ411245 | [44] | b |
| Hodotermopsidae | NA | *Hodotermopsis* | *sjostedti* | CHI15-151 (HSRNA1) | OM646553 | [44] | a |
| Hodotermitidae | NA | *Anacanthotermes* | *sp.* | Anacan\_w | OQ440394 | [44] | c |
| Hodotermitidae | NA | *Hodotermes* | *mossambicus* | SA16-13 | ON210831 | [44] | b |
| Stolotermitidae | Porotermitinae | *Porotermes* | *adamsoni* | Aus19 | OQ451182 | [44] | b |
| Stolotermitidae | Stolotermitinae | *Stolotermes* | *ruficeps* | AUS18 | OQ451181 | [44] | b |
| Kalotermitidae | NA | *Bifiditermes* | *sp. nr. madagascariensis* | MAD15-128 | OM991376 | [45] | c |
| Kalotermitidae | NA | *Calcaritermes* | *emarginicollis* | PAN18\_PG\_023 | OK163853 | [46] | a |
| Kalotermitidae | NA | *Calcaritermes* | *temnocephalus* | PAN18\_PG\_062 | OK163855 | [46] | a |
| Kalotermitidae | NA | *Cryptotermes* | *brevis* | CRYBREVIS | OM991333 | [45] | b |
| Kalotermitidae | NA | *Cryptotermes* | *havilandi* | CAM15\_103 | OL469805 | [46] | b |
| Kalotermitidae | NA | *Cryptotermes* | *domesticus* | CRYDOMESTI | OM991334 | [45] | b |
| Kalotermitidae | NA | *Cryptotermes* | *cynocephalus* | CC | OM991320 | [45] | b |
| Kalotermitidae | NA | *Cryptotermes* | *dudleyi* | CRYDRUDDLE | OM991335 | [45] | b |
| Kalotermitidae | NA | *Glyptotermes* | *fuscus* | NM2325 | TBS | This paper | d |
| Kalotermitidae | NA | *Glyptotermes* | *satsumensis* | JP2106 | TBS | This paper | d |
| Kalotermitidae | NA | *Glyptotermes* | *nakajimai* | NM356 | TBS | This paper | d |
| Kalotermitidae | NA | *Glyptotermes* | *nakajimai* | NM357 | TBS | This paper | d |
| Kalotermitidae | NA | *Glyptotermes* | *nakajimai* | NM2344 | TBS | This paper | d |
| Kalotermitidae | NA | *Glyptotermes* | *nakajimai* | JP2107 | TBS | This paper | d |
| Kalotermitidae | NA | *Incisitermes* | *minor* | 10 | OM991360 | [45] | b |
| Kalotermitidae | NA | *Kalotermes* | *flavicollis* | Breeds\_KF | OL875030 | [47] | b |
| Kalotermitidae | NA | *Longicaputermes* | *sinaicus* | ISR10 | OM991363 | [45] | a |
| Kalotermitidae | NA | *Marginitermes* | *hubbardi* | Marginitermes | OM991400 | [45] | b |
| Kalotermitidae | NA | *Neotermes* | *sugioi* | OK20-08 | PV057193 | [48] | d |
| Kalotermitidae | NA | *Paraneotermes* | *simplicicornis* | US1268.1 | OK506058 | [45] | b |
| Kalotermitidae | NA | *Pterotermes* | *occidentis* | US622 | OK506059 | [45] | b |
| Stylotermitidae | NA | *Stylotermes* | *halumicus* | Chi15\_136 | KY449049 | [49] | a |
| Serritermitidae | NA | *Glossotermes* | *oculatus* | Breeds\_FG19-PG-02 | OL875032 | [47] | a |
| Serritermitidae | NA | *Serritermes* | *serrifer* | BRA31 | KP026264 | [50] | a |
| Rhinotermitidae | NA | *Rhinotermes* | *hispidus* | EC1239 | OL875052 | [47] | a |
| Psammotermitidae | Prorhinotermitinae | *Prorhinotermes* | *simplex* | Breeds\_PS\_colF | OL875033 | [47] | b |
| Psammotermitidae | Psammotermitinae | *Psammotermes* | *voeltzkowi* | MAD19-27 | OQ555374 | [51] | c |
| Termitogetonidae | NA | *Termitogeton* | *planus* | IRJT202 | OL875040 | [47] | a |
| Heterotermitidae | NA | *Coptotermes* | *formosanus* | CF\_RNA\_1 | OR069384 | [52] | b |
| Heterotermitidae | NA | *Coptotermes* | *gestroi* | BG7 | KU925205 | [53] | b |
| Heterotermitidae | NA | *Reticulitermes* | *speratus* | NA | KY484910 | [54] | b |
| Heterotermitidae | NA | *Reticulitermes* | *flavipes* | FL349 | OL875053 | [47] | b |
| Heterotermitidae | NA | *Reticulitermes* | *virginicus* | FL395 | OQ446323 | [44] | b |
| Heterotermitidae | NA | *Reticulitermes* | *flaviceps* | NA | NC\_031162 | [55] | b |
| Heterotermitidae | NA | *Reticulitermes* | *chinensis* | NA | KM216388 | [56] | b |
| Heterotermitidae | NA | *Reticulitermes* | *aculabialis* | NA | NC\_026695 | [57] | b |
| Heterotermitidae | NA | *Reticulitermes* | *lucifugus* | NA | MK088051 | [58] | b |
| Termitidae | Sphaerotermitinae | *Sphaerotermes* | *sphaerothorax* | CAM17-SP3 | OL875036 | [47] | a |
| Termitidae | Macrotermitinae | *Ancistrotermes* | *pakistanicus* | Unknown | KP026267 | [45] | b |
| Termitidae | Macrotermitinae | *Hypotermes* | *makhamensis* | THAI008 | KY224429 | [59] | c |
| Termitidae | Macrotermitinae | *Macrotermes* | *natalensis* | Unknown | KM405637 | [60] | b |
| Termitidae | Macrotermitinae | *Macrotermes* | *annandalei* | THAI071 | KY224518 | [59] | b |
| Termitidae | Macrotermitinae | *Macrotermes* | *barneyi* | Unknown | JX050221 | [61] | b |
| Termitidae | Macrotermitinae | *Microtermes* | *obesi* | THAI088 | KY224524 | [59] | c |
| Termitidae | Macrotermitinae | *Odontotermes* | *formosanus* | OK19-03 (OK3) | OL875037 | [47] | b |
| Termitidae | Macrotermitinae | *Odontotermes* | *obesus* | E45 | KY224406 | [59] | b |
| Termitidae | Macrotermitinae | *Pseudacanthotermes* | *spiniger* | BDIT23 | KY224401 | [59] | b |
| Termitidae | Macrotermitinae | *Pseudacanthotermes* | *militaris* | RDCT109 | OQ947859 | [52] | b |
| Termitidae | Foraminitermitinae | *Foraminitermes* | *rhinoceros* | BDIT108 | KY224630 | [59] | a |
| Termitidae | Apicotermitinae | *Anoplotermes* | *banksi* | Guyane 104 | OL875045 | [47] | c |
| Termitidae | Amitermitinae | *Amitermes* | *californicus* | US589 | OL875042 | [47] | c |
| Termitidae | Crepititermitinae | *Crepititermes* | *verruculosus* | G13-067 | KY224440 | [59] | a |
| Termitidae | Cubitermitinae | *Cubitermes* | *tenuiceps* | 10 RNA K (DJ 0345/11) | PQ679231 | Josens et al. 2025 | b |
| Termitidae | Cubitermitinae | *Isognathotermes* | *ugandensis* | NA | KP091689 | [62] | b |
| Termitidae | Cubitermitinae | *Nitiditermes* | *aff oculatus* | 1 RNAL BF (DJ 0381/13) | OL875029 | [47] | c |
| Termitidae | Cubitermitinae | *Ternicubitermes* | *pallidiceps* | 2 RNA K (DJ 0346/12) | PQ679179 | Josens et al. 2025 | c |
| Termitidae | Cylindrotermitinae | *Cephalotermes* | *rectangularis* | RDCT180 | KY224689 | [59] | a |
| Termitidae | Cylindrotermitinae | *Cylindrotermes* | *parvignathus* | G687 | KY224565 | [59] | a |
| Termitidae | Engelitermitinae | *Engelitermes* | *zambo* | Cam19\_1\_PG\_179 | OP882288 | [63] | a |
| Termitidae | Forficulitermitinae | *Forficulitermes* | *planifrons* | Cam19\_1\_PG\_123 | OP882292 | [63] | a |
| Termitidae | Microcerotermitinae | *Microcerotermes* | *biroi* |  | OQ980240 | [52] | b |
| Termitidae | Mirocapritermitinae | *Pericapritermes* | *nitobei* | TBRU3.22A | KY224470 | [59] | c |
| Termitidae | Nasutitermitinae | *Nasutitermes* | *corniger* | NI275 | OL875055 | [47] | b |
| Termitidae | Nasutitermitinae | *Nasutitermes* | *exitiosus* | 3.11.1 | KY224642 | [59] | b |
| Termitidae | Nasutitermitinae | *Trinervitermes* | *geminatus* | CIVT035 | OQ555367 | [51] | c |
| Termitidae | Neocapritermitinae | *Neocapritermes* | *taracua* | G13-60 | OQ980239 | [52] | a |
| Termitidae | Promirotermitinae | *Promirotermes* | *redundans* | CAM239 | OL875039 | [47] | a |
| Termitidae | Protohamitermitinae | *Orientotermes* | *emersoni* | TBRU3.23a | KY224456 | [59] | a |
| Termitidae | Syntermitinae | *Cornitermes* | *cumulans* | BRA18 | KY224411 | [59] | b |
| Termitidae | Syntermitinae | *Embiratermes* | *neotenicus* | Unknown | KP026262 | [45] | b |
| Termitidae | Syntermitinae | *Procornitermes* | *araujoi* | BRA23 | KY224636 | [59] | b |
| Termitidae | Termitinae | *Inquilinitermes* | *inquilinus* | G699 | KY224634 | [59] | c |

a: Lineage with no information on tandem. Included to represent all termite lineages and outgroups.

b: Species with available tandem data [64]: genetic data from the same species available

c: Species with available tandem data [64]: genetic data from the same species is not available. Use the same genus but different species.

d: Species studied in this study

**Table S4. Fossil calibration.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Calibration group** | **Fossil calibration** | **Reference (calibration)** | **Minimum age constraint (Mya)** | **Soft maximum bound** | **Reference (softbound)** | **97.5% soft maximum bound (Mya)** |
| Isoptera + *Cryptocercus* | *Valditermes brenanae* | [65] | 130 | Earliest fossil of Mesoblattinidae: *Triassoblatta argentina* | [66] | 228 |
| Mastotermitidae + sister group | *Melqartitermes myrrheus* | [67] | 125.45 | Earliest fossil of Mesoblattinidae: *Triassoblatta argentina* | [66] | 228 |
| Archotermopsidae + Hodotermitidae + Hodotermopsidae + Stolotermitidae | *Cosmotermes multus* | [68] | 93.5 | Earliest fossil of Mesoblattinidae: *Triassoblatta argentina* | [66] | 228 |
| Kalotermitidae + sister group | *Proelectrotermes swinhoei* | [67,69] | 93.5 | Earliest fossil of Mesoblattinidae: *Triassoblatta argentina* | [66] | 228 |
| Termitidae + Heterotermitidae | *Nanotermes isaacae* | [70] | 47.8 | First fossil of Rhinotermitidae: *Archeorhinotermes rossi* | [71] | 93.5 |
| Heterotermitidae | *Reticulitermes antiquus* | [67] | 33.9 | First fossil of Rhinotermitidae: *Archeorhinotermes rossi* | [71] | 93.5 |
| *Cryptotermes* | *Huguenotermes septimaniensis* | [72] | 33.9 | First fossil of Kalotermitidae: *Proelectrotermes swinhoei* | [67] | 93.5 |
| *Calcaritermes* | *Calcaritermes vetus* | [73] | 15.97 | First fossil of Kalotermitidae: *Proelectrotermes swinhoei* | [67] | 93.5 |
| *Glyptotermes* | *Glyptotermes grimaldii* | [74] | 13.82 | First fossil of Kalotermitidae: *Proelectrotermes swinhoei* | [67] | 93.5 |
| *Coptotermes* | *Coptotermes sucineus* | [75] | 15.97 | First fossil of *Heterotermes*: *Heterotermes eocenicus* | [76] | 33.9 |
| Syntermitinae + Microcerotermitinae | *Microcerotermes insulanus* | [77] | 13.82 | First fossil of Termitidae: *Nanotermes isaacae* | [70] | 47.8 |
| *Macrotermes* + *Odontotermes* + *Hypotermes* | *Macrotermes pristinus* | [78,79] | 11.608 | First fossil of Termitidae: *Nanotermes isaacae* | [70] | 47.8 |

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