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Survey and classification of some termites' species in some arid area

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Abstract

The survey results illustrated that eight termites' species were identified according to shape and structure of soldier head-capsule (namely, *Anacanthotermes ochraceus, Heterotermes aethiopicus, Angulitermes arabiae, Microtermes* sp., *Amitermes desertrum, Microcerotermes parvulus, Microcerotermes* sp. were found at arid area in Taif governorate, Saudia Arabia. The most common one was *Anacanthotermes ochraceus* which was recorded at all investigated area, except, El Hada (west Taif). In addition to three termites species were recorded to first time in Taif governorate, Saudia Arabia (namely, *Microcerotermes parvulus, Heterotermes aethiopicus* and *Angulitermes arabiae*).

Keyword: Identification; *Anacanthotermes; Heterotermes; Angulitermes; Microtermes; Amitermes; Microcerotermes* ;

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Introduction

Termites are a group of eusocial insects that were classified at the taxonomic rank of order Isoptera but are now classified either as the infraorder Isoptera, or as epifamiliy Termitoidae within the cockroach order Blattodea [1,2,3]. There are so many species of subterranean termites that they can also be found on all continents of the world (except Antarctica). Termites are usually small, measuring between 4 to 15 millimeters (0.16 to 0.59 in) in length[4].

Globally, termites are found roughly between 50 degrees north and south, with the greatest biomass in the tropics and the greatest diversity in tropical forests and Mediterranean shrub-lands. Termites are also considered to be a major source (11%) of atmospheric methane, one of the prime greenhouse gases.

All termites consume cellulose-based plant materials. Unfortunately, all homes, regardless of their construction type, can provide cellulose food for termite infestation. They are often called the "silent destroyer" because they may be secretly hiding and thriving in your home or yard without any immediate signs of damage[5].

The aim of the present work is to search and identify the termites in different arid area at Taif city in Saudia Arabia.

Material and Method

The survey was carried out at seven arid areas to cover the four directions: El-Arfa (North Taif), El Hada (west), Rodaf, El-Shafa, Sedira (Sothern), Sasid (East) and Central area (middle) Taif city during four seasons 2011.

The samples were collected from fall woods, tree, houses or/and farms…etc. The collected samples from workers and soldiers termites were placed in glass tubes contained 70% alcohol + two drops glycerin and kept in refrigerated till examine under stereomicroscopy. All information around place of collection, date and type of sample were recorded on each one.

The samples of termites were examined and separated to groups according to the soldiers head capsule [6&7]. The termites sample was drawn and examined under Steriomicroscopy (model Nikon SMZ1000). The identification of termites was confirmed by Angela Marmont Centre for UK Biodiversity.

Results and Discussion

1- Identification and description of the collective termites:

The results of termite's survey were indicted that there are eight termites' species (Fig. 1) which classified according to head capsule of their soldiers as follows:

1.1. **Species: *Microcerotermes* sp. (Family: Termitidae):** The head capsule is oblong shape (mean length, 0.6 mm. and width 0.3mm) which is slightly convex and the posterior margin is arcuate. Their mandibles are equal in length (0.5 mm.) and sword like. The inner margin of mandibles is slightly serrated. The pronotum is Lips-like. The total number of flagellomere segments is thirteen. (Fig. 1A).

1.2. **Species: *Microcerotermes parvulus* (Family: Termitidae)**: It is very similar to *Microcerotermes* sp. but inner margin is sharply serrate and pronotum is squab shape and seem as divided to two part. The length of head capsule (0.5 mm.) is little longer than the length of mandibles (0.4mm) (Fig. 1B).

1.3. **Species: *Amitermes desertrum* (Family: Termitidae):** The head capsule is oval shape (its' length 0.38mm. and its' width 0.35 mm.). The inner margins of mandibles are sharply curved and carry one tooth which is well sclerosis and find in the middle of mandibule. Pronotum is broad shape; its' anterior margin is straight (Fig. 2A).

1.4. **Species: *Microtermes* sp. (Family: Termitidae):** The head capsule is oval shape (its' length 0.56 mm. and its' width 0.41 mm.) and its' posterior margin is curved. The inner margin of mandibule isn't serrate and its' upper end is lightly curved. Pronotum is lips like and its' anterior margin is lightly insert to inside (Fig. 2B).

1.5. **Species: *Angulitermes arabiae* (Family: Termitidae):** The head capsule is oblong shape (mean length, 0.42 mm. and width 0.2 mm) and carry frontal projection in its tip. The mandibles are asymmetry in length (i.e. the length of right one is 0.6 mm. and left one is 0.54) and its' inner margin is unserrate. The Labrum is seemed to divide to two parts. Pronotum is conical shape. The flagellomere consists of 12 segments (Fig.3A).

1.6. **Species: *Psammotermes hybostoma* (Family: Rhinotermitidae)**: The head capsule is oblong shape (mean length, 0.35 mm. and width 0.3 mm) and its' posterior margin is straight. The mandibles are well sclerosis. The inner margin of left mandibles has7 protrudes while right one has 5 protrudes. The fontanelle is present. The pronotum is cup shape (Fig. 3B).

1.7. **Species: *Heterotermes aethiopicus* (Family: Rhinotermitidae)**: The head capsule is oval shape (its' length 0.32 mm. and its' width 0.29 mm.). The mandibles are symmetric (its' mean length is 0.53mm). The inner margin of right mandible has one sharply protrude while the left mandible has small protrude. The flagellum consists of 13 segments. The pronotum is broad shape (Fig 4A).

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1.8. **Species: *Anacanthotermes ochraceus* (Family: Hodotermatidae)**: The head capsule is oblong shape (mean length, 0.4 mm. and width 0.3 mm) and its' posterior margin is curved. The mandibules are asymmetric in length (The left one is 0.5mm. and the right one is 0.3mm.). The mandibules are well serrate. The flagellum consists of 25 segments. The pronotum is broad shape (Fig. 4B).

II- Infestation areas of termites at different seasons: Table (1) cleared that eight species of termites were collected from different area in Taif city but the most species were noticed in North region (El-Arfa) (which is characterized by desert weather) followed by South region (Al-Sidera) around the four seasons during 2011. Six termites' species were recorded at North region as *A. ochraceus*, *P. hybostoma, H. aethiopicus, A. arabiae, Microcerotermes* sp. and *Microcerotermes parvulus* (Fig 9). On other side, in cold region as Al hada (west al-Taif) was recorded one species, *Microcerotermes parvulus* (Fig. 10). While other investigated areas were recorded five to four species which wasn't found in all seasons (Fig 11, 12, 13).

From the obtained results can be concluded that the most spread termite species was *A. ochraceus, Microcerotermes parvulus* and *Microcerotermes* sp., In El-Arfa and Sedera around the four seasons during 2011. From observations were recorded during investigation noticed that El-Arfa and Sedera characterized by desert weather and sandy land which contained different types from desert plants, while El-Rodaf (Hada) characterized by cold weather especially during winter season and rock- land.

The variation in present or absence termites' species from area to other might be attributed to geographical nature weather condition and coverage plant. These observations were agree with Light[8], King & Spink,[9] Jones et al., [10]al-Bedawy[6] Al-Kady,[11] and French,[12]) who recorded the variation in population and types of termites from place to other in different countries, including Saudi arabia .

A. ochraceaus was recorded in all investigated area, except El Hada (west Taif) and was considered the most common and dangerous termites' species which spread all over the kingdom of saudia Arabia (Al-Bedawy[6]). Aggregation more than one species of termites at the same area was observed also by Al-Bedawy *et al*.,[6] and Harris[13], who mentioned that there are some termites' species as *A. ochraceaus* must be found with *Psammotermes* species. The most common species was recorded in Taif governorate at desert weather arid area was *Microcerotermes* sp. which activated during summer and spring seasons, but it found at the four seasons (Moawad and Al.Otaibi [14]).

(A)- *Microcerotermes* sp.

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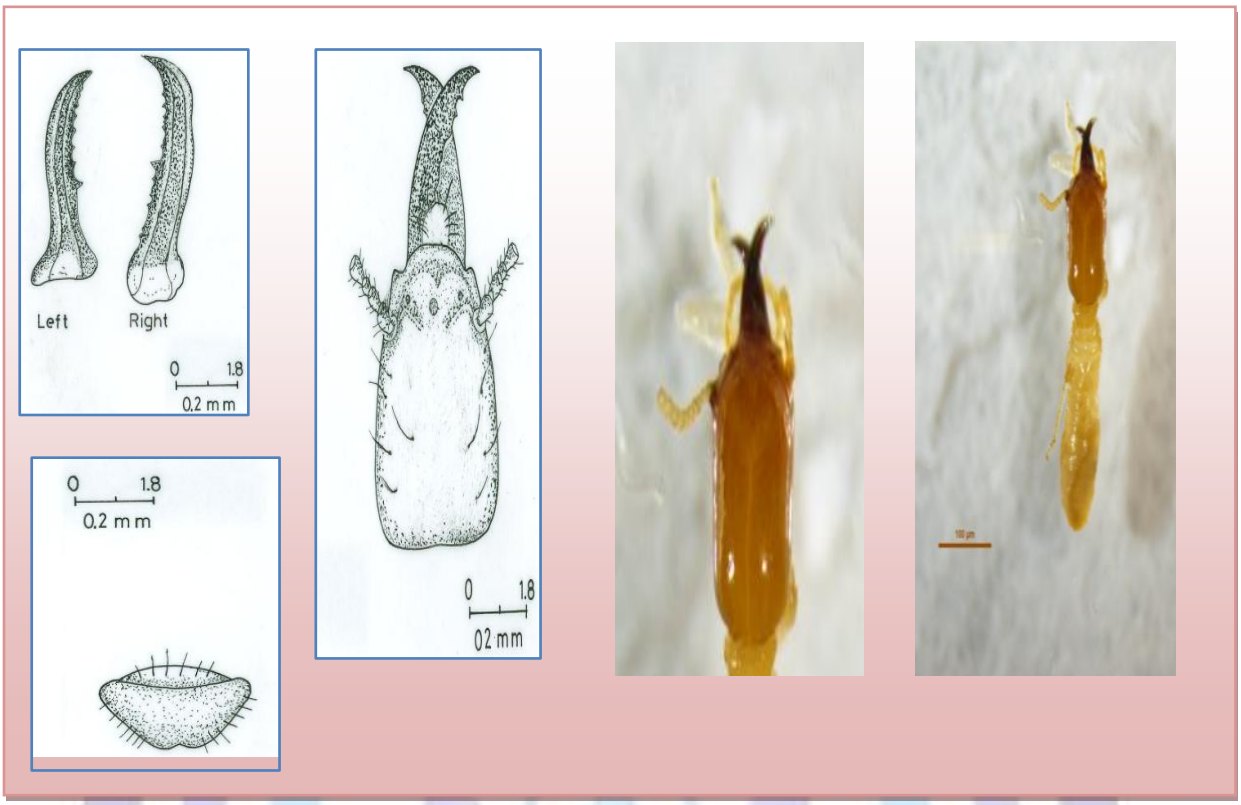

B-*Microcerotermes parvulus*

Fig (1 A&B): stereomicroscopic and drawing picture of *Microcerotermes* sp. and *Microcerotermes parvulu* soldier to show the following: a= dorsal view of solider body; b, c= head capsule d= left and right mandibles and f= pronotum.

Amitermes desertrum

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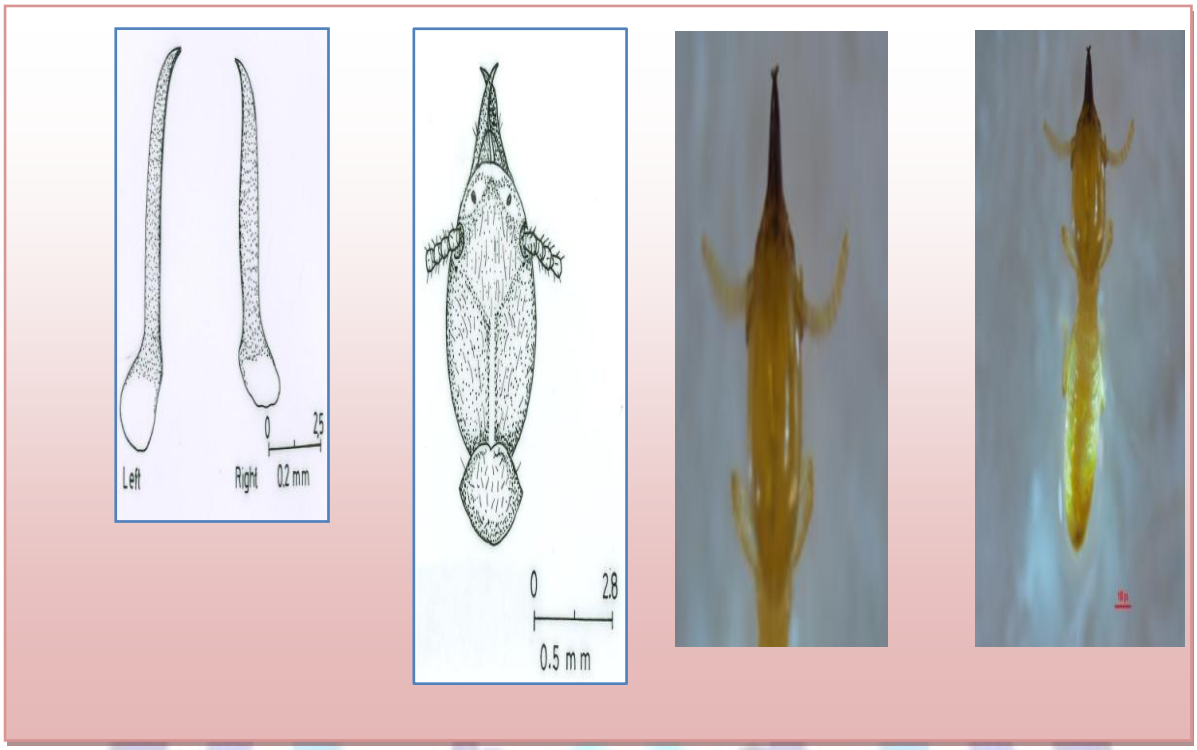
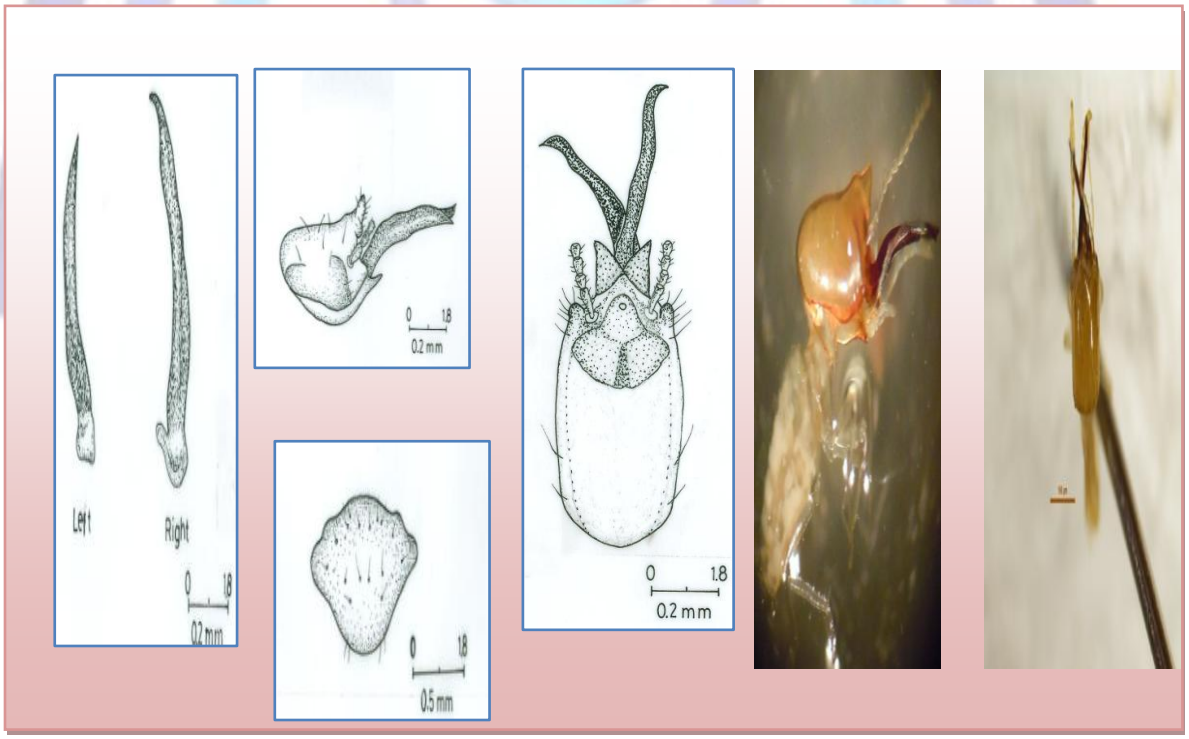


***Microtermes* sp.**

Fig (2 A&B): stereomicroscopic and drawing picture of *Amitermes desertrum* and *Microtermes* sp. soldier to show the following: a= dorsal view of solider body; b, c= head capsule d= left and right mandibles and f= pronotum.



Angulitermes arabiae

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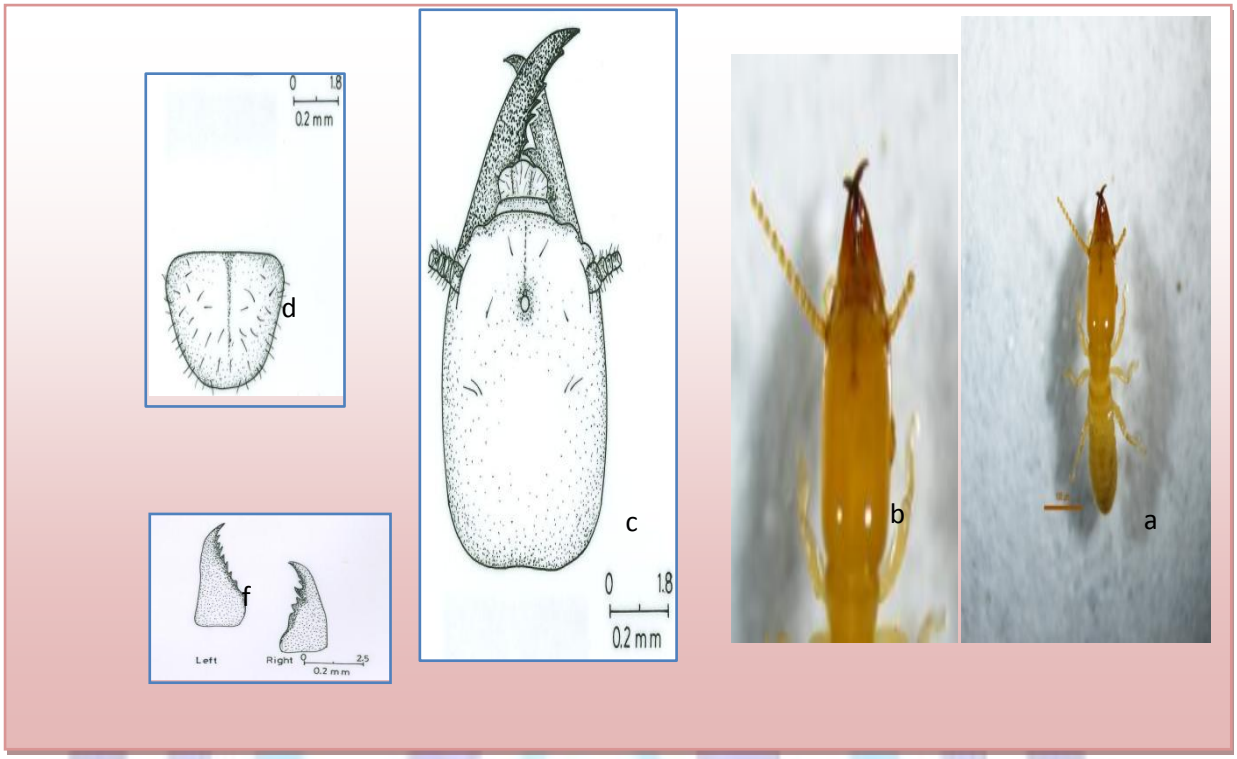
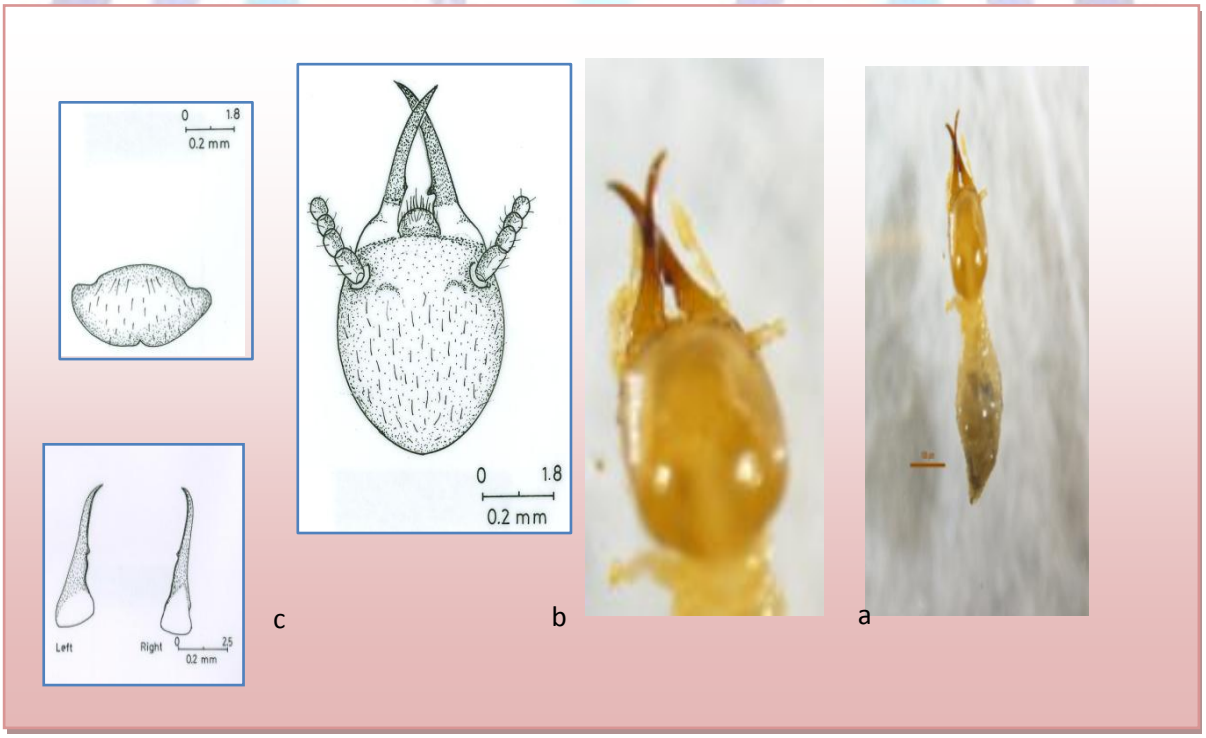


Psammotermes hybostoma

Fig (3A&B): stereomicroscopic and drawing picture of *Angulitermes arabiae* and *Psammotermes hybostoma* soldier to show the following: a= dorsal view of solider body; b, c= head capsule d= pronotum and f= left and right mandibles.



Heterotermes aethiopicus

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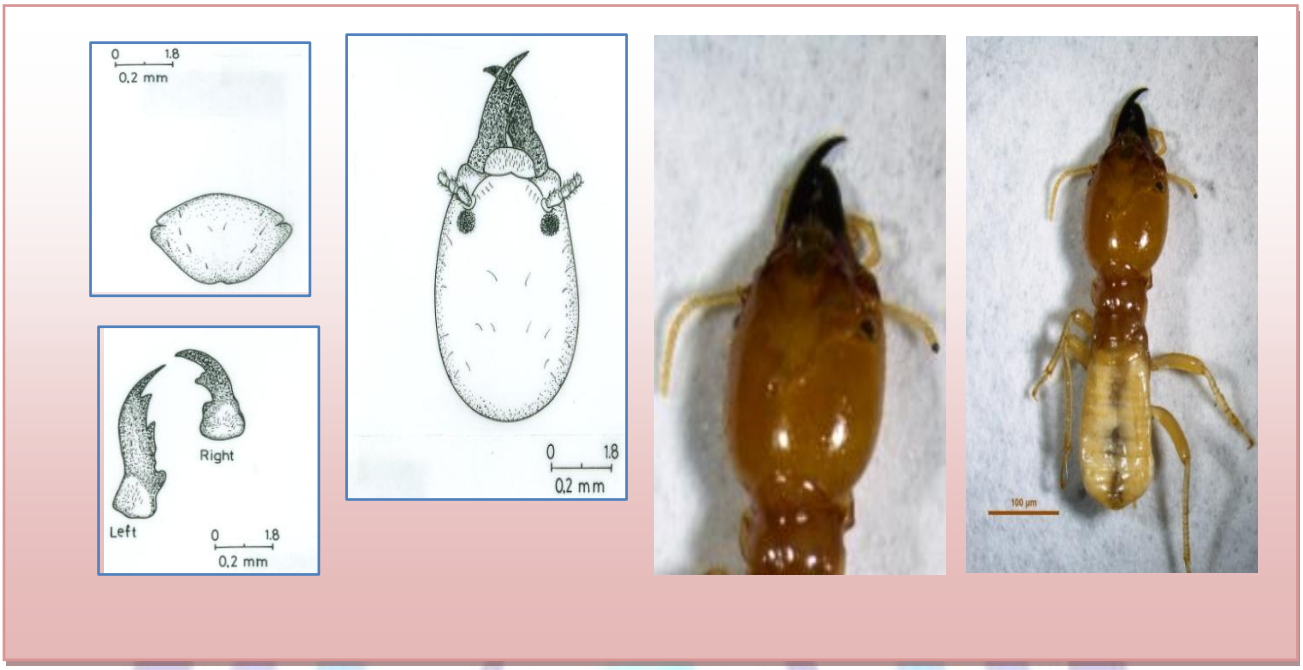

Anacanthotermes ochraceus

Fig (4 A&B): stereomicroscopic and drawing picture of *Heterotermes aethiopicus* and *Anacanthotermes ochraceus* soldier to show the following: a= dorsal view of solider body; b, c= head capsule d= pronotum and f= left and right mandibles.

Species	Areas / Seasons	Center city	Hada	Shafa	Rodaf	Sedairah	Saisad	Arafaa
Microcerotermes sp.	Winter	-	-	-	-	-	+	+
	Spring	-	-	+	+	-	-	+
	Summer	-	-	-	-	+	-	+
	Autumn	+	-	+	-	-	-	+
Angulitermes arabiae	Winter	+	-	-	-	+	-	-
	Spring	-	-	-	-	+	-	-
	Summer	-	-	-	-	+	-	-
	Autumn	-	-	+	-	+	-	-
Amitermes desertrum	Winter	-	-	-	-	+	-	+
	Spring	-	-	-	-	+	-	+
	Summer	-	-	-	-	+	-	+
	Autumn	-	-	-	-	+	-	+
	Winter	-	-	-	-	+	-	+

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Psammotermes hybostoma	Spring	-	-	-	-	+	-	+
	Summer	-	-	-	-	+	-	+
	Autumn	-	-	-	-	+	-	+
Anacanthotermes ochraceus	Winter	-	-	-	-	+	-	+
	Spring	-	-	-	-	+	+	+
	Summer	-	-	-	-	+	-	+
	Autumn	-	-	-	+	+	-	+
Heterotermes aethiopicus	Winter	-	-	-	-	-	-	+
	Spring	-	-	-	-	-	-	+
	Summer	-	-	-	-	-	-	+
	Autumn	-	-	-	-	-	-	-

Table (3): Survey of different termite species at different locations in Taif governorate during four seasons (2011)

+ Present , - absent

Cont. table 1

Species	Areas / Seasons	Center city	Hada	Shafa	Rodaf	Sedaira h	Saisad	Arafaa
Mic. Parvulus	Winter	+	+	+	-	-	-	+
	Spring	-	+	+	-	-	-	-
	Summer	-	-	+	-	-	-	-
	Autumn	-	-	-	-	-	-	-
Microtermes sp.	Winter	-	-	-	-	-	-	-
	Spring	+	-	-	-	-	-	-
	Summer	-	-	+	-	-	-	-
	Autumn	-	-	-	-	-	-	-

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