SRYAHWA PUBLICATIONS

Annals of Ecology and Environmental Science
ISSN: 2637-5338 | Volume 5, Issue 1, 2023
https://doi.org/10.22259/2637-5338.0501003

RESEARCH ARTICLE

Feeding Tendencies and Evaluation Resistance and non- Resistance Behavior of Odontotermes Obesus (Rambur) (Blattodea: Termitidea) on Different Commercial Timbers

Khalid Zamir Rasib[1], Hira Shafique[2], Ayesha Aihetasham[2]

[1-2]*University of Lahore, Institute of Biotechnology and Biology(IMBB), Defense Road Campus, Lahore Pakistan*

[2]*University of the Punjab, Institute of Zoology, Zoology Department, New Campus Lahore Pakistan*

Received: 08 February 2023 Accepted: 08 March 2023 Published: 04 April 2023

Corresponding Author: Khalid Zamir Rasib, ZNA3, University of Lahore, Institute of Biotechnology and Biology(IMBB), Defense Road Campus, Lahore Pakistan

Abstract

The primary purpose of this study is to reveal the feeding preferences of Odontotermes obesus termites on different commercial timbers along with the evaluation of different timbers and their resistance and non-resistance behavior under lab and field conditions at 100 0C. There were six wood species which were evaluated regarding attack and damage which include Abies pindrow (partal), Cedrus deodara (diar), Acacia arabica (keekar), Dalbergia sisso (tali), Mangifera indica (mango), Pinus roxburghii (palwadar). Two weeks' laboratory and 3 months of field trials were performed with suitable conditions. The samples of every six wood species were prepared and exposed to different species of termites by burying them in the active nests of termites. This practical was performed at Wagah border 30 km away from Lahore. After this time, the factors which were to be noted were wood mass loss and visual appearance of each sample. This also includes a choice and no choice feeding test. This trial is made to evaluate the nonresistance of wood to termite attack. After Trials have been made, it has been noted that the most palatable wood is A. pindrow and the nonresistant wood is C. deodara.

Keywords: Commercial timbers, Feeding Preferences, Temperature Impact, Choice and No choice test.

1. Introduction

Termites are the detritus feeders. Termites live in the soil they build tunnel systems and lives in the wood they often infest on walls and furniture. Assemblages of termites consist of the complex system comprises of several species based on the feeding modes and nesting modes. The Termites have an essential role in the environment, fundamentally in the decomposition and influence the soil and environmental structure.

The termites can be found around the globe Bignel.,2000., Eggleton., 2000. Termites were considered as a significant part of the forest community. There are many species of termites World Wide. The most common termite species include Coptotermes heimi (Wasmann), and Heterotermes indicola (Wasmann) and Microtermes obesi (Holmgren) and Odontotermes obesus (Rambur) Heterotermes indicola is considered as the most devastating termites of Pakistan. They damage not only wood but also the wooden products and cellulosic materials Manzoor., and Mir.,2010. In different ecological zones of Pakistan, there is diversity of termite species. There are more than 2500 species of termites' worldwide and 51 species are found in Pakistan. The termite species include Coptotermes heimi and Heterotermes indicola, and Odontotermes obesus are found in Pakistan. Heterotermes indicola is considered as the most dangerous pest found inside houses in Pakistan, and it is the most destructive termite species of

Citation: Khalid Zamir Rasib,. Feeding Tendencies and Evaluation Resistance and non- Resistance Behavior of Odontotermes Obesus (Rambur) (Blattodea: Termitidea) on Different Commercial Timbers. Annals of Ecology and Environmental Science. 2023; 5(1): 24-34.

the Lahore. Wolcott., 1951. M. obesi was the most common termite species (19%), and B. beesoni (1.5%) was least common species in forests of Punjab. The termite colony size expansion depends upon dead wood's volume (Manzoor and Mir.,2010. Wolcott, G.N., 1951.The most distributed termite in Pakistan is Coptotermes heimi (Wasmann) and cause damage to standing trees Rasib, and Ashraf., 2014. Control measures for different species of termites are different because of their life histories. Different insecticides are available for removing subterranean termites. Other slow-acting treatments are also used for exclusion of colonies of subterranean termites. Other treatments like whole structure treatments like heat and fumigation, compartmental treatments like heat or cold, and local treatments like wood surface treatments or insecticide introductions are primary tools for dry wood termite control Ahmed, etal., 2020.Termites as a pest are making a loss of wood. They are damaging wood structures, vegetation, and agriculture Cowie, etal., 1989. Pakistan's economy 18.9% accounts of agriculture. Therefore, agriculture and vegetation products are the primary source of livelihood for Pakistanis. Termite infestation is the threat to Pakistan's Economy, which create the Scarcity of food for both human and animals and damage commercial timber. Therefore, understanding subterranean termite resistance and feeding preferences on different commercial timbers is a demand of the time.

2. Materials and Methods

2.1 Termite Collection

Termites are the small ant-like insects that were found in mounds, trees and even on the walls of our houses. Large number of worker termites of Odontotermes. obesus were collected from nests located in Wagah border that is 30 km away from Lahore.

2.2 Wood Species

Commercially important wood species were selected for these trials. There were a great variety of timbers in Pakistan but for performing experiment most of wood species were taken from lumber yard. Abies pindrow (partal), Cedrus deodara (diar), Acacia Arabica (keekar), Dalbergia sisso (tali), Pinus roxburghii (palwadar) ,Mangifera indica (mango) the only one specie is taken from standing trees.

2.3 Sample from Wood Species

Blocks were cut from each single wood species. Fine grade and sand paper were used to smooth all the sides of the wooden blocks so that termites can easily feed on them. These wooden blocks were dried at 100^0C for 48 hours. Then these wooden blocks were ready for performing Trials.

2.4 Procedure

Four experiments were done on the pre-heated wooden blocks from different species to determine resistance and feeding preferences of subterranean termites on different commercial timber.

2.5 No Choice Laboratory Trials

Wooden blocks (4.2x2.5x1 cm). of A.pindrow, C.deodara, A.arabica, D.sisso, M.indica, P.roxburghii were prepared and dried at suitable 100^0C temperatures for 48 hours. One block from each type of wood species was put in a glass petri dish with suitable diameter and height and 50 worker termites were added in petridish. The wooden blocks were kept suitably moist. Three replicates of each wooden blocks were used for each wood. Petridish were maintained at suitable temperature for two weeks. At the end the wooden blocks were dried at the same temperature at which they were dried before the exposure to termites and the amount of wood eaten were calculated.

2.6 No Choice Field Trials

In this the wooden blocks of six different wood species measuring (4.2x2.5x1 cm) were prepared and dried at suitable 100^0C temperature for 48 hours. Blocks of each type of wood specie were tied separately. Nests of termites were found near Wagah border Lahore. Each tied block of wood was placed at different sites of nest buried 30cm deep into the soil. The blocks were removed from the soil after 3 months and reweighed.

2.7 Choice Laboratory Trials

Choice laboratory tests were also conducted to compare feeding preferences and resistance of termite on A.pindrow vs C.deodara, A.arabica vs D.sisso, M.indica vs P.roxburghii, A.pindrow vs A.arabica, C.deodara vs D.sisso. This feeding comparison were considered more accurate then no choice laboratory trials. The methodology was same as in the no choice laboratory trials but in this the wooden blocks were placed side by side with other wood of different species in the form of pair to determine feeding preference and resistance of each species of wood. The wooden blocks of six different wood species measuring (4.2x2.5x1 cm) were prepared and dried at suitable 100^0C temperature for 48 hours. The time period was also same as in no choice laboratory trials, after that time period data will be analyzed.

2.8 Choice Field Trials

Choice laboratory tests were also conducted to compare feeding preferences and resistance of termites on A.pindrow vs C.deodara, A.arabica vs D.sisso, M.indica vs P.roxburghii, A.pindrow vs A.arabica, C.deodara vs D.sisso. These pairs were tie side to side with the help of copper wire in a bundle. The location of nest and the methodology of the test were same as in no choice field Trials. The wooden blocks of six different wood species measuring (4.2x2.5x1 cm) were prepared and dried at suitable 100^0C temperature for 48 hours. The time period is also same as bundles were buried for 3 months and after 3 months the wooden blocks were reweighed again and the wood consumption was calculated.

Figure 1. *Timbers for no choice trials*

Figure 2. *Timbers for choice trials*

Figure 3. *Nest of termites*

Figure 4. *BRB canal*

Figure 5. *Comb of termite's nest*

Figure 6. *Thick vegetation of Wagha border*

2.9 Statistical Analysis

On the conclusion of the no-choice laboratory trials, data on wood consumption, percentage of wood consumption and percentage of survival were subjected to one-way analysis of variance. Data obtained in the choice laboratory and field trials were statistically analyzed using a paired comparison t-test. Similarly, the percentage of mass loss in wood species in the no-choice field trails was analysed.

3. Results

3.1 No Choice Lab Trials

3.1.1 Abies Pindrow

Termites fed considerably more than (35-40 %) on dried A.pindrow wooden blocks at 100^{0}C as shown in (fig 7). Wood consumption was affected by the temperature level at which the blocks were dried (100^{0}C) prior to exposure to termites, and increased wood consumption with exposure to temperature. Similar alphabet letters suggest non-significant differences (P<0.0001) (Table 1).

3.1.2 Dalbergia Sisso

Termites fed considerably less than (1.7 %) on dried D.sisso wooden blocks at 100^{0}C as shown in (fig 8). This could be due to a certain non-resistant component present. Wood consumption was affected by the temperature level at which the blocks were dried (100^{0}C) prior to exposure to termites, and increased wood consumption with exposure to temperature. Similar alphabet letters suggest non-significant differences (P<0.0001) (Table 1).

3.1.3 Pinus Roxburghii

Termites consumed less than(5 %) of wooden blocks of P. roxburghi. This is shown in (fig 9).Wood consumption was affected by the temperature level at which the blocks were dried (100^{0}C) prior to exposure to termites, and increased wood consumption with exposure to temperature.Similar alphabet letters suggest non-significant differences (P<0.0001) (Table 1).

3.1.4 Cedrus Deodara

The wooden blocks of C. deodara were not affected by termites shown in (fig 10) a little this may happen due to some nonresistant component present in wood, whereas wood consumption was influenced by the temperature condition at which the blocks were dried (100^{0}C) before exposure to termites and the wood consumption increased with temperature exposure. Similar alphabet letters suggest non-significant differences (P<0.0001) (Table 1).

3.1.5 Acacia Arabica

Termites ate less than (15 per cent) of wooden blocks of Acacia Arabica as in (fig 11). Wood consumption was affected by the temperature level at which the blocks were dried (100^{0}C) prior to exposure to termites, and increased wood consumption with exposure to temperature. Similar alphabet letters suggest non-significant differences (P<0.0001) (Table 1).

3.1.6 Mangifera Indica

Termites ate more than (15 per cent) of wooden blocks of Mangifera indica shown in (fig 12). Wood consumption was affected by the temperature level at which the blocks were dried (100^{0}C) prior to exposure

to termites, and increased wood consumption with exposure to temperature. Wood moisture content also has a big effect on wood consumption. Similar alphabet letters suggest non-significant differences (P<0.0001)

Table 1. *Amount of wood consumption (mg) from different wooden blocks dried at 100^0 C temperatures after 2-week exposure to workers of Odontotermes Obesus under no choice lab trials. Means followed by the same letters show non- significant differences (P>0.05).*

Wood species	Mean pre weight(mg)	Mean post weight(mg)	Average Wood consumption(mg)	% age consumption.
A.pindrow	15	9.1	5.9 a	39.33%
D.sisso	14.7	13.6	1.1b	7.48%
P.roxburghii	14.8	14.5	0.3c	2.03%
C.deodara	15	14.7	0.3c	2.00%
A.arabica	14.9	13.6	1.3b	8.72%
M.indica	15	13.3	1.7d	11.33%

3.2 No Choice Field Trials

The results were same as in the no choice laboratory trials. The tables will show the proper results which were concluded at the end.

3.2.1 Abies Pindrow

Termites ate more than (45-50 %) of Abies pindrow wooden blocks as shown in (fig 7). Wood consumption was affected by the temperature level at which the blocks were dried (100^{0}C) prior to exposure to termites, and increased wood consumption with exposure to temperature. Related letters display non-significant variations in alphabets (P<0.0001) (Table 2).

3.2.2 Dalbergia Sisso

Termites ate less than (20%) of wooden blocks of Dalbergia sisso as shown in (fig 8) Wood consumption was affected by the temperature level at which the blocks were dried (100^{0}C) prior to exposure to termites, and increased wood consumption with exposure to temperature. Related letters suggest non-significant variations in alphabets (P<0.0001) (Table 2).

3.2.3 Pinus Roxburghii

Termites ate wooden blocks of Pinus roxburghi (11 %) shown in (fig 9).Wood consumption was affected by the temperature level at which the blocks were dried (100^{0}C) prior to exposure to termites, and increased wood consumption with exposure to temperature. Related letters suggest non-significant variations in alphabets (P<0.0001) (Table 2).

3.2.4 Cedrus deodara

Termites ate less than (12 %) Wooden blocks of Cedrus deodara this is shown in (fig 10) Wood consumption was affected by the temperature level at which the blocks were dried (1000C) prior to exposure to termites, and increased wood consumption with exposure to temperature. Related letters suggest non-significant variations in alphabets (P<0.0001) (Table 2).

3.2.5 Acacia Arabica

Termites ate wooden blocks of Acacia Arabica (19 %). This will be seen in (fig 11). Wood consumption was affected by the temperature level at which the blocks were dried (100^{0}C) prior to exposure to termites, and increased wood consumption with exposure to temperature. Related letters suggest non-significant variations in alphabets (P<0.0001) (Table 2).

Table 2. *Amount of wood consumption (mg) from different wooden blocks dried at 100^{0}C temperatures after 3 months' exposure to workers of obesus under no choice field trials. Means followed by the same letters show non- significant differences (P>0.05).*

Wood species	Mean pre weight(mg)	Mean post weight(mg)	Wood consumption(mg)	% age wood consumption
A.pindrow	14.9	7.2	7.7a	51.6%
D.sisso	14.8	11.9	2.9b	19.56%
P.roxburghii	14.9	13.4	1.5c	10.06%
C.deodara	15	13.3	1.7c	11.33%
A.arabica	15	12.2	12.8d	18.66%
M.indica	15	12	3f	20%

3.2.6 Mangifera Indica

Termites ate wooden blocks of Mangifera indica more than (20 %) shown in (fig 12) Wood consumption was affected by the temperature level at which the blocks were dried (100^{0}C) prior to exposure to termites, and increased wood consumption with exposure to temperature. Related letters suggest non-significant variations in alphabets (P<0.0001) (Table 2).

Figure 7. *Abies pindrow*

Figure 8. *Dalbargia sisso*

Figure 9. *Pinus roxbughii*

Figure 10. *Cedrus deodara*

Figure 11. *Acacia Arabica*

Figure 12. *Mangifera indica*

3.3 Choice Lab Trials

In this trials the wooden blocks were dried at temperature 100^{0}Cand then the blocks were tie in group form with alternate wood species.

3.3.1 A.Pindrow vs C.Deodara

Different species of dried woods at 100^{0}C temperatures were provided to O.obesus workers in conjunction with two in a cage (Table 3).

In a choice of two woods O.obesus quickly found the apealing wood and fed more on the palatable wood. Table 4.3 and (fig 13) shows that in combinations of wooden blocks dried at 100^{0}C two species of wood,

O.obesus, exhibited maximal feeding on A.pindrow and on C.deodara the minimal and the volume of wood consumed were significantly different (P=0.0081).

3.3.2 A.Arabica vs D.Sisso

In a choice of two woods O.obesus quickly found the palatable wood and fed more on the appealing wood shown in (fig 14). Table 3 shows that among the wooden blocks dried at 1000C and provided in combinations of two wood types, O.obesus exhibited remarkable feed on A.arabica and limited feed on D.sisso, and significantly different was the amount of wood consumed (P=0.15).

3.3.3 M.Indica vs P.Roxburghii

In a choice of two woods O.obesus quickly found the appealing wood and fed more on the appealing wood. Table 3 shows that among the wooden blocks dried at 100^0C and provided in combinations of two wood types, termites exhibited remarkable feeding on M.indica and minimal feeding on P.roxburghi shiwn in (fig 15) and slightly different was the amount of wood consumed (P=0.11).

3.3.4 A.Pindrow vs A.Arabica

In a choice of two woods O.obesus quickly found the appealing wood and fed more on the appealing wood. Table 3 shows that O.obesus exhibited remarkable feeding on A.pindrow and minimal feeding on A.arabica among the wooden blocks dried at 100^0C shown in (fig 16) and provided in combinations of two wood types, and that the amount of wood consumed was significantly different (P= 0.0086).

3.3.5 C.Deodara vs D.Sisso

In a choice of two woods O.obesus quickly found the appealing wood and fed more on the palatable wood. Table 3 shows that O.obesus showed the maximal feed for C.deodara shown in (fig 17) and the minimal for D.sisso among the wooden blocks dried at 100^0C and provided in groups of two wood types, and the amount of wood consumed was considerably different (P= 0.10).

a: Each wooden block was paired with a wooden block of other species (wood 1/wood 2) in Petri plate containing 100 termites (n=3).

b: Difference in mass loss for each pair of wooden block indicated by ** = 0.05, are significantly different (paired comparison t-test).

3.4 Choice Field Trials

The results are same as got in the choice laboratory trials. The most prefer wood by termites were A.pindrow. The wood consumption by termites was 40-50% .And the wood which is consumed in very less amount by termites were the wooden blocks of P.roxburghii.

Table 3. Mean wood consumption (X, SD) workers of O. obesus in "mg" AP/CD (A.pindrow vs C.deodara), AA/DS (A.arabica vs D.sisso), MI/PR (M.indica vs P.roxburghii), AP/AA (A.pindrow vs A.arabica) and CD/DS (C.deodara vs D.sisso) dried at 100^0C temperatures in 2-week "CHOICE" trial under laboratory condition.

Temperature	Comparisona	Wood mass loss(mg)		Probabilityb
		Wood1	Wood2	
100^0C	AP/CD	6.1 ± 2.34	0.9 ± 0.34	0.081**
	AA/DS	1.4 ± 3.45	1.2 ± 0.45	0.15
	MI/PR	1.2 ± 3.12	0.3 ± 0.01	0.11
	AP/AA	6.5 ± 2.12	1.1 ± 0.34	0.0086**
	CD/DS	0.7 ± 2.46	1.3±0.54	0.10

3.4.1 A.Pindrow vs C.Deodara

In a choice of two woods O.obesus quickly found the appealing wood and fed more on the appealing wood. Table 4 shows that O.obesus exhibited remarkable feeding on A.pindrow and minimal on C.deodara among the wooden blocks dried at 100^0C shown in (fig 13).

3.4.2 A.Arabica vs D.Sisso

In a choice of two woods O.obesus quickly found the appealing wood and fed more on the appealing wood. Table 4 shows that O.obesus exhibited remarkable feeding on A.arabica shown in (fig 15) and minimal feeding on D.sisso among the wooden blocks dried at 100^0C and provided in groups of two wood types, and significantly differed the amount of wood ingested (P= 0.17).

3.4.3 M.Indica vs P.Roxburghii

In a choice of two woods O.obesus quickly found the appealing wood and fed more on the appealing wood.

Table 4. *Mean wood consumption (X, SD) workers of O.obesus in "mg" AP/CD (A.pindrow vs C.deodara), AA/DS (A.arabica vs D.sisso), MI/PR (M.indica vs P.roxburgi), AP/AA (A.pindrow vs A.arabica) and CD/DS (C.deodara vs D.sisso) dried at 1000C temperatures in 2-week "CHOICE" trial Under Field Trials.*

Temperature	Comparisona	Wood mass loss(mg)		Probabilityb
		Wood1	Wood2	
100^0C	AP/CD	6.5±2.41	1.2± 0.4	0.072**
	AA/DS	1.4±2.95	1.1±0.45	0.17
	MI/PR	1.6±3.22	0.5±0.1	0.14
	AP/AA	6.8±2.14	1.6±0.44	0.0067**
	CD/DS	0.9±2.23	1.7±0.53	0.13

3.4.4 A.Pindrow vs A.Arabica

In a choice of two woods O.obesus quickly found the appealing wood and fed more on the appealing wood. Table 4 and (fig 16) shows that O.obesus exhibited remarkable feeding on A.pindrow and minimal feeding on A.arabica among the wooden blocks dried at 100^0C and provided in groups of two wood types, and significantly differed the amount of wood ingested (P= 0.0067).

3.4.5 C.Deodara vs D.Sisso

In a choice of two woods O.obesus quickly found the appealing wood and fed more on the appealing wood. Table 4 and (fig 17) shows that O.obesus showed the maximal feed for C.deodara and the minimal for D.sisso among the wooden blocks dried at 100^0C and provided in groups of two wood types, and the amount of wood consumed was significantly different (P= 0.13).

a: Each wooden block was paired with a wooden block of other species (wood 1/wood 2) in Petri plate containing 100 termites (n=3).

b: Difference in mass loss for each pair of wooden block indicated by ** = 0.05, are significantly different (paired comparison t-test).

Figure 13. *A.pindrow vs C.deodara*

Figure 14. *A.arabica vs D.sisso*

Figure 15. *M.indica vs P.roxburghi*i

Figure 16. *A.pindrow vs A.arabica*

Figure 17. *C.deodara vs D.sisso*

4. Discussion

Resistance and feeding preferences of O. obesus subterranean termites on six commercial timber wood species at fixed temperature were studied for having a knowledge about feeding preferences and responses toward certain wood species. The result indicated that the feeding preference of O.obesus was A.pindrow > M.indica > D.sisso > C. deodar > P.roxburghii when all wooden blocks were dried at 100^0C.

The result indicated that P.roxburgi > C.deodra > D.sissio, when wooden blocks were dried at 100^0C, was least consumed wood and come up as a most resistant wood toward the attack of O.obesus termites as shown in figure (9,10,8). In 1951 and 1978 it was confirmed that wood is resistant to termites due to the presence of certain chemicals in it. These chemicals affect the protozoa. Many experiments are done in order to get the correct result about the resistance of wood to termites. According to Wolcott.,1951 observations are neither the hardness nor the lignin composition will affect the wood resistance towards termites.

According to Sen-Sarma and Gupta., 1978 they notice the feeding activity of termites on C.deodara and reported that temperature had great effect on the feeding activity of termites. Moore., 1969 worked in Australia on Pinus which is attacked by many termites except one termite that is Nasutitermes exiotiosus. The timber is resistant to this because of essential oil having α and β pinenes which act as alarm-pheromone to the termites. According to Chaudhry etal., 1978 work on termite's specie Coptotermes heimi its attack on different wood species and their resistance. Sawdust of 12 common Pakistani wood species was used to investigate about the C.heimi in laboratory. C.deodara and P.roxburghii were declared as most resistant to termite attack whereas Salmalia malabarica, A. pindrow and Picea smithiana were considered as most susceptible.

Afzal etal.,2017 also studied the feeding preferences of Heterotermes indicola (Wasmann). D. sissoo and S. cumini were more resistive to the termite attack. P. euramericana and B. monosperma were more consumed by termites. Both Dugal & Latif.,2015 studied the laboratory and field feeding preferences of by termite species Heterotermes indicola and Coptotermesn heimi. The result revealed that Populus deltoides was most consumed and Dalbergia sissoo was the least consumed wooden block by termites. In field, D. sissoo was least consumed and Mangifera indica was most consumed wooden block by the termites.

Rasib eta.l, 2014studied the feeding preference of O. obesus. The study revealed the most consumed was P. euramericana > C. fistula > A. excelsa > A. indica > H. adenophyllum > B. variegata > E. camaldulensis > P. roxburghii > S. cumini > A. lebbeck > B. monosperma > M. indica > M. alba > D. sissoo > J. mimosifolia > E. subrosa > B. bamboo > T. grandis, respectively. Sheikh etal., 2010 work on the termite species of O.obesus and its feeding habitat this specie prefer Fagus sp (beech) and Pinus wallichiana (kail) andut whereas the least prefer wood is Abies pindrow (pertal) and Cedrus deodara (diar). The resistant chemicals in trees are not present in all trees, which make some trees more resistant and some trees more vulnerable to termite attack, According to Akhtar A.pindrow considered as highly resistant wood specie towards termites.The result indicated that A.pindrow following M.indica was most consumed and less resistant toward the attack of O.obesus termites shown in fig Cowie etal, (1989)&Dugal & Latif (2015). Present study results were not consistent with the previous researches about resistance of wood protecting from termite attacks. Both Ijaz &Aslam 2003 also revealed that O. obesus infestation increases with the increase in humidity level in Lahore, Pakistan.

The Phyllanthus emblica and Cupressus sempervirens is more palatable for the termites because of presence of dense shelter. The alteration in the resistance of wood is because of changes in chemical constitution (phenol, terpenoids, and quinines) of wood, PH level of wood and hardness of wood, which makes wood more palatable to O.obesus termites.Aihetasham & Iqbal 2012)suggested that temperature is the factor that will effect the rate of wood palatability. They suggested that with increase of temperature the degradation of wood also increases. According to

Thorne 1998 the feeding habit of termites depend on group of factors which include termite specie, wood species, temperature, chemical composition of wood, amount of wood, wood density and wood moisture content.

The Result indicated that wooden blocks were more consumed in choice field Trials and no choice filed test rather than no choice laboratory and choice laboratory Trials. The present study result is consistent with previous researches as according to Qureshi etal.,2012 reveled that termites' mortality rate is high due to presence of protozoa's populations which effected the wood.

5. Conclusions

The present study indicated that the feeding preference of O.obesus was A.pindrow > M.Indica > D.sisso > C. deodar > P.roxburghii when all wooden blocks were dried at 100^0C. A.pindrow and M.indica are most platable wood species for the O.obesus termites, when wooden blocks were dried at 100^0C. D.sisso, C. deodar, and P.roxburghii wood species were most resistant to terminate attack and durable in long run that can be used for making building materials and wooden structure. Termites consumed more wooden blocks in no choice field and choice field Trials than no choice lab Trials and choice lab Trials when wooden blocks were dried at 100^0C. Termite feeding depends on moisture content and temperature of wood specie. So wooden species treated at 100^0C temperature became more palatable for termites. This study does not illustrate which chemical prevent the attack of termites. Contrary to all the previous researches, A.pindrow in this research was most palatable to O.obesus may be because the wooden blocks were dried at 100^0C but further research in future is needed to know exact factors that turn most resistant species to most palatable species to O.obesus.

6. Acknowledgments

This study was not supported by any agency.

Statement of conflict of interest

The authors have declared no conflict of interest.

7. References

1. Bignell, D.E., 2000. Introduction to symbiosis. InTermites: evolution, sociality, symbioses, ecology (pp. 189-208). Springer, Dordrecht.
2. Eggleton, P., 2000. Global patterns of termite diversity. In Termites: evolution, sociality, symbioses, ecology (pp. 25-51). Springer, Dordrecht.
3. Manzoor, F., Mir, N.,2010. Survey of termite infested houses, indigenous building materials and construction techniques in Pakistan. Pakistan Journal of Zoology, 1:42-49.
4. Wolcott, G.N.,1951. The most effective termite repellents. ibid., 1949, 42, 273. The termite resistance of pinosylvin and other new insecticides. ibid, 44:263.
5. Rasib, K.Z., and Ashraf. H., 2014. Feeding preferences of Coptotermes heimi (Isoptera: Termitidae) under laboratory and field conditions for different commercial and non-commercial woods. International Journal of Tropical Insect Science, 34:115-126.
6. Ahmed, S., Fatima R., Hassan, B., 2020. Evaluation of different plant derived oils as wood preservatives against subterranean termite Odontotermes obesus. Maderas. Ciencia y tecnología, 22:109-120.
7. Cowie, R.H., Logan, J.W and Wood, T.G., 1989. Termite (Isoptera) damage and control in tropical forestry with special reference to Africa and Indo-Malaysia: a review. Bulletin of Entomological Research, 79:173-184.
8. Sen-Sarma, P.K., Gupta, B.K., 1978. Natural resistance of six Indian timbers to termites under laboratory conditions. Holzforschung und Holzverwertung, 30:88-91.
9. Moore, B. P. (1969). Biochemical studies in termites. Biology of termites, 1:407-432.
10. Chaudhry, M. I., Malik, N. K. and Arshad, M., 1978. Natural resistance of various timbers to the attack of Coptotermes heimi (Wasmann). Pakistan Journal of Forestry 28, 123 – 126.
11. Afzal, M., Rasib, K., Hussain, J., 2017. Resistance of Commercial and Non-commercial Woods against Heterotermes indicola Wasmann (Blattodea. Pakistan Journal of Zoology, 49:785-792.
12. Dugal, F.M., Latif, M.U., 2015. Comparative Study of Resistance and Feeding Preference of 24 Wood Species to Attack by Heterotermes indicola (Wasmann) and Coptotermes heimi (Isoptera: Rhinotermitidae, Termitidae) in Pakistan. Sociobiology, 62:417-425.13

13. Rasib, K.Z., Ashraf, H., Afzal, M., 2014. Feeding preferences of Odontotermes obesus (Rambur) (Isoptera: Termitidae) on different commercial and non-commercial woods from Lahore, Pakistan, under laboratory and field conditions. Zoology and Ecology, 24:369-379.14

14. Sheikh, N., Mahmood, Qureshi A., Latif, U.M., Manzoor, F., 2010. Study of temperature treated woods for the preference and first food choice by Odontotermes obesus (Isoptera: Termitidae). Journal in Sociobiology 56:363-7.15

15. Ijaz, M., and Aslam, M., 2003. Infestation Trend of Odontotermes obesus (Rambur) on Wheat Crop (Triticum aestivum linnaeus) in Rain fed conditions. Asian Journal of Plant Sciences, 2: 699-701.16

16. Aihetasham, A., Iqbal S., 2012. Feeding preferences of Microcerotermes championi (Snyder) for different wooden blocks dried at different temperatures under forced and choice feeding conditions in laboratory and field. Pakistan Journal of Zoology, 44:1137-1144.17

17. Thorne, B.L., 1998. Biology of subterranean termites of the genus Reticulitermes. National Pest Control Association Research Report on Subterranean Termites, 1-30.18

18. Qureshi, N.A., Qureshi, M.Z., N, Ali., Athar, M., Ullah, A., 2012.Protozoidal activities of Eucalyptus cammeldulensis, Dalbergia sissoo and Acacia arabica woods and their different parts on the entozoic flagellates of Heterotermes indicola and Coptotermes heimi. African Journal of Biotechnology, 11:12094-12102.