Different Type of Ant Species Nests in Periyanaickenpalyam Village, Coimbatore District, TamilNadu

ABSTRACT

The present study deals with the ant species trees associate in and around Periyanaickenpalyam village, Coimbatore district, TamilNadu from November 2017 to February 2018. The seasonal assemblage of ants and their species composition of ants were mostly presented in *Mesquite* (n=14)trees followed by *Azadiracaindica*(n=10*)* and *Mangiferaindica*(n=6) *Ficusreligiosa*(n=8) , *Shorearobusta*(n=5*)*,*Toona*(n=4),*Musa acuminate (n=3)* ants species, were less in *Cocosnucifera, Ficusbenghalensis, Bambuseae,* each species (n=2)and*Thespepsiapopulnea,,Cassia fistula,Santalum album, ,Gmeliaarborea, Caricapapya,Delonix, Tamrindsindica*which contain (n=1) for each species.Species wise, subfamily Formicinae abundant with *mesquite* (n=8)followed by *Azadiracaindica*and*Mangiferaindica*(n=4),*Ficusreligiosa,Cocosnucifera,Musa acuminate,Shorearobusta,Bambuseae,Delonix,Tamrindsindica*which has (n=2) species for eachspecies.TheDolichoderinae species only occurred in *Sandalum album* (n=1).

KEY WORDS: *Azradicaindica, Mesquite,* Formicinae, Nests

1. INTRODUCTION

Ants are ubiquitous in distribution and occupy almost all terrestrial ecosystems. There are about 15000 species of ants [1] only 11,769 species have been described [2].

Ants play an important role in with in the terrestrial ecosystems because they have numerous interactions with different plants species, including seed dispersers, leaf- and seed predators and in some cases, as pollinators [3, 4].

It is part of a series that details many aspects of the relationship between biodiversity, forest disturbance and reforestation at this same site although not as species globally as the Coleoptera, Hymenoptera (Parasitica) and Diptera, ants can contribute significantly to local species richness. For example, recorded 43species of ants [5, 6, and 7] from a single tree in Brazil. Ants are also relatively well known taxonomically, both in West and Central Africa, and for the world as a whole [8].

In urbanization process urban ecosystem are create. Rapid urbanization, natural areas. Under the urban zones will play critical role in safeguarding biodiversity [9]. All of this belong to a single family called Formicinae included in the super family vespoidea of the order Hymenoptera, which is placed in the largest class insect in the animal kingdom. Recently, these subfamilies Martialinae has been added to the family Formicidae [10]. The aim of nest behaving study is nourishment of soil by ants and their nesting.

2. MATERIALS AND METHODS

2.1 Study area

The field work was conducted in the Periyanaickenpalyam village, Coimbatore district, TamilNadu. Coimbatore lies at 11°1′6″N, 76°58′21″E, in south India at 411 metres (1349 ft) above sea level on the banks of the Noyyal River, in southwestern Tamil Nadu . The average annual rainfall is around 700 mm (27.6 in) with the northeast and the southwest monsoons contributing to 47% and 28% respectively to the total rainfall. Periyanaickenpalayam is a neighbourhood in Coimbatore in the Indian state of Tami nadu. It is located along National Highway NH 67, Mettupalayam road, an arterial road in Coimbatore.

2.2 Collection Method

We employed all out search method for the collection of ants in November 2017 to February 2018. Ants were collected using a brush and forceps during day time in between 11am to 4 pm twice in every month.

2.3 Preservation method

Ant's species were preserved in 70% ethanol in plastic vials at the Department of Zoology, PSG College of arts and science. The stored ant specimens were then counted and identified up to genus level (some to species level) using microscope. Species identification was carried out under the help of the keys of "Ants identification guide" [11] collected ants were identified up to the genus level by using based on literature [12, 13, 14, 9 and 15]. Identified specimens will be kept in the air tight insect wooden box. Ant species were listed and each species was counted to calculate and compared composition, richness, species diversity, trees association, habitat type and identification of ants.

2.4 Measurement of diversity

Relative density of the species was calculated by the formula,

Relative Density (%) = (Number of individuals of one species / Number of individuals of all species) X =100.

(SDI), and Shannon-Wiener index. SDI is a measure of diversity which takes into account the number of species present, as well as the relative abundance of each species. SDI is calculated using the formula,

Where,

$D = \Sigma n\ (n-1)/ N\ (N-1)$

n=total number of organisms of a particular species and *N*=total number of organisms of all species. Subtracting the value of Simpson's index from 1, gives Simpson's Index of Diversity (SID).

Shannon-Wiener index (*H'*) is another diversity index and is given as follows

$H' = -\Sigma\ Pi \ln (Pi)$,

Where,

$Pi = S/N$

S=number of individuals of one species, *N*=total number of all individuals in the sample, *ln*=logarithm to base e. Dominance index is a measure of how dominants (or similar), (D) follows the formula D=n (100/N), where n=individual number, N=total number of species.

3. RESULTS

Ants sampled from November 2017 to February 2018, varied with the seasons and the type of trees. They were mostly represented by five distinct sub families viz, Formicinae, Myrmicinae, Dolichoderinae, Pseudomyrmicinae and Ponerinae.From the table 1 showing the trees association of ants species in the Periyanaickenpalyam village. The ants were associated with trees including the Neem (*Azadiracaindica)*, Sacred fig (*Ficusreligiosa)*, Sal (*Shorearobusta*), Coconut (*Cocosnucifera)*, Banayan (*Ficusbenghalensis)* , Sandalwood (*Santalum album)*, Mango (*Mangiferaindica),* Toona (*Toona*), Whiteteak (*Gmelinaarborea*),Bamboo (*Bambuseae*),Papaya (*Caricapapya*),and Banana (*Musa acuminate*) .The ants were mostly presented in karuva (*Mesquite) (*n=14) trees followed by Neem (*Azadiracaindica*)(n=10), *Ficusreligiosa (n=8), Mangiferaindica (n=6), Shorearobusta*(n=5),*Toona*(n=4), *Musa acuminate* (n=3) ants species, were as less in *Cocosnucifera, Ficusbenghalensis, Bambuseae, Santalum album, , Gmeliaarborea, Caricapapya,,Thespepsiapopulnea, Delonix, Tamrindsindica*and *Cassia fistula*(n=2) trees.

Table 1 showing the ants and their trees association in Periyanaickenpalyam village, Coimbatore district

Trees association	**H**	**D**
Azadiracaindica	0.94325	2.38
Ficusreligiosa	0.90018	2.1335
Shorearobusta	0.673	1.923
Cocosnucifera	0	0
Ficusbenghalensis	0	0
Santalum album	0.6932	2
Mangiferaindica	1.213	2.909
Toona	0.56233	1.6
Gmelinaarborea	0.69315	2
Bambuseae	0	0
Carica papaya	0.69315	2
Mesquite	1.0997	2.51294
Thespepsiapopulnea	0.6932	2
Delonix	0	0
Tamrindsindica	0	0
Cassia fistula	0.6932	2
Musa acuminate	1.397	2.66

*D-Simpson's index, H-Shannon wiener index

Species wise, subfamily Formicinae abundant with karuva (*Mesquite) (*n=8) followed by Neem (*Azadiracaindica), Mangiferaindica*(n=4)*, Ficusreligiosa, Cocosnucifera, Musa acuminate, Shorearobusta, Bambuseae, Delonix, Tamrindsindica*which constitute foreach species(n=2) and the minimum level ant species occurred in *Toona, Santalum album, Gmeliaarborea, Carica papaya,Thespepsiapopulnea Cassia fistula* contain *(n=1)* species.Subfamily Myrmicinae, maximum in *Mesquite, Azadiracaindica (n=5),*

Shorearobusta, Toona, Cinamoumverum which contain *(n=3), Ficusreligiosa (n=2), Santalum album, Mangiferaindicia,Thespepsiapopulnea, Cassia fistula, Musa acuminate, Gmeliaarborea*and*Caricapapya.* Mymicinae subfamily absent in *Bambuseae, ,Cocosnucifera,,Delonix,Tamrindsindica, Ficusbenghalensis* along with and Subfamily Ponerinae present in *Cinomoumverum (n=1)*. Along with (SD: 0.243, SE: 0.059, AM: 1.35). Pseudomyrmicinae subfamily ants associated on some trees like *Magniferaindica, Cinomumverum (n=2), Azadiracaindica, Ficusreligiosa, Musa, acuminare* which contain for each species *(n=1)*. The Dolichoderinae species only occurred in *Sandalum album (n=1)* trees.

Table 2 showing the ant species and their nests in Periyanaickenpalyam village

S.NO	Species	Number Of Species	Percentage (%)	Number Of Nests	Percentage (%)
1	*radiates*	. 8	14%	47	16.26%
2	*compressus*	12	21%	61	21.1%
3	*Irritans*	3	5.26%	11	3.80%
4	*Parius*	3	5.26%	12	4.15%
5	*fabricus*	2	3.5%	7	2.42%
6	*sericeus*	1	1.75%	11	3.80%
7	*Maculatus*	2	3.5%	11	3.80%
8	*germinata*	7	12.2%	44	15.2%
9	*Destructor*	2	3.5%	6	2.07%
10	*Rufonigra*	5	8.7%	25	8.65%
11	*smaragidina*	1	1.75%	6	2.07%
12	*Pharaonis*	2	3.5%	18	6.22%
13	*gracillipes*	1	1.75%	3	1.03%
14	*longicornis*	2	3.5%	3	1.03%
15	*minimum*	2	3.5%	8	2.76%
16	*subnuda*	1	1.75%	3	1.03%
17	*allaborans*	2	3.5%	6	2.07%
18	*spp(flying)*	1	1.75%	7	2.42%

From the Table 2 showing the ant species and their total number of nests in Periyanyackenpalayam village. In Periyanaickenpalayam village, Species *compressus*(n=12)which was dominant with the percentage of 21% followed by *smaragidina*(n=10) with1.75%, *radiates* (n=8) contain 14%, *germinata*(n=7), 12.2%,*rufonigra (*n=5)with 8.7% *and irritans, parius*(n=3) with5.26%.In *longicornis, allaborans, pharnois, destructor* and*fabricus*species *with the percentage* of 3.5%. The minimum level species were*subnuda, sericusgracillipes, spe (flying) (n=1)* with 1.75%. Number of nests were different from place to place, maximum nests in *compressus (n*=61)

with the fraction 21.1%,followed by *radiates (*n=47) 16.26%*, germinata*(n=44) which consists 15.2%, *parius (*n=12), with the 4.15%,*rufonigra*(n=25)comprises of 8.65%,*pharnois*(n=18) with 6.22%,*sericeus, irritans, maculatuss* each contains *(*n=11), 3.80%*fabricus and spe (flying) each (*n=7) which covers 2.42%,*destructor,smaragidina, allaborans*species *(n=6)*which contains 2.07%. The minimum abundant ant species were *gracillipes, longicornis, subnuda (n=3)* which involves each 1.03% species.Dolichoderinae and Ponerinae species nests were absent in Periyanaickenpalayam village.

4. DISCUSSION

The most common among them were *Oecophyllasmaragdina*, a truly arboreal species. These ants nested in shady places and require broad leaves to stitch their nest. All the recorded species of *Polyrhachis*were arboreal and found in undisturbed areas. These ants nested on the ground such findings were also recorded in this study though not to such an extent of work. Ponerinae subfamily was more specific about its niche and food habits. Subfamily DolichoderinaeThe only species in this genus was the ubiquitous *Tapinoma sessile* (Say). Thisdiminutive, but aggressive, species showed no preference for nest substrate,consistent with its ability to inhabit virtually any habitat [16].

Earlier, it was observed the dominance of Myrmicine ants during summer (April – May) and post rainy (October-November) seasons; Formicine ants during rainy (July – August) and post rainy seasons (October-November) The Myrmicine ants also predominated in terms of their proportion to total ants on trees *viz*., Sandalwood (15.43%), Teak (14.23%) and Neem (14.07%) irrespective of seasons, while the Dolichoderine ants exceptionally predominated on Sissoo (9.35%) [17].

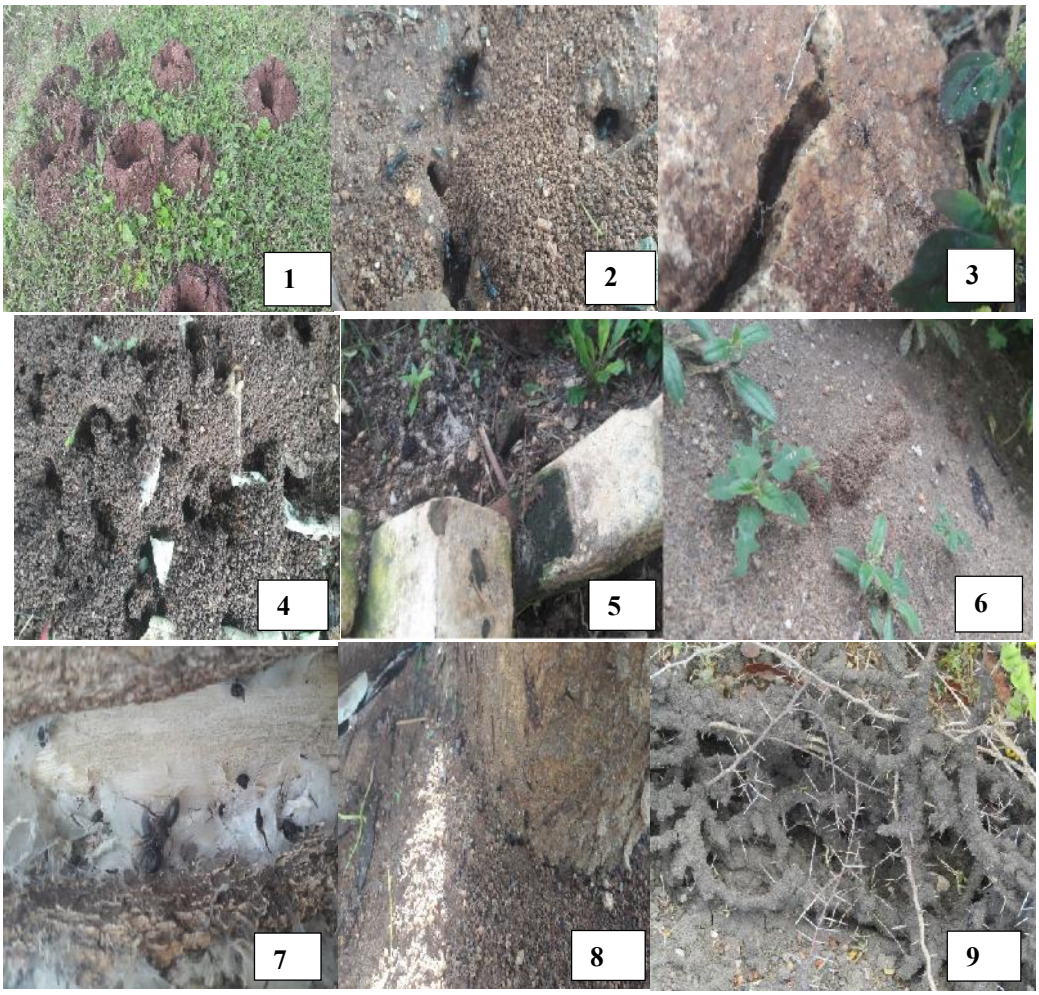
The ants were associated with trees including the Neem (*Azadiracaindica)*, Sacred fig (*Ficusreligiosa)*, Sal (*Shorearobusta*), Coconut (*Cocosnucifera)*, Banayan (*Ficusbenghalensis)*, Sandalwood (*Santalum album)*, Mango (*Mangiferaindica),* Toona (*Toona)*, White teak (*Gmelinaarborea),* Bamboo (*Bambuseae),* Papaya (*Caricapapya)* and Banana (*Musa acuminate)* .The ants are mostly presented in karuva (*Cinamoumverum)* trees followed by Neem (*Azadiracaindica)*, *Ficusreligiosa , Mangiferaindica , Shorearobusta , Toona , Musa acuminate* ants species were less in *Cocosnucifera, Ficusbenghalensis, Bambuseae, Santalum album, ,Gmeliaarborea, Caricapapya,,Thespepsiapopulnea, Delonix, Tamrindsindica and ,Cassia fistula* each.

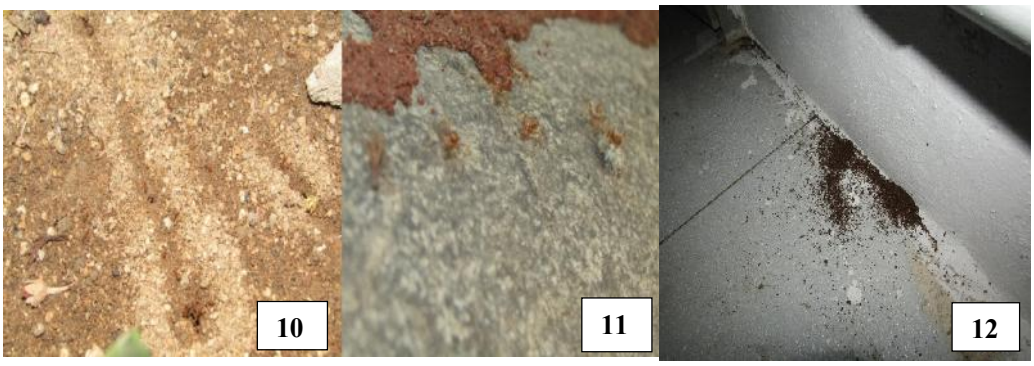
Sunil Kumar *et al* [18] reported the ant species richness generally increases with increase in vegetation. Every year, several millions of seeds per hectare are collected by those species [19]. Seed harvesting is especially common within the Myrmicinae genera specifically Messor, Pogonomyrmex as well as in some species of Pheidole found in arid habitats. In the case of seed-dispersal or myrmecochory, plants produce seeds bearing a lipid-rich part, the elaiosome, which attracts ants but does not play a role in germination. As the elaiosome is usually carried back to the ant nest before it is eaten, this protects the seeds against predation, fire, or desiccation and promotes seed germination. This mutualistic interaction between ants and plants has been documented for approximately 11 000 species of plants and is geographically widespread and especially common in the arid regions of Australia or South Africa [20].

5. CONCLUSION

The diversity dynamic patterns of ants on various trees inurban habitat as observed in the present investigation indicated absence of anthropogenic pressures. So it was to maintain a variety of habitat types in order to conserve the high species richness in urban areas. Tree. Among the sub-families, Formicinaerepresented by 6-7 species dominated on all the trees. Maximum ant species abundant in *Azradicaindica*and *Mesquite* trees. The Myrmicinaeants with 2-4 species were the nextpredominating in such undisturbed ecosystem across season (November 2017 to February 2018). Nesting and species number is rich depending trees association.

PLATE 1





1 *Camponotus spp,*2 *Componotus compressus,* 3 *Camponotus sericeus,* 4 *Camponotus fabricus,* 5 *Monomorium destructor, 6 Crematogaster subnuda*, 7 *Componotus spp, 8 Camponotuscompressus, 9 componotus spp,10 Monomoriumpharaonis, 11 Oecophyllasmaragidina, 12 Paratrechinalongicornis*

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