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Diversity and distribution of worker ants (Family: Formicidae) in selected sites in two dry zone districts of Sri Lanka and the potential of Neemazal –F and Citronella oil in the control of selected ant species.



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Abstract

Ants are very common in terrestrial ecosystems but the ant species that inhabit dry zone districts of Sri Lanka are not well documented. Worker ants in eighteen lands of Anuradhapura and Polonnaruwa districts were investigated from November, 2007 to October, 2008 by soil sifting, litter sifting, honey baiting and hand collection along each of the five, 100 m transects laid at all other locations and each of the four 100 m transects laid at Kahalle-Pallekele forest. Also, honey-baited pitfall traps were fixed randomly throughout each location and collected after five hours. All samples were preserved in 85% ethanol. Air and soil temperatures, soil pH and soil moisture% at each transect were also recorded. Cumulative species richness of worker ants recorded from each land increased with the use of several sampling methods as well as with the increase of number of transects laid at each of them. Thirty two genera and seventy two species belonging to six subfamilies were recorded from Anuradhapura lands. Cumulative species richness of ants gradually increased from nineteen to seventy two with the increase of number of lands to nine in this district. Thirty genera and seventy species of ants belonging to nine subfamilies were recorded from Polonnaruwa lands. Cumulative species richness increased from seventy two to eighty six after addition of fourteen other species observed at Polonnaruwa lands. *Solenopsis geminata* Fabricius (15%) was dominant in this collection and *Pheidole* sp. 4, *Tapinoma melanocephalum* Fabricius, *Pheidole* sp. 3, *Lophomyrmex quadrispinosus* Jerdon, *Monomorium pharaonis* L. and *Paratrechina longicornis* Latrielle were also observed in considerable proportions while a less than 5% proportion was represented by each of the other species ($H' = 3.0$). The number of

genera and the cumulative species richness of ants reached to forty two and ninety two, respectively with the addition of current findings to the previous information.

Burning of forest areas for chena cultivation is a common practice in the dry zone of Sri Lanka. How ants respond to environmental disturbances, the burning of a forest area and burning followed by chena cultivation was investigated by surveying the nests and species of ants in a 50 m x 50 m area of each of the three adjacent regions, a forest (F), a burned forest area (B) and a chena (C) in Kekirawa. Fifty, 0.5 m x 0.5 m quadrats were laid randomly throughout each region on the 30th January, 2009 while recording the number of nests and the nest owners in each quadrat and several environmental parameters at F, C and B. Significantly higher species richness values and nest densities were recorded from each F and C than those from B. The number of nests and nest owners observed in a quadrat was also different according to the type of land. The nests of eight species were common at the three lands while nine different nest-owning species were restricted to each F and C. The other species were common at two lands. The nests of *Camponotus compressus* Fabricius were observed only at B. *Anoplolepis gracilipes* Smith and *Monomorium pharaonis* L. are two household ant species that attend food and if the workers of the two species contaminate food by transmitting fungi or bacteria was also investigated. Worker ants of each species were collected in to sterilized Petridishes and five workers of each species were allowed to crawl for five minutes in each of the five Petridishes containing two culture media; Potato Dextrose Agar (PDA) for isolation of fungi and Nutrient Agar (NA) for isolation of bacteria under aseptic conditions. Five controls for each medium were also maintained. All PDA plates were incubated at room temperature for a week. All NA plates were incubated for an overnight at room temperature. Five

microorganisms transmitted by *A. gracilipes* and four microbes transmitted by *M. pharaonis* were identified. *Salmonella* sp. and *Micrococcus* sp. were the potential human pathogens among those microbes.

Insecticidal effects of neemazal- F and citronella oil, two biopesticides available in Sri Lanka, on six nuisance ant species were investigated in the laboratory. Graded series of neemazal –F and citronella oil were applied to the dorsal surface of prothorax of the workers of six ant species using a micro-applicator. LD₉₉ values of neemazal –F for *Anoplolepis gracilipes* Smith, *Crematogaster rothneyi* Mayr, *Odontomachus simillimus* Smith, *Oecophylla smaragdina* Fabricius, *Pheidole* sp. 3, *Solenopsis geminata* Fabricius were 0.4 mg, 1.7 mg, 0.4 mg , 1.1 mg, 0.9 mg and 1.9 mg per mg body weight and LD₉₉ values of citronella oil were 1.0 mg, 3.6 mg, 0.7 mg, 0.8 mg, 0.8 mg and 2.6 mg per mg body weight, respectively.