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NOTE

CARCASS CONSUMPTION BY *NASUTITERMES CALLIMORPHUS* (BLATTODEA: ISOPTERA) IN HIGHLAND FORESTS FROM BRAZIL

Igor Eloi, Mário Herculano de Oliveira & Maria Avany Bezerra-Gusmão

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Carcass consumption by *Nasutitermes callimorphus* (Blattodea: Isoptera) in highland forests from Brazil

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Despite the small number of species, termites (Blattodea: Isoptera) are among world's most representative organisms regarding biomass (Bignell & Eggleton 2000). These insects are mainly known from wood-feeding, which is universal among the lower termites (exporadically other items might be used as food, but no specialization in feeding habit is known), however, the higher termites (Termitidae) were able to diversify their diet and occupy many previously available niches (Bucek et al. 2019). Besides plant material, higher termites are mainly reported as feeding on fungi, lichens, humus, other termite's faeces, nest materials, dead siblings (intra-colonial cannibalism) and, rarely, on mammal carcasses (Lima & Costa-Leonardo 2007). Wood (1978) lists parts of vertebrate carrion as "special or incidental" items in the diet of these insects. Freymann et al. (2007) have observed that termites from the genus *Odontotermes* may frequently forage on carrion (hooves), but that item might represent a way to supplement on macro and micro-nutrient, rather than a main source of energy.

The termite genus with the higher number of species, *Nasutitermes* Dudley, 1890 (around 248 extant taxa), comprise wood feeding insects and is present through most of the world's tropical territory, with some species being regarded as notorious pests in the

Neotropics (Constantino 2002). Despite the amount of living species only *N. corniger* (Queiroz et al. 2017), *N. nigriceps* (Thorne & Kimsey 1983) were previously reported as feeding on mammal carcasses (excluding reports of damage on archaeological sites, which we don't consider here). Here we report a third species of *Nasutitermes* feeding on mammal carrion.

The observation was made during a field trip on 11 August 2016 in the highland humid forest state reserve Mata do Pau Ferro (6.962°S & 35.754°W) (Image 1). With 607ha of protected woodland, the park is located 9km away from the municipality of Areia, Paraíba, Brazil. The altitude ranges from 400m to 600m and observed precipitation during the sample month is registered to be 26.8mm (annual rainfall=1208.3mm) (AESA 2019).

A common house dog *Canis familiaris* skull was found partially covered by carton sheets typically made by *Nasutitermes* spp. (Image 2). Inside the skull, multiple workers and soldiers were found and collected (preserved in 80% alcohol), as well as the bones. The termites were identified as *Nasutitermes callimorphus* Mathews, 1977 (Image 3), a common species inside Brazilian evergreen forests. This species does not build a separated termitarium, rather lives within dead wood covered in carton sheets or in underground galleries. They can be commonly found in carton galleries built

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Image 1. Northeastern Brazil. Paraíba State is highlighted in dark gray. Sample location (white dot) is approximately 100km away from the state capital, João Pessoa (white triangle).



Image 2. Dog skull attacked by termites of the species *Nasutitermes callimorphus*. Note the carton sheet covering the whole palate area.



Image 3. Soldier of *Nasutitermes callimorphus*, the species found in the bones.

over the soil surface or in foraging parties constituted by many large workers and soldiers. The food content from the gut of workers collected from the carrion had a ferruginous red colouration, hinting that termites might be feeding on muscle leftovers.

Most termites species reported as carrion feedings are also reported as damage-causing in other reports (Prestes et al. 2014). These commonalities tempt one to suppose that saprophily in termites can be related to the feeding plasticity (a trait ever so frequent in pest species). However, *N. callimorphus* belongs with

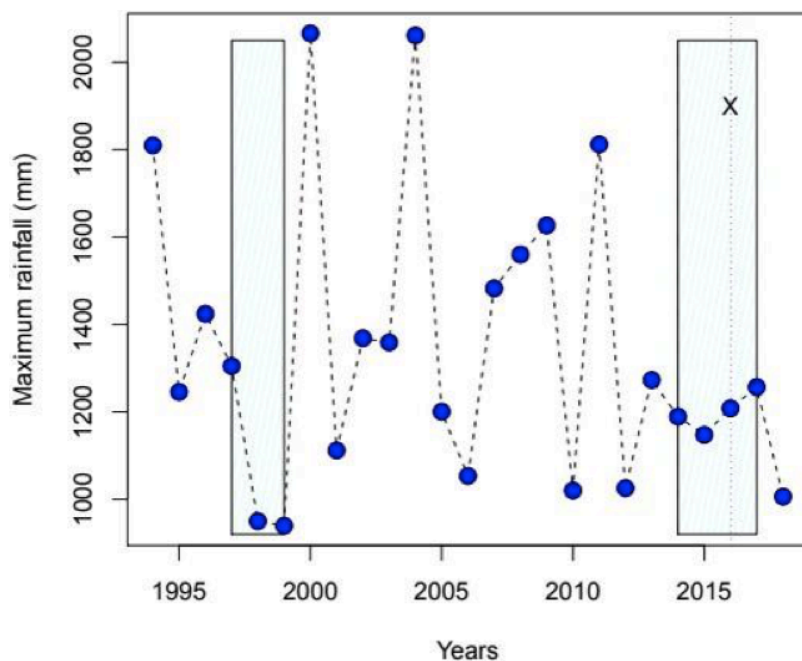


Figure 1. Time series of maximum rainfall registered for Areia municipality from 1994 to 2018. The boxes highlight the years which el Niño prolonged the dry season. "X" marks the sample date. Data available online on AESA (2019).

Rhynchothermes nasutissimus (Silvestri, 1901) (Prestes et al. 2014) in a group of termites that do not represent a threat to anthropic activities such as agriculture or habitational buildings.

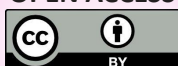
The majority of carrion feeding reports were made during dry seasons, suggesting that termites may explore carcasses as a supplementary source of nutrients (Thorne & Kimsey 1983). Our sample took place during a time period in which el Niño had prolonged dry season into a particularly tough drought (Figure 1). This (plus previous reports) supports the hypothesis of drought being a force driving necrophagous behaviour in termites, allowing one to hypothesize that climate change may play a key role in niche exploration by termites and therefore in the rise of new adaptations.

References

- AESA (2019). <http://www.aesa.pb.gov.br/aesa-website/>. Accessed 27 October 2019.
- Bignell, D. & P. Eggleton (2000). Termites in ecosystems, pp. 363–388. In: Abe, T., D. Bignell & M. Higashi (eds.). *Termites: Evolution, Sociality, Symbioses, Ecology*. Kluwer Academic Publisher, 453pp.
- Bucek, A., J. Šobotník, S. He, M. Shi, D.P. McMahon, E.C. Holmes, Y. Roisin, N. Lo & T. Bourguignon (2019). Evolution of termite symbiosis informed by transcriptome-based phylogenies. *Current Biology* 29(21): 3728–3734. <https://doi.org/10.1016/j.cub.2019.08.076>
- Constantino, R. (2002). The pest termites of South America: taxonomy, distribution and status. *Journal of Applied Entomology* 126(7–8): 355–365. <https://doi.org/10.1046/j.1439-0418.2002.00670.x>
- Freyman, B.P., S.N. de Visser, E.P. Mayemba & H. Olff (2007). Termites of the genus *Odontotermes* are optionally keratophagous. *Ecotropica* 13(2): 143–147.
- Lima, J.T. & A.M. Costa-Leonardo (2007). Recursos alimentares explorados pelos cupins (Insecta: Isoptera). *Biota Neotropica* 7(2): 243–250.
- Prestes, A.C., K.P. Tepedino, C. Kosmann & J.R. Pujol-Luz (2014). First record of *Rhynchothermes nasutissimus* (Silvestri) (Isoptera: Syntermitinae) associated with rat carrion in Brasília, Brazil. *EntomoBrasilis* 7(1): 58–61.
- Queiroz, R.A., E.P. Soriano, M.V.D. Carvalho, A.F. Caldas-Junior, E.H.A. Souza, L.G.T.M. Coelho-Junior, R.I.C. Campello, A.C. Almeida, R.C.A.P. Farias & A. Vasconcellos (2017). First forensic records of termite activity on non-fossilized human bones in Brazil. *Brazilian Journal of Biology* 77(1): 127–131. <https://doi.org/10.1590/1519-6984.11415>
- Thorne, B.L. & R.B. Kimsey (1983). Attraction of neotropical *Nasutitermes* termites to carrion. *Biotropica* 15(4): 295–296.
- Wood, T.G. (1978). Food and feeding habits of termites, pp. 55–80. In: Brian, M.V. (ed.). *Production Ecology of Ants and Termites*. Cambridge University Press, London, 401pp.



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Communications

Dusky Langurs *Trachypitecus obscurus* (Reid, 1837) (Primates: Cercopithecidae) in Singapore: potential origin and conflicts with native primate species
– Andie Ang, Sabrina Jabbar & Max Khoo, Pp. 15967–15974

A new report on mixed species association between Nilgiri Langurs *Semnopithecus johnii* and Tufted Grey Langurs *S. priam* (Primates: Cercopithecidae) in the Nilgiri Biosphere Reserve, Western Ghats, India
– K.S. Chetan Nag, Pp. 15975–15984

A review of the bacular morphology of some Indian bats (Mammalia: Chiroptera)
– Bhargavi Srinivasulu, Harpreet Kaur, Tariq Ahmed Shah, Gundena Devender, Asad Gopi, Sreehari Raman & Chelmala Srinivasulu, Pp. 15985–16005

Status of the Critically Endangered Bengal Florican *Houbaropsis bengalensis* (Gmelin, 1789) in Koshi Tappu Wildlife Reserve, Nepal
– Hem Sagar Baral, Tek Raj Bhatt, Sailendra Raj Giri, Ashok Kumar Ram, Shyam Kumar Shah, Laxman Prasad Poudyal, Dhiraj Chaudhary, Gitanjali Bhattacharya & Rajan Amin, Pp. 16006–16012

Observations on breeding behaviour of a pair of endangered Egyptian Vultures *Neophron percnopterus* (Linnaeus, 1758) over three breeding seasons in the plains of Punjab, India
– Charn Kumar, Amritpal Singh Kaleka & Sandeep Kaur Thind, Pp. 16013–16020

Additions to the cicada (Insecta: Hemiptera: Cicadidae) fauna of India: first report and range extension of four species with notes on their natural history from Meghalaya
– Vivek Sarkar, Cuckoo Mahapatra, Pratyush P. Mahapatra & Manoj V. Nair, Pp. 16021–16042

The perceptions of high school students on the habitat of the crab *Ucides cordatus* (Linnaeus, 1763) (Crustacea: Decapoda: Ucididae) in northern Rio de Janeiro State, southeastern Brazil
– Laiza Fernanda Quintanilha Ribeiro, Laura Helena de Oliveira Côrtes & Ana Paula Madeira Di Benedetto, Pp. 16043–16047

Woody species diversity from proposed ecologically sensitive area of northern Western Ghats: implications for biodiversity management
– M. Tadwalkar, A. Joglekar, M. Mhaskar & A. Patwardhan, Pp. 16048–16063

Resolving taxonomic problems in the genus *Ceropegia* L. (Apocynaceae: Asclepiadoideae) with vegetative micromorphology
– Savita Sanjaykumar Rahangdale & Sanjaykumar Ramlal Rahangdale, Pp. 16064–16076

A checklist of angiosperm flora of low elevation lateritic hills of northern Kerala, India
– K.A. Sreejith, V.B. Sreekumar, P. Prashob, S. Nita, M.P. Prejith & M.S. Sanil, Pp. 16077–16098

Phytodiversity of chasmophytic habitats at Olichuchattam Waterfalls, Kerala, India
– Arun Christy & Binu Thomas, Pp. 16099–16109

Contribution to the macromycetes of West Bengal, India: 51–56
– Diptosh Das, Entaj Tarafder, Meghma Bera, Anirban Roy & Krishnendu Acharya, Pp. 16110–16122

Short Communications

Catalogue of herpetological specimens from peninsular India at the Sâlim Ali Centre for Ornithology & Natural History (SACON), India
– S.R. Ganesh, S. Bhupathy, P. Karthik, G. Babu Rao & S. Babu, Pp. 16123–16135

Osteological description of Indian Skipper Frog *Euphylyctis cyanophlyctis* (Anura: Dicroglossidae) from the Western Ghats of India
– Pankaj A. Gorule, Sachin M. Gosavi, Sanjay S. Kharat & Chandani R. Verma, Pp. 16136–16142

DNA barcode reveals the occurrence of Palearctic *Olepa schleini* Witt et al., 2005 (Lepidoptera: Erebiidae: Arctiinae) from peninsular India with morphological variations and a new subspecies
– Aparna Sureshchandra Kalawate, Shital Pawara, A. Shabnam & K.P. Dinesh, Pp. 16143–16152

Present status of the genus *Sphrageidus* Maes, 1984 (Lepidoptera: Erebiidae: Lymantriinae) from India
– Amritpal Singh Kaleka, Devinder Singh & Gagan Preet Kour Bali, Pp. 16153–16160

Early stages of Nilgiri Grass Yellow *Eurema nilgiriensis* (Yata, 1990) (Lepidoptera: Pieridae), with a note on its range extension in the Kerala part of the Western Ghats, India
– Balakrishnan Valappil & V.K. Chandrasekharan, Pp. 16161–16165

Notes

Breeding site records of three sympatric vultures in a mountainous cliff in Kahara-Thathri, Jammu & Kashmir, India
– Muzaffar A. Kichloo, Sudesh Kumar & Neeraj Sharma, Pp. 16166–16169

First distribution record of Elongated Tortoise *Indotestudo elongata* (Blyth, 1853) (Reptilia: Testudines: Testudinidae) from Bihar, India
– Arif, Sourabh Verma, Ayesha Mohammad Maslehuddin, Uttam, Ambarish Kumar Mall, Gaurav Ojha & Hemkant Roy, Pp. 16170–16172

The niche of shrimp stocks (*Xiphopenaeus kroyeri* Heller, 1862) from southeastern Brazil: a stable isotope approach
– Keltony de Aquino Ferreira, Leandro Rabello Monteiro & Ana Paula Madeira Di Benedetto, Pp. 16173–16176

First record of the White Tufted Royal *Pratapa deva lila* Moore, [1884] (Lepidoptera: Lycaenidae: Theclinae) from Himachal Pradesh, extending its known range westwards
– Sanjay Sondhi, Pp. 16177–16179

Range extension of the Lilac Silverline *Apharitis lilacinus* to southern Rajasthan and a review of the literature
– K.S. Gopi Sundar, Swati Kittur, Vijay Kumar Koli & Utkarsh Prajapati, Pp. 16180–16182

A record of gynandromorphism in the libellulid dragonfly *Crocothemis servilia* (Insecta: Odonata) from India
– R.V. Renjith & A. Vivek Chandran, Pp. 16183–16186

Carcass consumption by *Nasutitermes callimorphus* (Blattodea: Isoptera) in highland forests from Brazil
– Igor Eloi, Mário Herculano de Oliveira & Maria Avany Bezerra-Gusmão, Pp. 16187–16189

New records of nasutiform termite (Nasutitermitinae: Termitidae: Isoptera) from Meghalaya, India
– Khirad Sankar Das & Sudipta Choudhury, Pp. 16190–16192

Corrigendum

Corrections to A citizens science approach to monitoring of the Lion *Panthera leo* (Carnivora: Felidae) population in Niokolo-Koba National Park, Senegal
– Dimitri Dagorne, Abdoulaye Kanté & John B. Rose, Pp. 16193–16194

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