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FEEDING PREFERENCES AND DIVERSITY OF TERMITES OF IRAN*

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Abstract: For feeding preferences of termites of Iran, 81 plots of 30 m x 30 m were selected. On the basis of importance value of tree/shrub, five habitats were recognized *i.e.*, *Populus caspica, Tamarix gallica, Morus alba, Salix babylonica* and *Vitis vinfora*. *Populus caspica* habitat harboured *13 species of termites and this habitat was more diverse in its vegetation than other habitats. The values of H, H_{max} and E for termite diversity in P. caspica were 3.4556, 3.7004 and 0.9329 respectively. The species richness was 5.7518. Simpson index being the index of dominance revealed a value of C=0.1783 to which Postelectrotermes pasniensis alone contributes a value of 0.1021. Postelectrotermes pasniensis had more colonies of termites on trees in this habitat as compared to other termite species and its preferred host was P. caspica. In T. gallica habitat only two termite species i.e., Anacanthotermes iranicus and A. vagans* were feeding on trees. *Anacanthotermes vagans* has positive association with *T. gallica* habitat. The value of H, H_{max} and E were 0.9708, 0.9999 and 0.9708, respectively. The species richness was 0.59 and was much less than that of *P. caspica* habitat (5.7518). *Postelectrotermes pasniensis* mostly preferred *P. caspica* and *A. vagans* mostly preferred *T. gallica* and *M. alba*. In *Populus diversifolia* habitat, it is interesting to note that only *P. pasniensis* was recorded, and no other termite species was recorded attacking this tree.

Key words: Feeding, diversity, termites, Iran.

INTRODUCTION

For feeding preferences of termites, eighty-one plots in Iran were surveyed and were classified on the basis of vegetation *i.e.*, trees/shrubs. Tree preferences of termites and their habits of feeding on trees were recorded in different habitats. Lot of work on feeding preferences of termites has been done in different parts of the world (Fougerousse, 1969; Behr *et al.*, 1972; Howick, 1975; Wood and Johnson, 1978; Rugooka and Howick, 1978; Akhtar and Ali, 1979; Akhtar, 1981; Afzal, 1981; Carter, 1981; Collins, 1981; Akhtar and Raja, 1985; Lenz, 1986; Lenz *et al.*, 1987; Waller, 1988; Akhtar and Shahid, 1989). For termites of Iran, this report provides some basic information about the feeding preferences of termites and their diversity in different habitats.

MATERIALS AND METHODS

Different termite affected areas in Iran, *i.e.*, Province of Sistan and Baluchistan, Kerman, Hormuzan, Khurasan, Esfahan, Khuzistan, Fars, Tehran and Mazandaran were

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surveyed for the feeding habits and feeding preferences of termites. The plots established for studies in these areas are shown in Fig.1. These plots (81 in total; each 30 m x 30 m) were grouped together on the basis of importance value of the trees.

Vegetation

For vegetation, quadrat of 30 m x 30 m size was used for counting the number of trees/shrubs to work out importance value. Here the importance value is based on the number of trees. As pointed out by Odum (1975) the importance value can be number, biomass, productivity, surface coverage and so on. Habitat was named after a tree or a shrub species having the highest importance value.

Termites

Soldier, workers of the termite species collected from trees from different plots were preserved in 80% alcohol and brought to the laboratory for identification.

The relative frequency of different species of termites was worked out as follows:

$$\frac{\text{Fi of a species}}{\text{Fi of all the species}} \times 100$$

$$\text{Where F1} = \frac{\text{Point of occurrence of a species in all the quadrats}}{\text{Total number of quadrats}}$$

Species richness was worked out according to Odum (1975).

$$\text{Species richness or variety (dl)} = \frac{S-1}{\log N}$$

where S = number of species and N = number of termite colonies.

Diversity indices were worked out according to Simpson (1949) and Shannon Wiener function. Here the importance value for termites is not based on the number of individuals but on the number of termite colonies/nests recorded from infested trees in different habitats.

i) Simpson index: $(D) = \Sigma(Pi)^2 \times S$

ii) Shannon index $(H) = \Sigma(Pi)(\log^2 Pi)$, $i = 1$

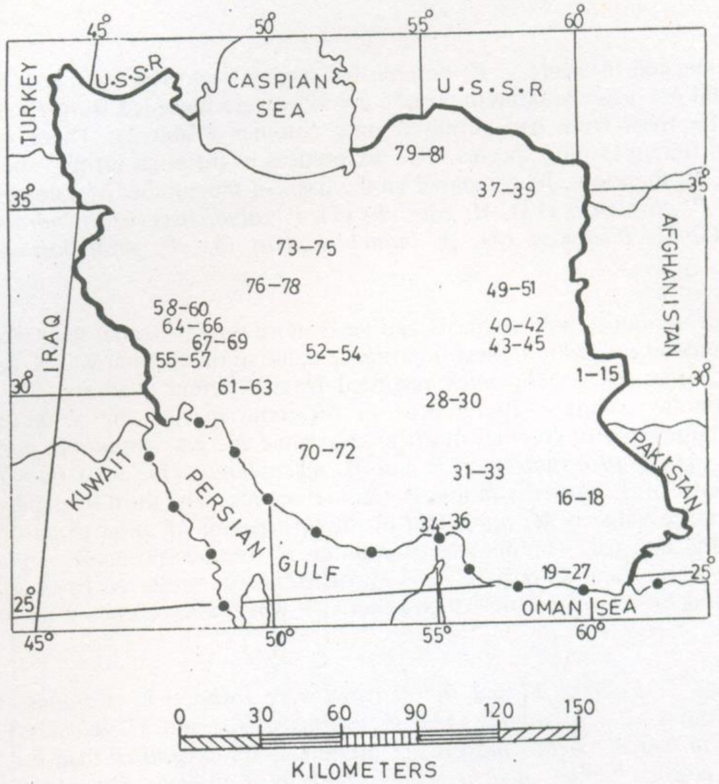

Fig. 1: Map of Iran showing location of sampled pots.

iii) Evenness index $(E) = \dfrac{H}{\log S}$

H = Shannon index
S = Number of termite species.

RESULTS

Based on importance value (Table 1), five tree habitats were identified. The habitats recognized are: *P. caspica, T. gallica, M. alba, S. babylonica* and *V. vinfora*. Distribution of 16 termite species in these habitats has b. ı studied and is described below:

Populus caspica habitat

As is indicated in Table 1, *P. caspica* has higher importance value (185) than *S. babylonica* and *M. alba*. Maximum termite colonies were recorded from *P. caspica* and 46 out of 185 trees were harbouring termite colonies (Table 2). These 46 colonies belonged to different termite species. The preferences of different termite species for *P. caspica* tree can, therefore, be compared on the basis of the number of colonies (given in parentheses): *P. pasniensis* (13), *M. gabrielis* (7), *P. zabuliensis* (6), *A. paravilis* (6), *P. bidentatus* (4), *M. buettikeri* (4), *A. baluchistanicus* (3), *P. prohybostoma* (2), *H. indicola* (1).

Postelectrotermes pasniensis feeds and nests more on *P. caspica* than other termite species. The second tree with highest importance value in this habitat was *S. babylonica*. Out of the 92 trees of *S. babylonica* recorded from different quadrats, 15 trees were harbouring termite colonies. Preferences of different species for *S. babylonica* is indicated by the number of colonies of different termite species. *Amitermes paravilis* (8), *P. pasniensis* (4), *P. prohybostoma* (2) and *M. mycophagus* (1). *Salix babylonica* was the preferred host of *A. paravilis* in this *P. caspica* habitat. The third tree species having highest importance value is *M. alba*. Out of the 63 trees of *M. alba* examined, only 6 trees were found infested. The number of colonies of termite species *A. vagans* and *P. prohybostoma* were 4 and 2, respectively. *Morus alba* was preferred by *A. vagans* and was not attacked by *P. pasniensis* which otherwise was a very common termite in this habitat.

As regards *T. gallica*, 17 out of 60 trees were infested by termites. Based on number of colonies *i.e.*, *A. vagans* (13), *P. pasniensis* (3) and *M. buettikeri* (1), it is easy to comment that *A. vagans* has greater preference for *T. gallica* than for any other tree in this *P. caspica* habitat. *Acacia seyal* comprised of 44 trees. Out of these, 5 were infested and only 2 termite species were nesting on this tree species. *Psammotermes prohybostoma* was represented by 4 colonies and *P. rajasthanicus* by only 1 colony. Thirty-three trees of *P. diversifolia* were recorded in the above mentioned habitat. Out of these, 10 were infested by *P. pasniensis* alone. It is interesting to note that no other termite species attacked *P. diversifolia*.

As regards, *T. diocia*, 5 out of 32 trees were harbouring termites belonging to *A. vagans*. From 31 trees of *Phoenix dactylofolia*, 4 colonies of termites belonging to *M. diversus* were collected. No other termite species attacked this tree, *i.e.*, *P. dactylofolia*. Thirteen trees of *P. alba* were recorded in the *P. caspica* habitat. Out of these, 9 trees were harbouring termites. *Postelectrotermes pasniensis* infested 7 and *P. zabuliensis* infested 2 trees of this species. Out of the 12 trees of *Populus lilita*, only 1 tree was harbouring colony of *P. pasniensis*.

Briefly, 13 termite species were recorded from the *P. caspica* habitat. Out of these, only *P. pasniensis*, *A. vagans*, *M. buettikeri*, *M. gabrielis* have positive association with *P. caspica* habitat (Tables 3 and 4).

Table 1: Habitat types found in the study area of Iran surveyed for termites.

Plot Number	*Populus caspica* 1-27,28-33, 34-36,55-69	*Tamarix gallica* 37-51	*Morus alba* 52-54, 73-78	*Salix baby-lonica* 79-81	*Vitis vinfora* 70-72	Total
Trees/Shrubs						
Populus caspica	185*	-	-	-	-	185
Tamarix gallica	60	98	-	-	-	158
Populus alba	13	-	-	-	-	13
Populus diversifolia	33	-	-	-	-	33
Populus lilita	12	-	-	-	-	12
Tamarix aphylla	26	37	-	-	-	63
Tamarix dioica	32	97	-	-	-	129
Salix babylonica	92	-	-	19	-	111
Phoenix dactylofolia	31	-	-	-	-	31
Morus alba	63	42	46	-	9	160
Acacia seyal	44	-	-	-	-	44
Morus indica	-	46	-	-	-	46
Acer candatum	-	-	-	-	4	4
Acer monspessulanum	-	-	9	-	-	9
Acer cinerascens	-	-	-	11	-	11
Vitis vinfora	-	-	-	-	26	26
Vitis parrifera	-	-	-	-	15	15
Total:	591	320	55	30	54	1050

* Importance value of trees in each habitat.

Species diversity

There were 13 species of termites in *P. caspica* habitat. Diversity of termites (based on number of colonies of different termite species) is indicated in Table 5. Termite diversity (1-D=0.8216) on Simpson Scale is 82% and on Shannon Scale ($H/\log_2 S$) or (H/H_{max}) is 93%. The values of H, H_{max} and E were 3.4556, 3.7004 and 0.9329, respectively. The species richness or variety (dl) was 5.7518 (Table 5). The value of C index of dominance is 0.1783, to which *P. pasniensis* alone contributes a value of 0.1021. This is due to representation of more colonies of *P. pasniensis* on trees in the said plots.

As regards diversity of vegetation (here trees/shrubs) in *P. caspica* habitat, the values of H, H_{max} and E were 3.016, 3.4594, 0.8718, respectively (Table 6). If compared with diversity of termites in *P. caspica* habitat, there is lesser tree diversity and equitability.

Table 2: Number of trees attacked by termites in different tree habitats.

Trees/ Shrubs	*Populus caspica* No.of trees	No.of infested trees	*Tamarix gallica* No.of trees	No.of infested trees	*Morus alba* No.of trees	No.of infested trees	*Salix babylonica* No.of trees	No.of infested trees	*Vitis vinfora* No.of trees	No.of infested trees
Populus caspica	185	46	-	-	-	-	-	-	-	-
Tamarix gallica	60	17	98	26	-	-	-	-	-	-
Morus alba	13	9	-	-	-	-	-	-	-	-
Populus diversifolia	33	10	-	-	-	-	-	-	-	-
Populus lilita	12	1	-	-	-	-	-	-	-	-
Tamarix aphylla	26	4	37	4	-	-	-	-	-	-
Tamarix dioica	32	5	97	14	-	-	-	-	-	-
Salix babylonica	92	15	-	-	-	-	19	1	-	-
Phoenix dactylofolia	31	4	-	-	-	-	-	-	-	-
Morus alba	63	6	42	4	46	3	-	-	9	2
Acacia seyal	44	5	-	-	-	-	-	-	-	-
Morus indica	-	-	46	2	-	-	-	-	-	-
Acer candatum	-	-	-	-	-	-	-	-	4	1
Acer monspessulanum	-	-	-	-	9	1	-	-	-	-
Acer cinerascens	-	-	-	-	-	-	11	3	-	-
Vitis vinfora	-	-	-	-	-	-	-	-	26	5
Vitis parrifera	-	-	-	-	-	-	-	-	15	2
Total:	591	122	320	50	55	4	30	4	54	10

Tamarix gallica habitat

As is indicated in Table 1, *T. gallica* and *T. diocia* have importance value (based on the number of trees) 98 and 97, respectively. In this *T. gallica* habitat, maximum (26) colonies were recorded from *T. gallica* (Table 2). The preference of different termite species for *T. gallica* can be compared on the basis of number of colonies (given in parenthesis): *A. iranicus* (20), and *A. vagans* (6). *A. iranicus* has a greater preference for *T. gallica* than that of *A. vagans*.

The number of termite colonies found on *T. diocia* are: *A. iranicus* (10) and *A. vagans* (4). Out of 37 trees of *T. aphylla*, four trees were infested by *A. vagans*. Only 4 out of 42 trees of *M. alba* were infested by termites and only *A. vagans* was recorded feeding on this tree.

Table 3: Distribution of termites in relation to different habitat types in Iran.

Termite species	*Populus caspica*	*Tamarix gallica*	*Morus alba*	*Salix babylonica*	*Vitis vinfora*	Total
Postelectrotermes pasniensis	++	-	-	-	-	1
P. zabuliensis, n.sp.	+	-	-	-	-	1
P. bidentatus, n.sp.	+	-	-	-	-	1
Anacanthotermes vagans	++	++	+	-	-	3
A. gurganiensis, n.sp.	-	-	-	+	-	1
A. iranicus, n.sp.	-	+	-	-	-	1
Psammotermes prohybostoma, n.sp.	+	-	-	-	-	1
P. rajasthanicus	+	-	-	-	-	1
Heterotermes indicola	+	-	-	-	-	1
Microtermes mycophagus	+	-	-	-	-	1
Microcerotermes diversus	+	-	-	-	+	2
M. buettikeri	++	-	++	-	-	2
M. gabrielis	++	-	-	-	-	1
Amitermes paravilis, n.sp.	+	-	-	-	-	1
A. baluchistanicus	+	-	-	-	-	1
A. belli	-	-	+	-	-	1
Total:	13	2	3	1	1	20

+ present, - absent, ++ positive association
For method of calculation see Table 4.

Fourty-six trees of *M. indica* were recorded in *T. gallica* habitat. Out of these only 2 trees were infested with *A. vagans*.

Briefly speaking only 2 termite species *i.e.*, *A. iranicus* and *A. vagans* were feeding on trees in *T. gallica* habitat. Only *A. vagans* has got positive association with *T. gallica* habitat (Tables 3 and 4).

Species diversity

There were 2 species of termites in *T. gallica* habitat. Diversity of termites is indicated in Table 7. Termite diversity on Sampson Scale is 48% and on Shannon Scale 97%. This is expected because more even or equitable distribution of number of colonies among species will increase diversity measured by Shannon-Wiener function. The values of H, H_{max} and E were 0.9708, 0.9999 and 0.9708, respectively. The species richness index = 0.5917 (Table 7).

Table 4: **Association between *Populus caspica* habitat and termite species.**

Termite species	Observed value			
	Present	Not present	Total (A)	Association
Postelectrotermes pasniensis	10	41	51	Positive
P. zabuliensis, n.sp.	3	48	51	Negative
P. bidentatus, n.sp.	2	49	51	Negative
Anacanthotermes vagans	10	41	51	Positive
Psammotermes prohybostoma, n.sp.	3	48	51	Negative
P. rajasthanicus	1	50	51	Negative
Heterotermes indicola	1	50	51	Negative
Microtermes mycophagus	1	50	51	Negative
Microcerotermes diversus	2	40	51	Negative
M. buettikeri	5	46	51	Positive
M. gabrielis	6	45	51	Positive
Amitermes paravilis, n.sp.	3	48	51	Negative
A. baluchistanicus	2	49	51	Negative
Total (B):	49	614	663 (C)	
Expected value =	3.76	47.23		

* Calculated by comparing observed value (number of plots having a particular termite species) and expected value. Expected value was determined by multiplying marginal totals (A & B) and dividing the product by grand total (C). Positive association: Observed value > Expected value. Negative association: Observed value < Expected value. Independent: Observed value = Expected value.

As regards diversity of vegetation in *T. gallica* habitats, the value of H, H_{max} and E were 2.1912, 2.3219 and 0.9437, respectively (Table 8). If compared with diversity of termites in *T. gallica* habitat, there is greater tree diversity but lower equitability.

Morus alba habitat

As is indicated in Table 1, *M. alba* has higher importance value than *Acer monspessulanum*. More termite colonies were recorded from *M. alba* and 3 out of 46 trees were infested by termites (Table 2). Preference of different species can be compared on the basis of number of colonies (which are given in parentheses): *M. buettikeri* (2), *A. vagans* (1) and *A. belli* (1). Only *M. buettikeri* has positive association with it.

Table 5: **Proportional abundance of termites and their diversity indices in *Populus caspica* habitat.**

Termite species	No. of colonies	Average frequency	% of total	Proportional abundance (*Pi*)	*Pi*2xS*	*Pi* log2** (*Pi*)xS
Postelectrotermes pasniensis	39	0.7647	31.96	0.3196	0.1021	0.5259
Anacanthotermes vagans	26	0.5098	21.31	0.2131	0.04541	0.4752
Amitermes paravilis, n.sp.	14	0.2745	11.47	0.1147	0.01315	0.3583
Psammotermes prohybostoma, n.sp.	9	0.1764	7.37	0.07377	0.005442	0.27736
Postelectrotermes zabuliensis, n.sp.	8	0.1568	6.55	0.06557	0.004299	0.25769
Microcerotermes gabrielis	7	0.1372	5.73	0.05737	0.003291	0.2365
M. buettikeri	5	0.09803	4.10	0.04098	0.001679	0.18887
Postelectrotermes bidentatus, n.sp.	4	0.07843	3.27	0.03278	0.001074	0.16163
Microcerotermes diversus	4	0.07843	3.27	0.03278	0.001074	0.16163
Amitermes baluchistanicus	3	0.05882	2.45	0.02459	0.0006046	0.13145
Heterotermes indicola	1	0.01960	0.82	0.008196	0.00006717	0.05679
Microtermes mycophagus	1	0.01960	0.82	0.008196	0.00006717	0.05679
Psammotermes rajasthanicus	1	0.01960	0.82	0.008196	0.00006717	0.05679
Total:	122	2.39191			D=0.17832	H=3.45225
					E = 0.9329	
					dl = 5.7518	

*: Simpson index; **: Shannon-Wiener function

Species diversity

There were 3 species of termites in *M. alba* habitats. The value of H, H_{max} and E were 1.4997, 1.58449 and 0.9464, respectively. The species richness index is 3.32 (Table 9).

As regards diversity of vegetation in *M. alba* habitat, there are only 2 species of trees and value of H, H_{max} and E are 0.6428, 0.9999 and 0.6428, respectively (Table 10). The species richness index is 0.5747. The value of C (index of dominance) is 0.7260 to which *M. alba* contributes a value of 0.6993. This is due to presence of more trees of *M. alba* in the said plots.

Table 6: **Proportional abundance of tree and their diversity indices in *Populus caspica* habitat.**

Tree species	No. of trees	Average frequency	% of total	Proportional abundance (*Pi*)	*Pi*2xS*	*Pi* log2** (*Pi*)xS
Populus caspica	185	3.6274	31.3028	0.3130	0.09796	0.5245
Salix babylonica	92	1.8039	15.5668	0.1556	0.02421	0.4170
Morus alba	63	1.2352	10.6598	0.10659	0.01136	0.3442
Tamarix gallica	60	1.1764	10.1522	0.1015	0.01030	0.3349
Acacia seyal	44	0.8627	7.4450	0.07445	0.005542	0.2790
Populus diversifolia	33	0.6470	5.5837	0.05583	0.003116	0.2324
Tamarix dioica	32	0.6274	5.4145	0.05414	0.002931	0.2277
Phoenix dactylofolia	31	0.6078	5.2453	0.05245	0.002751	0.2230
Tamarix aphylla	26	0.5098	4.3993	0.04399	0.001935	0.1982
Populus alba	13	0.2549	2.1996	0.02199	0.000483	0.1210
Populus lilita	12	0.2352	2.0304	0.02030	0.000412	0.1141
Total:	591	11.5877			D=0.161000	H=3.016

*: Simpson index
**: Shannon-Wiener function

E = 0.8718
dI = 3.608

Table 7: **Proportional abundance of termites and their diversity indices in *Tamarix gallica* habitat.**

Termite species	No. of colonies	Average frequency	% of total	Proportional abundance (Pi)	Pi2xS*	Pi log2** (Pi)xS
Anacanthotermes iranicus, n.sp.	30	2	60	0.6	0.36	0.4421
Anacanthotermes vagans	20	1.3333	40	0.4	0.16	0.5287
Total:	50	3.3333			D=0.52	H=0.9708

*: Simpson index
**: Shannon-Wiener function

E = 0.9708
dI = 0.5917

Salix babylonica habitat

As is shown in Table 1, *S. babylonica* has higher importance value than *Acer cinerascens*, only one species of termites that is *A. gurganiensis* was collected from this habitat. Three colonies were collected from *A. cinerascens* and only one from *S. babylonica* (Table 2).

Table 8: Proportional abundance of tree and their diversity indices in *Tamarix gallica* habitat.

Tree species	No. of trees	Average frequency	% of total	Proportional abundance (*Pi*)	*Pi*2xS*	*Pi* log2** (*Pi*)xS
Tamarix gallica	98	6.5333	30.625	0.30625	0.09378	0.5228
T. dioica	97	6.4666	30.3125	0.303125	0.09188	0.5219
Morus indica	46	3.0666	14.375	0.14375	0.02066	0.4022
M. alba	42	2.80	13.125	0.13125	0.01722	0.3845
Tamarix aphylla	37	2.4666	11.5625	0.115625	0.01336	0.3598
Total:	320	21.3331			D=0.2369	H=-2.1912

*: Simpson index E = 0.9437
**: Shannon-Wiener function dl = 1.5967

Table 9: Proportional abundance of termites and their diversity indices in *Morus alba* habitat.

Termite species	No. of colonies	Average frequency	% of total	Proportional abundance (*Pi*)	*Pi*2xS*	*Pi* log2** (*Pi*)xS
Microcerotermes buettikeri	2	0.2222	50	0.5	0.25	0.4999
Anacanthotermes vagans	1	0.1111	25	0.25	0.0625	0.4999
Amitermes belli	1	0.1111	25	0.25	0.0625	0.4999
Total:	4	0.4444			D=0.375	H=1.4997

*: Simpson index E = 0.9464
**: Shannon-Wiener function dl = 3.32

Vitis vinfora habitat

In *V. vinfora* habitat again only one species of termites that is *M. diversus* was present. The preference of this termite species can be understood by the occurrence of termite colonies on different species of trees *i.e.*, *V. vinfora* (5), *V. perrifera* (2), *M. alba* (2) and *Acer candatum* (1) (Table 2).

Table 10: **Proportional abundance of tree and their diversity indices in *Morus alba* habitat.**

Tree species	No. of trees	Average frequency	% of total	Proportional abundance (P*i*)	P*i*2xS*	P*i* log2** (P*i*)xS
Morus alba	46	5.1111	83.6363	0.8363	0.6993	0.2156
Acer monspessulanum	9	1	16.3636	0.1636	0.02676	0.4272
Total:	55	6.1111			D=0.7260	H=0.6428

*: Simpson index
**: Shannon-Wiener function

E = 0.6428
dl = 0.5747

Feeding habits

Postelectrotermes pasniensis: The species was recorded excavating irregular galleries inside infested portion of trees. There was no external indication of the presence of the termite on the infested trees. No galleries were present on the bark of the tree. This species has positive association with *P. caspica* habitat and *P. caspica* was its preferred host.

Postelectrotermes bidentatus: Its feeding pattern and nature of damage to infested trees was similar to that of *P. pasniensis*.

Postelectrotermes zabuliensis: Its feeding pattern was almost similar to that of *P. pasniensis*. It makes irregular galleries in the infested portion of the tree and galleries on the surface of the bark were not seen on any infested trees. It makes its nest inside the stump of the tree. Its host was *P. caspica*, but does not indicate positive association with *P. caspica* habitat.

Anacanthotermes vagans: It was feeding on trees by making galleries on the bark of the trees. Foraging galleries on the adjoining ground were also present. Pieces of grasses were recovered from nest. This species makes small lumps of mound type structure consisting of loose soil particles in Province of Sistan and Baluchistan but makes mounds in Province of Khorasan.

Anacanthotermes gurganiensis: This species was recorded only from 2 trees (*i.e.*, *A. cinerascens* and *S. babylonica*). The former was its preferred host in the type locality. As regards the nature of damage on these trees, there was no external indication of the presence of the termite in the infested trees. The species excavates galleries inside the trees.

Anacanthotermes iranicus: As regards its feeding pattern it was almost similar to that of *A. vagans*. The nature of damage involved making of mud sheeting and galleries on trees. Pieces of grasses were also recorded from their nests in soil.

Psammotermes rajasthanicus: This species was collected only once feeding on *A. seyal*. The nature of galleries was similar to that of *P. prohybostoma*.

Psammotermes prohybostoma: This species was foraging by making clayee galleries in the soil and surface of the trees. The consumed portion of stump was not replaced by mud.

Heterotermes indicola: This species was collected only once feeding on *P. caspica*. This species was foraging by constructing galleries on the bark of the trees and branches.

Microtermes mycophagus: This fungus growing termite was collected only once from *S. babylonica*, feeding under clayee galleries. The damaged and consumed portion of the tree was replaced by the clay by this species.

DISCUSSION

Gay *et al*. (1954) carried out studies on standard laboratory colonies of termites for evaluating the resistance of timber, timber preservation and other materials to termite attack. Their comparative tests of matched timber specimens in standard laboratory colonies of *N. exitiosus*, *C. lacteus* and *C. acinaciformis* showed that the tree species of termites have different food preferences and rates of attacks, so that results obtained from tests with only one species do not necessarily apply to other species and may, in fact, be misleading.

Sen-Sarma and Chatterjee (1965) tested natural resistance of various species of Indian and exotic woods to different species of termites under laboratory conditions. They reported that termites avoided *Cedrus deodara*, and resistance appears to be due to certain chemical substances which act as repellent to termites. Akhtar (1980) reported that forced feeding of *Bifiditermes beesoni* on *Cedrus deodara* caused diarrhoea in this termite which failed to produce normal fecal pellets. Sen-Sarma and Chatterjee (1965) also reported that woods of *Albizzia odoratissima*, *Dalbergia latifolia*, *Prosopis spicigera*, *Swictenia macrophylla*, *Tectona grandis* and *Xylia xylocapra* revealed the presence of some toxic chemical substances because they caused high mortality in test termites.

MacMahan (1966) worked on *Cryptotermes brevis* (Walker) and reared them in different termitaries made of 15 kinds of wood veneer and reported that this termite preferred some wood over others. Poplar and maple both were ranked as more preferred woods.

Smythe and Carter (1969) showed that samples from different trees of loblolly pine and bald cypress showed a marked variation in susceptibility to termite attack.

Nel *et al*. (1970) studied food preferences of laboratory colonies of the Harvester termite, *Hodotermes mossambicus* (Hagen) and reported that colonies deteriorated rapidly when fed exclusively on green *Themeda triandra*, and also confirmed poisonous quality of *Chrysocoma tenuifolia* towards *H. mossambicus*.

Minnick *et al.* (1972) studied feeding preferences of the drywood termite *Cryptotermes brevis* and reported that only pine was consumed in significantly less quantities both by volume and weight as compared to balsa western redcedar. Beal *et al.* (1974) studied force feeding response of *Reticulitermes flavipes* (Kollar) and *Coptotermes formosanus* Shiraki exposed to blocks of 97 species of tropical woods. Bultman *et al.* (1977) evaluated natural resistance of some tropical African woods to *Coptotermes formosanus* Shiraki and reported that 19 out of the 42 woods were highly damaged.

Gentry and Whitford (1982) used point-quarter technique to estimate the abundance of *Reticulitermes* in dead wood in four southeastern coastal habitats in the USA. The four habitats chosen were: lowland hardwood forest dominated by oak (*Quercus* spp.), sweet gum (*Liquidambar styraciflua*) and poplar (*Liriodendron tulipfera*); turkey oak (*Quercus nigra*) woodland, and burned and unburned pine (*Pinus* spp.) plantations. Two burned pine plantation had the highest estimated termite density, $13x10^6$/ha and $2.2x10^6$/ha, respectively; and the turkey oak woodland had an estimated density of $61.9x10^3$/ha.

Kayani *et al.* (1985) carried out some studies on abundance of termites in various plant communities of Eastern Baluchistan, Pakistan. On the basis of termite nest density and extent of termite infested area it was concluded that out of the 19 plant communities four have serious termite infestation problem (nest density 7124/ha).

Thirugnanasuntharan (1987) studied feeding and survival of *Glyptotermes dilatatus* and *Postelectrotermes militaris* on five regions of tea stems. The trunk region of the tea plant showed the highest percentage of termite survival. *Postelectrotermes militaris* lived better than *G. dilatatus* in tea stems. *Postelectrotermes militaris* showed some wood preference in the tropical woods tested; while pine was more susceptible than beech. El-Sherif *et al.* (1987) determined relative susceptibility of 11 species of wood to attack by *Psammotermes hybostoma* by measuring the amount of wood consumed, from samples for two successive years. They reported that *Albizia lebbek* was consumed least by this termite.

Supriana (1988) compared resistance and repellency of 28 tropical timbers to *Cryptotermes cyanocephalus* and *Coptotermes curvignathus*. They also reported that the presence of other species in the tests probably affected the feeding behaviour patterns.

Braithwaite *et al.* (1988) described structure of termite communities in the Australian tropics. They described the distribution of 50 species of termites across five habitat types in Kakadu National Park. They further reported that open forests are richest in species and monsoon forests are species poor.

The present studies describe the distribution of 16 species of termites in five tree habitats: *P. caspica*, *T. gallica*, *M. alba*, *S. babylonica* and *V. vinfora*. *Populus caspica* habitat has higher importance value and more rich in termite species than *S. babylonica* and *M. alba* habitats.

Delaplane and Lafage (1990) have reported on feeding excavations on wood block by *Coptotermes formosanus*, *Reticulitermes flaviceps* and *R. virginicus*. Feeding rates was greatest in *C. formosanus* followed by *R. flaviceps* and then *R. virginicus*.

Agbogba (1990) reported that the termite population and vegetation was sampled along seven 17 km transects covering 34 ha in the Lac de Guiers region of Senegal. *Psammotermes hybostoma* builds thick layers of earth on trees and attacks both the bark and the wood under the earth. *Microcerotermes* sp. builds tunnels up the trunks and penetrates trees via galleries bored into the wood. *Psammotermes hybostoma* was the dominant species. Termite damage was greatest in areas with sparse tree cover. Of 31 tree species recorded, 11 had been attacked. Damage to *Balanites aegyptica* by *Psammotermes hybostoma* was the most severe (33-100%) and sometimes led to the death of the tree; however, damage to *B. aegyptica* diminished where the diversity of tree species increased. *Acacia* was relatively undamaged. It is noted that *P. hybostoma* is a species which had previously been thought to feed only on dead vegetable matter.

Present report based on the importance value, revealed that maximum termite species (13) were recorded in *P. caspica* habitat. Different species had different tree preferences, *Postelectrotermes* fed and nested more on *P. caspica* and *P. diversifolia* than other tree species. The values of H, H_{max} and E were 3.4556, 3.7004 and 0.9329, respectively for termite species diversity in *P. caspica* habitat. Wood *et al.* (1982) have also reported values of termite species diversity for a riparian forest in the Southern Guinea with H, H_{max} and E for plots 39 and 40 as 3.367, 4.475, 0.752 and 3.333, 4.367 and 0.763, respectively.

Delaplane *et al.* (1991) studied number of workers, mass of individual workers, and % of soldiers of foraging group from *Coptotermes formosanus* colonies living in Cypress tree at the Calcasieus River lake charles, Lousiana (USA).

Duncan and Hewitt (1991) observed foraging behaviour of *Hodotermes mossambicus* and noticed division of labour among the workers. The major workers mainly cut plant material and the minor workers mainly transported it. Comparison between the dimensions and mass of the forage items and commercial baits showed that the baits were generally shorter, heavier and wider than the natural food.

Present studies in Iran are the first of its kind. Nobody has reported on species diversity or species richness. *Populus caspica* habitat which had greater number of tree species was more rich in termite species (dl=5.7518) compared to *T. gallica* habitat (dl=0.59). Presently it is concluded that termite species richness is to a great extent related to tree species richness.

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