

Research Article

Ants (Hymenoptera: Formicidae) from Kogi State University Campus, Anyigba, Nigeria

Martin Abdubala Okpanachi.¹ and Clement Ameh Yaro.²

¹Department of Animal and Environmental Biology Kogi State University Anyigba Kogi State Nigeria.

²Department of Zoology Ahmadu Bello University Zaria Nigeria.

*Corresponding Author

Clement Ameh Yaro

Abstract: Background: The study was carried out to determine the species composition of ants in Kogi State University Campus, Anyigba, Kogi State, Nigeria. **Materials and Methods:** Ants species were collected manually using an aspirator and forceps during the daytime from 8:00 am to 6:00 pm on sampling days. Berlese funnel technique was used for extracting ants from soil and leaf litter and at a few sites, pitfall traps were used. Ant samples collected were studied using a Leica S4D stereomicroscope and identified using the standard ant taxonomic keys. Taxonomic nomenclature of Bolton (2014) was followed. Photomicrographs of ant species were taken. **Results:** A total of eight species of ants were observed in KSU Campus. These include; *Oecophylla longinoda*, *Monomorium minimum*, *Odontomachus haematodus*, *Pachycondyla harpax*, *Camponotus terebrans*, *Leptogenys elongate*, *Cardiocondyla emeryi* and *Bothroponera sp.*. **Conclusion:** Kogi State University Campus despite the level of altering in the natural setting still maintains high diversity of ant species.

Keywords: Berlese funnel technique, Taxonomic, Photomicrographs.

BACKGROUND OF STUDY

Ants are a diverse group of animals with a community structure which tends to reflect the nature of the environment in which they occur (Aroujo and Beserra, 2007). They are the most dominant components of any functioning terrestrial ecosystem (Mahalakshmi and Channaveerappa, 2016). They play an important role in ecosystem by improving the soil and assisting in the decomposition process (Watanasit *et al.*, 2000), therefore serving as good biological indicators in monitoring environmental degradation.

There are about 15,000 species of ants (Andrade, 2007). All species differ tremendously in size, color and behavior. Ants have evolved from wasps and belong to the same order as wasps and bees, the Hymenoptera (Aroujo and Beserra, 2007). They constitute a very interesting group of litter arthropods for intensive ecological studies because of their relatively high abundance and high degree of foraging success (Andersen, 2004), population stability, resource partitioning and coexistence (Torres, 1984). The recovery of ants after disturbances is very fast because they do not build elaborate nests (Aroujo and Beserra,

2007) and they can endure long periods of starvation (Botelho, 2011).

This study was carried out to provide information on the species composition of ants in Kogi State University Campus, Anyigba, Nigeria.

MATERIALS AND METHODS

Study Area

This study was conducted in Kogi State University Campus, Anyigba, Kogi State, Nigeria. Kogi State University lies between latitude 7.4749°N to 7.4896°N and longitude 7.1759°E to 7.1988°E.

Sampling Collection

Ant sample collection was carried out in and around the campus from August to September, 2018. Manual collection of ants was carried out using an aspirator and forceps during the daytime from 8:00 am to 6:00 pm on sampling days. Berlese funnel technique was used for extracting ants from soil and leaf litter and at a few sites, pitfall traps were used. Specimens collected were taken to the Department of Animal and Environmental Biology, Kogi State University,

Quick Response Code



Journal homepage:

<http://www.easpublisher.com/easjals/>

Article History

Received: 15.04.2019

Accepted: 30.04.2019

Published: 08.05.2019

Copyright © 2019 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

DOI: 10.36349/easjals.2019.v02i05.001

Anyigba and were studied using a Leica S4D stereomicroscope and identified using the keys of Cagniant (1996) and Cagniant (2009). Taxonomic

nomenclature of Bolton (2014) was followed. Photomicrographs of ant species were taken.



Fig. 1: Map of Kogi State University Campus, Anyigba, Kogi State, Nigeria.

RESULTS

Ant Species Found at Anyigba, Kogi States

A total of eight (8) ant species were found in Anyigba, Dekina Local Government Area, Kogi State. These species of ants were; *Oecophylla longinoda*, *Monomorium minimum*, *Odontomachus haematodus*, *Pachycondyla harpax*, *Camponotus terebrans*, *Leptogenys elongate*, *Cardiocondyla emeryi* and *Bothroponera sp.*

Description of Species of Ant

Oecophylla longinoda are relatively large ants, with the bodies of workers averaging 6 mm in length. The body is divided into three main parts; the head, thorax, and abdomen with six legs are connected to the thoracic region. These ants range from orange to dark brown in color. Erect hairs cover the surface of the gaster while a finer pubescence encompasses the rest of its body. The eyes are well developed with eyespots. It has 12-segmented antennae with the first segment of the antennae longer than the second and the third put together. Its mandibles are extended, and have triangular elongated teeth that cross one another when at rest. The thorax is very constricted in the mesonotal region.

Monomorium minimum (Buckley)

They get their name from their size and jet black color. They have a 12 segment antenna with a 3 segmented-club. Little Black Ants have 2 nodes and a small weak stinger. The colonies have multiple queens which aids the the colonies to grow rapidly.

Odontomachus haematodus

Striae on head reaching occipital carina; first gastric tergum predominantly smooth; metasternum with acute paired denticles anterior to metacoxae; body brown, legs yellow to brown. Easily confused with the Nearctic *Odontomachus brunneus*, but the latter taxon lacks metasternal processes.

Pachycondyla harpax

They have triangular mandibles, anterior clypeal margin without projecting teeth, metanotal groove at most present as a faint suture, propodeal spiracles slit-shaped, metapleural gland orifice with a posterior U-shaped cuticular lip, arolia not prominent, tarsal claws unarmed, petiole a thick block-like node, stridulitrum absent from pretergite of A4, and hypopygium with a row of stout spines on either side of the sting.

Camponotus terebrans

Erect hairs present on scapes and tibiae. Metanotal groove weakly developed and essentially absent. Propodeum with 10 to 25 erect hairs. Pubescence on head and gaster sparse, with individual hairs generally non-overlapping or at most only slightly overlapping. In profile, dorsum of petiolar node angular in both minor and major workers.

Leptogenys elongate

Head sub-quadrate to sub-rectangular in full-face view, wider anterad than posterad; anterior clypeal margin tapers evenly to median process, lateral lobes weakly developed; mesosternum sharply separated from mesopleuron by carina that expands anterad into modest lobe; surface of head and mesosoma dull, with coarse punctuations; color deep yellow-red to black.

***Cardiocondyla* sp.**

Worker monomorphic; head in full-face view subrectangular; frontal lobe small and narrow; frontal carina and antennal scrobe absent; median portion of clypeus prominently extended forward, and fused to the flattened lateral portions to form a shelf which hides basal part of mandibles in full-face view but is elevated away from the dorsal surface of mandibles in lateral view; posteromedian portion of clypeus relatively broadly inserted between frontal lobes; median clypeal seta present; mandible triangular, with 5 teeth which

decrease in size from apex to base; palp formula 5,3; stipes of maxilla with a transverse crest at about midlength; antenna 12-segmented, with 3-segmented club; eye generally large and conspicuous; promesonotal dorsum in lateral view flattened to slightly convex; promesonotal suture absent dorsally; metanotal groove absent or distinctly impressed dorsally; propodeum nearly unarmed to strongly bispinose; propodeal lobe roundly extended posteriad; petiole pedunculate anteriorly and with distinct node; subpetiolar process present but small; postpetiole in lateral view dorsoventrally flattened, in dorsal view very broad, much broader than petiolar node; gastral shoulder indistinct or distinct; dorsa of head, mesosoma, waist and gaster lacking standing hairs.

***Bothroponera* sp.**

The genus is characterized by the narrowed, convex, and medially raised clypeus. The mandibles are triangular or narrowed with 6–9 teeth. The frontal lobes are rounded or semioval, divided by a well-developed frontal furrow. The pronotum of the worker lacks any evidence of a carina or shelf. The mesonotum is completely fused with the propodeum, and the notopropodeal suture is completely absent. The petiole is thick with a developed ventral process. The mesopleuron is not divided by an anapleural suture and is well separated from the metapleuron by the mesometapleural suture.



Plate I: *Oecophylla longinoda* (a) abdomen (b) appendages and thorax (c) head with eyes and mandibles.



Plate II: *Monomorium minimum* (a) head and thorax (b) head, thorax, and abdomen (c) abdomen.

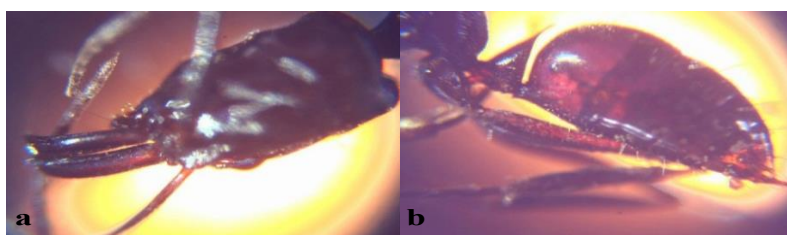


Plate III: *Odontomachus haematodus* (a) head with stinger and (b) abdomen.

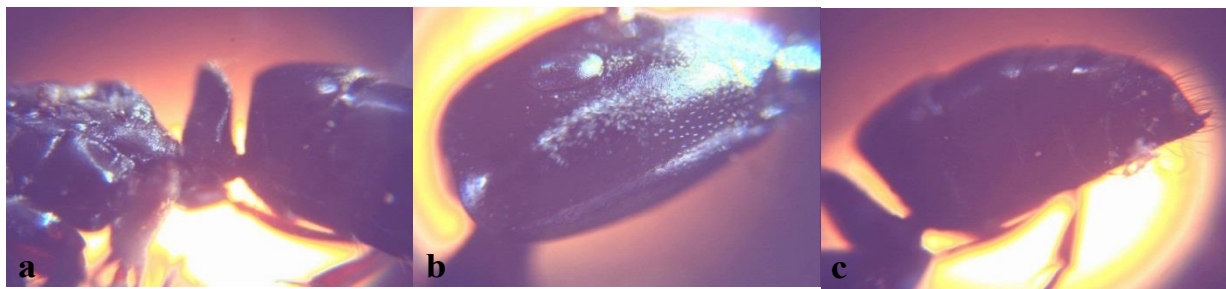


Plate IV: *Pachycondyla harpax* (a) petiole (b) head and (c) abdomen.



Plate V: *Camponotus terebrans* (a) head (b) appendages and (c) abdomen.



Plate VI: *Leptogenys elongata* (a) head and thorax (b) head with mandibles (c) abdomen.



Plate VII: *Cardiocondyla* sp. (a) head with mandibles (b) appendages and (c) abdomen.



Plate VIII: *Bothroponera sulcata*.(a) head, thorax, abdomen (b) Head with mandibles (c) abdomen.

DISCUSSION

In my studies carried out in Anyigba, Kogi State, eight (8) varieties of ant species were found and describe in Anyigba, Dekina Local Government Area of Kogi State. These species of ants are; *Oecophylla longinoda*, *Monomorium minimum* (Buckley), *Odontomachus haematodus*, *Cardiocondyla batesii*, *Pachycondyla*, *Camponotus ligniperda*, *Bothroponera pumicosa*, *Solenopsis solenopsisidis* and *Leptogenys elongate*. A similar study carried out in the Commercial Farm of the Obafemi Awolowo University, Ile-Ife, Nigeria between November 1980 and October 1981 and also between October 1987 and June 1988, (Badejo, 1990) observed the presence of these ant species. Six (6) of these ants' species were also found and Population of these species of *Oecophylla longinoda*, *Monomorium minimum* (Buckley), *Odontomachus haematodus*, *Cardiocondyla batesii*, *Pachycondyla*, *Camponotus ligniperda* ants reaches multiple peaks during raining season.

In this study, the population of ants appears to oscillate very high and tends to come out from their nest or colonies in search of food and also to carry out their activities to aid the growth of the colony. A study was carried out in Santa Catarina in 1999 (Lopes and Fowler, 2000) were 3 of the species (*Bothroponera pumicosa*, *Solenopsis solenopsisidis* and *Leptogenys elongate*), of ants found in Anyigba, Dekina Local Government Area of Kogi State were also found there, Same data and information concerning those same ant species was also identified and described. Data were obtained from local studies involving ant fauna surveys conducted in several regions of the state. Also the major findings was that ants in the normal temperature environments will definitely last longer than ants in a hot environment.

CONCLUSIONS

A total of nine (9) ant species were found and also described in Anyigba. Kogi State, this include; *Oecophylla longinoda*, *Monomorium minimum* (Buckley), *Odontomachus haematodus*, *Cardiocondyla batesii*, *Pachycondyla*, *Camponotus ligniperda*, *Bothroponera pumicosa*, *Solenopsis solenopsisidis* and *Leptogenys elongate*.

RECOMMENDATIONS

The need for more research in the biology and importance of ants should be carried out in Nigeria as they are little literatures on the occurrence of ant species in Nigeria.

ACKNOWLEDGEMENTS

The Laboratory Technologist, Department of Animal and Environmental Biology, Kogi State University, Anyigba for helping in the identification of the ant species.

REFERENCES

1. Agosti, D., Majer, J. D., Alonso, L. E. & Schultz, T. R. (2000). *Ants: Standard Methods for Measuring and Monitoring Biodiversity*. Smithsonian Institution Press. Washington D. C, 280.
2. Andersen. (2004). Ants show the way Down Under: invertebrates as bioindicators in land management. *Frontiers in Ecology and the Environment*, 2, 291-298.
3. Araujo, Y., & Beserra, P. (2007). Diversity of invertebrates consumed by the Yanomami and Yekuana communities from the Alto Orinoco, Venezuela. *Interciencia*, 32, 318-323.
4. Badejo, M. A. (1990). Seasonal abundance of soil mites (Acarina) in two contrasting environments. *Biotropica*, 22(4), 93.
5. Bolton, B. (1973). The ant genera of West Africa. A synonymic synopsis with keys (Hymenoptera Formicidae). *Bulletin of Museum of Natural History of Entomology*, 27, 319-368.
6. Bolton, B. (1994). *Identification guide to the ant genera of the world*. Harvard University Press, Cambridge, Massachusetts, 222.
7. Bolton, B. (2014). An online catalog of the ants of the world. Available from <http://antcat.org>. (Accessed 25 May 2014).
8. Botelho, J. B., & Weigel, V. (2011). The Satere-Mawe community of Yapyrehyt: ritual and health on the urban outskirts of Manaus. *History Sciences, Health Mangoes*, 18, 723 -744.
9. Boulton, A.M., & Amberman, K.D. (2006). How ant nests increase soil biota richness and abundance: a field experiment. *Bio-diversity and Conservation*, 15, 69-82.
10. Buckley, S. B. (1867). Descriptions of new species of North American Formicidae. *Proceedings of the Entomological Society of Philadelphia*, 6, 335-350.)
11. Buren, W. F. (1972). Revisionary studies on the taxonomy of the imported fire ants. *Journal of the Georgia Entomological Society*, 7, 1-27)
12. Cagniant, H. 2006. Liste actualisee des fourmis du Maroc (Hymenoptera: Formicidae). *Myrmecologische Nachrichten* 8, 193-200.
13. Cagniant, H. (2009). Le Genre *Cataglyphis* Foerster, 1850 au Maroc (Hymenoptera: Formicidae). *Orsis* 24: 41-71.
14. Crozier, R. H., Newey, P. S., Schlüns, E. A. & Robson, S. K. A. (2010). A masterpiece of evolution: *Oecophylla* weaver ants (Hymenoptera: Formicidae). *Myrmecological News*, 13, 57-71.
15. Del Toro, I., Floyd, K., Gardea-Torresdey, J., & Borrok, D. (2010). Heavy metal distribution and bioaccumulation in Chihua-huan Desert Rough Harvester ant (*Pogonomyrmex rugosus*) populations. *Environmental Pollution*, 158, 1281-1287.

16. Dennis, C. A. (2013). The distribution of ant species in Tennessee with reference to ecological factors. *Annals of Entomological Society of America*, 31, 267-307
17. Domisch, T. (2006). Contribution of red wood ant mounds to forest floor CO₂ efflux in boreal coniferous forests. *Soil Biology and Biochemistry*, 38, 2425-2433.
18. Frouz, J., & Jilkova, V. (2008). The effect of ants on soil proper-ties and processes (Hymenoptera: Formicidae). *Myrm ecological News*, 11, 191-199.
19. Giladi, I. (2006). Choosing benefits or partners: a review of the evidence for the evolution of myrmecochory. *Oikos*, 112, 481-492.
20. Hölldobler, B., & Wilson, E. O. (1990). *The ants*. 1st edition. Harvard University Press, Cambridge, M. A, 732.
21. Kempf, W. W. (2012). A study of some Neotropical ants of genus *Pheidole* Westwood. (Hymenoptera: Formicidae). *Study of Entomology*, 15, 449-464.
22. Kennedy, C. H. (1939). Notes on the hypogaeic ant, *Proceratium silaceum*. *Proceedings of Indiana Academy of Science*, 48, 202-210.
23. La Polla, J. S., Otte, D., & Spearman, L.A. (2011). Assessment of the effects of ants on Hawaiian crickets. *Journal of Orthoptera Research*, 9, 139-148.
24. Lopes, B. C., & Fowler. H. G. (2000). Fungus-growing ants (Hymenoptera:Formicidae) on Santa Catarina Island, Brazil: patterns of occurrence. *Revision on Biological and tropics Tropical entomology*, 48, 643-646.
25. Mahalakshmi, B.R., & Channaveerappa, H. (2016). Diversity of Ant Species (Hymenoptera: Formicidae) in the Campus of Maharani's Science College for Women: A Mini Model of Habitat Persistence. *International Journal of Pure and Applied Zoology*; 4(3), 277-281.
26. Majerj, D. (1972). The ant mosaic in Ghana cocoa farms. *Bulletin of Entomological Research*, 62: 151-160.
27. Watanasit, S., & Bickel, T.O. (2000). "Diversity of Ants from Ton Nga Chang Wildlife Sanctuary, Songkhla, Thailand", 187-194.
28. Way, M. J. (1954). Studies on the life history and ecology of the ant *Oecophlyiki longinoda* Latreille. *Bulletin of Entomological Research*, 45, 93-112.
29. Wheeler, M. (1910). *Ants, their structure, development and behaviour*. Oxford University Press, London, England.
30. Wilsone, O. (1959). Some ecological characteristics of ants in New Guinea rain forests. *Ecology*, 40, 437-447.