

Data Sheets on Forest Pests

Anacanthotermes ahngerianus

IDENTITY

Name: *Anacanthotermes ahngerianus* Jacobson

Synonym: *Hodotermes ahngerianus* Jacobson
Acanthotermes ahngerianus Jacobson

Taxonomic position: Insecta: Isoptera: Termitidae

Common Name: Large Transcaspien termite; termite of Anger (English); Большой закаспийский термит; термит Ангера (Russian).

Bayer computer code: ANKTAH

HOSTS

A. ahngerianus attacks all available kinds of wood (both coniferous and deciduous) including manufactured wood, paper and cardboard, as well as cotton textile and other materials containing cellulose; it also may damage some plastic materials: peno-polyurethane, polyethylene, foam plastic, glass-fibre plastics, etc. (Luppova, 1958; Gornostaev and all, 1970). *A. turkestanicus* has been known to damage seeds and live plants of, for example, *Haloxylon* sp., *Salsola* sp., *Artemisia* sp., *Alhagi persarum*, *Lagonychium farctum*, *Gossypium* sp., *Ephedra strobilacea*, *Astrogalus unifoliolatus*, *Euclidium syriacum*, *Gramineae*, and some other (Artemiev & Zhuzhikov, 1968; Kakaliev, 1968; Luppova & Luppov, 1968).

GEOGRAPHICAL DISTRIBUTION

EPPO region: Kyrgyzstan, Southern Kazakhstan (potential EPPO member), Tajikistan (potential EPPO member), Turkmenistan (potential EPPO member), Uzbekistan (potential EPPO member).

Asia: Iran, Kyrgyzstan, southern Kazakhstan, Tajikistan, Turkmenistan, Uzbekistan. (Gornostaev *et al.*, 1970; Ghayourfar, 1996).

EU: Absent

BIOLOGY

A. ahngerianus lives mainly in deserts and semi-deserts at altitudes up to 250 m. Its flight usually occurs in April – May (later than the flight of the related species *A. turkestanicus* in the same geographic area). Thousands of winged adults leave the mother colony and spread usually using the wind. Pairs containing a male and a female try to find a suitable place to enter the soil and establish a new colony. The pest lives in big colonies (nests), which construct hives (cities) in the soil. In human towns, nests are situated under constructions and in walls. The above-ground part of the hive is represented by a mound (hill). The size of the mound depends on the age of the hive and usually reaches 1-2 m in diameter and from 20-40 cm in height. The height of a mound increases when pieces of clay are transported by termites to the surface from the underground parts of the hive. The annual increase does not exceed 2-3 mm. Thus, a mound of 40 cm height can cover a hive of more than 100 years old. Some hives are several centuries old and may reach 2-3 m in diameter and more than 60 cm in height. The shape of the mound depends on the soil and other physical conditions (Fig. 1). The mound and the underground part of the hive consist of numerous cavities and tunnels. The cavities in the mound are small, 6-15 mm high, with a surface area of the floor of 5–10 cm². Underground cavities are much higher and their floor surface may reach more than 100 cm². The underground part of the hive may be 10–15 m deep. There are no clear borders of a hive. The structure of the hive help to keep temperature necessary for the survival and development of the species in desert conditions. The temperature inside the hide seldom exceeds +25°C, even if the temperature on the surface exceed 40-50°C, and it never falls to less than +5°C even during frosts outside. The number of colonies may reach 40 per hectare.

According to their morphology and functions in the hive, individual insects are subdivided into true queen and true king, as founders of the hive, and the following types derived from eggs laid by the true queen: larvae (52-55%), nymphs (1–3%), workers (42-43%), pre-soldiers, soldiers (less than 1% on average), one or two replacement queens and replacement kings, winged males and females (less than 1% on average) (see table 1).

Table 1. Stages of *Anacanthotermes* spp. (after Artemiev, 1968)

Stages	Replacement sexual individuals	Winged types	Workers	Pre-soldiers	Soldiers
11		♂ ♀	6		4
10		H5	5		3
9	♂ ♀	H4	4		2
8		H3	3		1
7		H2	2		
6		H1	1		
5		L5			
4		L4			
3		L3			
2		L2			
1		L1			
Egg					

During warm period (usually, from the beginning of May till the end of October), “workers” collect pieces of food (wood, plants, fungi, etc.) and fill underground cavities. (Luppova, 1958; Kakaliev, 1968; Gornostaev *et al.*, 1970; Luppova *et al.*, 1971; Luppova & Kakaliev, 1972; Zhuzhikov, 1979).

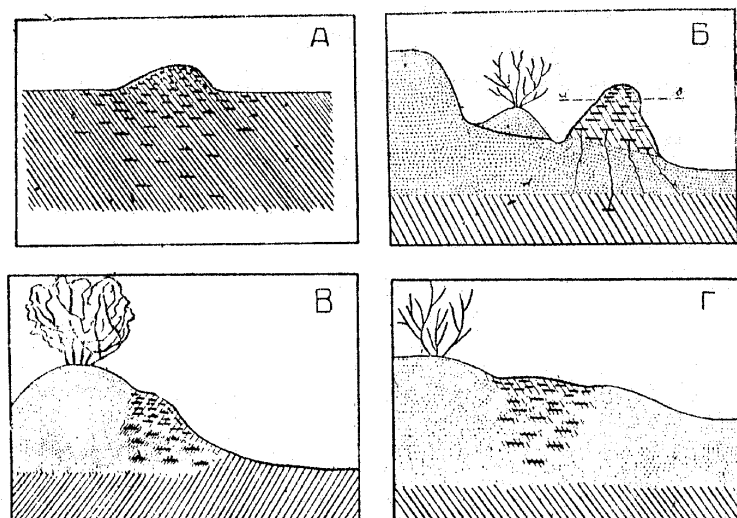


Fig. 1. Mounds of *Anacanthotermes ahngerianus*: A – on clay plain; Б – on sands with decreasing level (line a-b – ancient level of sand); Б – on sand-clay desert close to a bush; Г – on sands with increasing level and deep layer of clay (Luppova, 1958)

DETECTION AND IDENTIFICATION

Symptoms

Characteristic symptoms are: mound of termite hives, holes in soil or wood, presence of termites.

Morphology

Eggs

Eggs of *A. ahngerianus* are white, cylindrical, with rounded ends, 0.86-1.05 mm long, 0.38-0.41 mm wide. Eggs continue to increase in size after being laid (Artemiev, 1968).

Larvae

Larvae of *A. ahngerianus* have 5 instars (Table 2). They are white, without rudiments of wings. Their eyes, mandibles and maxillae become darker from the 1st to the 5th instar. The 5th instar has a yellowish head and occurs in two forms. One of these forms gives rise to nymphs, the other to workers (Artemiev, 1968).

Table 2. Characteristics of larvae of *Anacanthotermes ahngerianus* (Artemiev, 1968)

Characteristics	Instars					
	1 st	2 nd	3 rd	4 th	5 th ‘	5 th ”
Number of segments in antennae	11-12	12-13	14	15-16	17	17
Average width of the head (mm)	0.48	0.62	0.80	0.93	1.07	1.12
Average length of the head (mm)	0.53	0.70	0.94	1.06	1.23	1.29
Average width of the pronotum (mm)	0.37	0.46	0.48	0.56	0.64	0.67
Average length of the body (mm)	1.44	2.43	2.86	3.28	3.85	4.02

Nymphs

Nymphs of *A. ahngerianus* have five instars (Table 3). They are yellowish-white, with a darker head and brown eyes, and with rudiments of wings developing from the 1st to the 5th instar. The head is wider than the pronotum (Artemiev, 1968).

Table 3. Characteristics of nymphs of *Anacanthotermes ahngerianus* (Artemiev, 1968)

Characteristics	Instars				
	1 st	2 nd	3 rd	4 th	5 th ‘
Number of segments in antennae	20	21-22	23-24	24	25
Width of the head (mm)	1.35-1.40	1.45-1.70	1.90-2.10	2.30-2.35	2.75-2.80
Length of the head (mm)	1.40-1.45	1.60-1.80	2.10-2.30	2.45-2.60	3.10-3.15
Width of the pronotum (mm)	0.80-0.85	1.00-1.10	1.40-1.50	1.70-1.85	2.40-2.55
Length of the body (mm)	4.25-5.00	5.70-7.00	8.50-8.75	9.00-10.20	10.00-12.00
Length of wing rudiments (mm)	0.40	1.75-1.80	3.10-3.20	3.75-3.85	5.90-6.00

Winged adults

Winged adults of *A. ahngerianus* develop from nymphs of the 5th instar. They are light brown-ochre with brownish pronotum, brown mandibles, mesonotum and postnotum, and black eyes (Fig. 2). Wings are ochre and slightly transparent. The head is big, round, shiny, covered by rare, light-brown bristles. The antennae are covered by dense, very small hairs and rarer long hairs. They are usually as long as the head and have usually 25 segments; the 3rd segment is very short, the 2nd segment is as wide as the 4th segment, its length is much greater than its width, the 4th-7th segments are wider than long, the 8th-20th segments are as long as wide, and the 21st-25th segments are longer than wide (Fig.3). The length of the body from the end of mandibles to the end of folded wings is 27-31 mm, and without the wings it is 11-15 mm. The head is 3.1-3.4 mm long and 2.6-3.0 mm wide. The front wing is 24-27 mm long and 5.0-5.8 mm wide. The pronotum is 2.2-2.4 mm wide and is twice as wide as long, its transversal fissure is situated closer to its front border. The abdomen is covered by pale-yellow hairs (Jacobson, 1913; Luppova, 1958; Artemiev, 1968). The morphology of adults (Fig. 4, 5, 6A, 6B and 6C) is described in detail by Artemiev (1968).

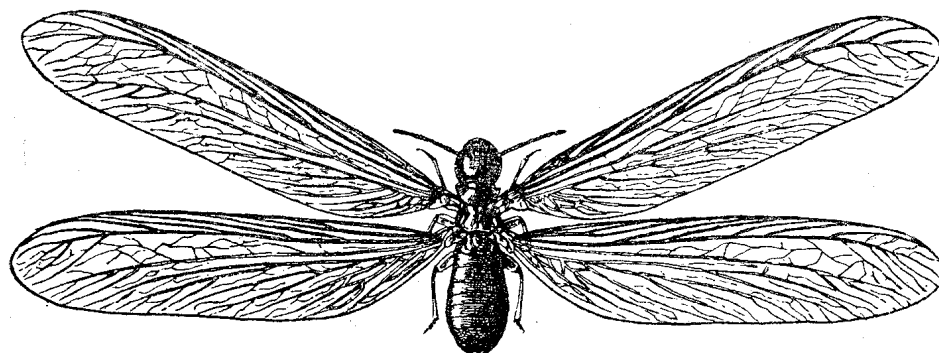


Fig. 2. Winged adult of *Anacanthotermes ahngerianus* (Jacobson, 1913)

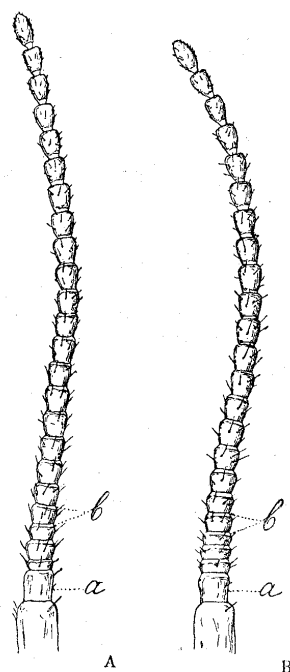


Fig. 3. Antennae of *Anacanthotermes ahngerianus* (A) and *A. turkestanicus* (B)
(a – 2nd segment, b – ends of 5th and 6th segments) (Jacobson, 1913)

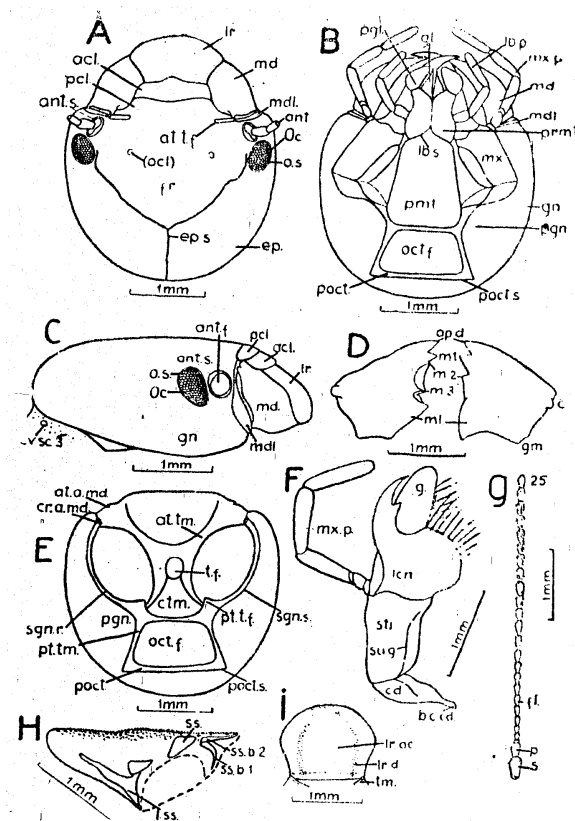


Fig. 4. Morphology of the head of *Anacanthotermes ahngerianus* (Artemiev, 1968)

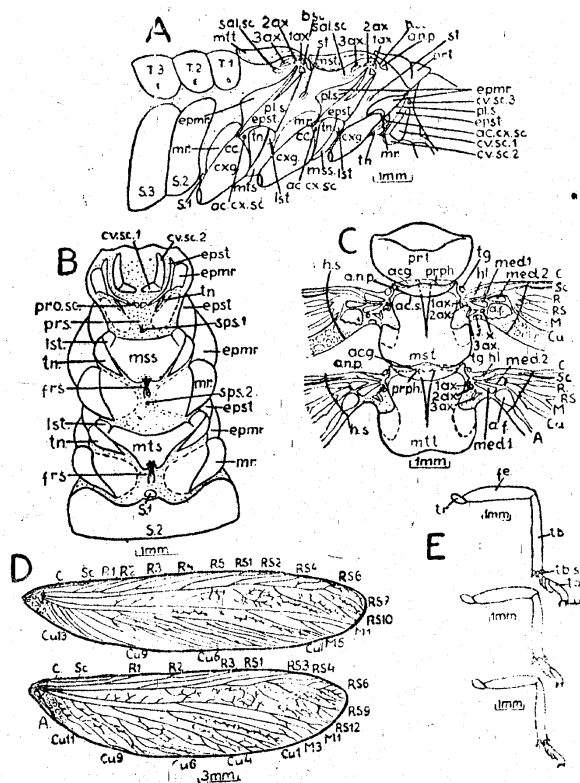


Fig. 5. Morphology of the thorax, legs and wings of *Anacanthotermes ahngerianus* (Artemiev, 1968)

Workers

Workers of *A. ahngerianus* develop from the form of the 5th larval instars having a smaller head (the form of the 5th larval instars having a larger head develops into nymphs). Their body is shiny, covered by rare hairs. Their head is yellowish-orange. The eyes are brown and small, the thorax and legs are yellowish-white. The pronotum is half as wide as the head. Workers have six instars (Table 3) (Jacobson, 1913; Luppova, 1958; Artemiev, 1968).

Table 3. Characteristics of workers of *Anacanthotermes ahngerianus* (Artemiev, 1968)

Characteristics	Instars					
	1 st	2 nd	3 rd	4 th	5 th	6 th
Number of segments in antennae	19-20	21	22-23	23	24	25
Average width of the head (mm)	1.30	1.55	2.05	2.45	2.8	3.2
Average length of the head (mm)	1.55	1.80	2.30	2.70	3.25	3.75
Average width of the pronotum (mm)	0.75	0.80	1.00	1.20	1.50	1.80
Average length of the body (mm)	4.60	4.95	5.60	7.15	9.25	11.75

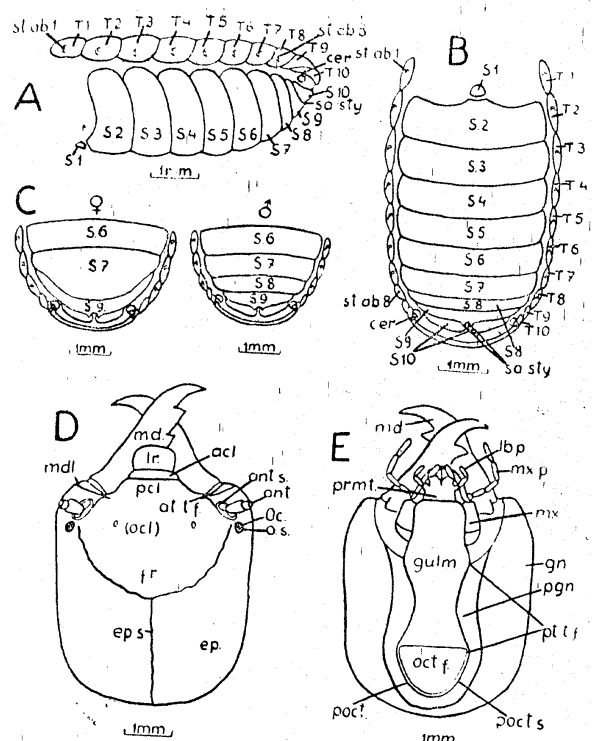


Fig. 6. Morphology of the adult abdomen (A, B, C) and soldier head (D, E) of *Anacanthotermes ahngerianus* (Artemiev, 1968)

Soldiers

Soldiers of *A. ahngerianus* develop from workers and/or nymphs. They have four instars (Table 4). Their body is 12-14 mm long, shiny, covered by rare hairs. Their head is large, 5.4-6.8 mm long, shiny, yellowish-orange, with well developed, brown-black mandibles, which

are 2.4-2.8 mm long (Fig. 6D and 6E). The eyes are black and small, the thorax and legs are yellowish and more developed than those of workers. The pronotum is slightly less wide than the head. The abdomen is milk-white (Jacobson, 1913; Luppova, 1958; Artemiev, 1968).

Table 4. Characteristics of soldiers of *Anacanthotermes ahngerianus* (Artemiev, 1968)

Characteristics	Instars			
	1 st	2 nd	3 rd	4 th
Number of segments in antennae	23	23-24	24-25	24-25
Average width of the head (mm)	2.40	2.70	3.35	3.70
Average width of the pronotum (mm)	1.90	2.40	2.75	2.95
Average length of the pronotum (mm)	1.10	1.30	1.35	1.40

True queen

The true queen of *A. ahngerianus* develops from the winged female, which originally established the colony together with the winged male which developed into the true king. Its head and thorax are morphologically similar to those of winged adults, but there are only scales instead of wings (Fig. 7). The antennae are often underdeveloped. The abdomen is well developed, 10.5-15.5 mm long, 5.2-8.0 mm wide and 3.8-5.5 mm high, with brownish-yellow tergites and sternites, and milk-white inter-segmental membranes. The abdomen is more than twice as long as the head and the thorax together. The true queen is 18.0-22.5 mm long (Jacobson, 1913; Luppova, 1958; Artemiev, 1968).

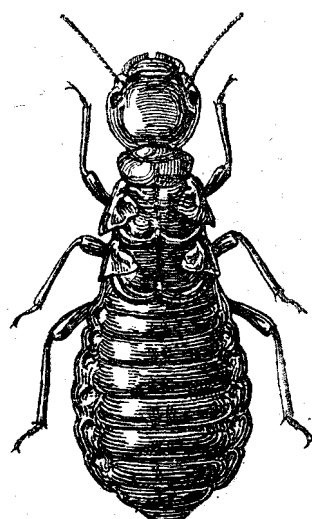


Fig. 7. True queen of *Anacanthotermes ahngerianus* (Jacobson, 1913)

True king

The true king of *A. ahngerianus* develops from the winged male, which originally established the colony together with the winged female which developed into the true queen. Its head and thorax are morphologically similar to those of the true queen. The antennae are often underdeveloped. The abdomen is well developed, 6.4-8.8 mm long and 2.8-3.8 mm wide,

with brown-yellow tergites and sternites, and milk-white inter-segmental membranes. The true king is 13.0-15.0 mm long (Jacobson, 1913; Luppova, 1958; Artemiev, 1968).

Replacement queen

The replacement queen of *A. ahngerianus* develops from the 3rd instar nymphs. Its head and thorax are whitish-brown and are morphologically similar to those of winged adults and true queen (Fig. 8). The antennae have 24 segments. The head is 2.3-3.0 mm long and 2.0-2.6 mm wide. The pronotum is 1.6-2.1 mm wide. Wing rudiments are 1.3-2.2 mm long. The antennae are often underdeveloped. The abdomen is well developed, 7.0-12.0 mm long, 4.6-5.4 mm wide and 2.4-4.5 mm high, with brownish-yellow tergites and sternites, and milk-white inter-segmental membranes. The replacement queen is 11.5-17.0 mm long (Jacobson, 1913; Luppova, 1958; Artemiev, 1968).

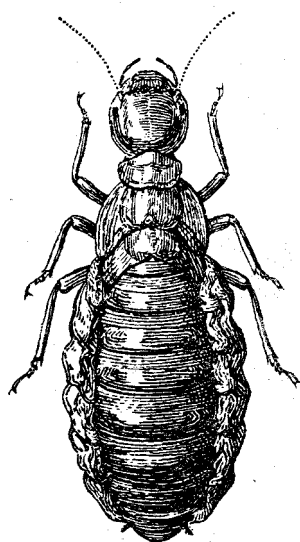


Fig. 8. Replacing queen of *Anacanthotermes ahngerianus* (Jacobson, 1913)

MEANS OF PEST MOVEMENT AND DISPERSAL

The winged adults are not very strong fliers, but, when they are airborne, they may be carried long distances (several kilometres) by wind. Parts of the termite colonies may be transported by human activity with soil or wooden structures adjoining the hive, and may contain a sufficient proportion of the social structure (e.g. eggs, replacement queen and king, workers) to enable a new colony to be established. Worker termites that are foraging for food in various types of wood commodities may also be transported over greater distances but would be unable to establish new colonies.

PEST SIGNIFICANCE

Economic Impact

A. ahngerianus is one of the most common termites in Central Asian countries. There, they are considered as pests of grasslands and desert plants including shrubs and trees, especially saxauls (*Haloxylon* sp.). The termite hives may also interfere with the construction of

irrigation systems. But the main damage occurs in houses where the pest may destroy wood and other cellulose containing materials during all the year (Jacobson, 1913; Luppova, 1958; Gornostaev *et al.*, 1970).

Outside human constructions and houses, *A. ahngerianus* may play a positive role in protecting sands and improving soils (Luppova & Kakaliev, 1972).

Environmental Impact

The environmental impact of *A. ahngerianus* is mainly positive, except for the negative influence on irrigation systems. But social impact on human constructions and materials may be very important.

Control

Control efforts consists mainly of fumigation and chemical impregnation of wood and other materials susceptible to be attacked by the pest (Jacobson, 1913; Luppova & Kakaliev, 1972).

Natural enemies of *A. ahngerianus* may considerably reduce its populations, especially predator ants *Camponotus fedtschenkoi* Maer and *Cataglyphis altisquamis forely* Ruzs. as well as some vertebrates, such as, the lizard *Phrynocephalus helioscopus* Pall., hedgehogs and birds. Some fungi may cause the death of termites and even of colonies, especially *Termitaria* sp., *Aspergillus* sp., *Syncephalis* sp. *Metarrhizium* sp., *Beauveria* sp., and some others (Luppova, 1958; Kakaliev, 1968).

Phytosanitary risk

A. ahngerianus is not a quarantine pest for any individual country (as far as is known) or any regional plant protection organization. It is considered as a serious pest of wood and cellulose containing materials in areas where it occurs and it would be likely to establish in dry and hot areas in the south of the EPPO region. However, the possibilities for transfer of viable colonies from the area of origin to the EPPO region are limited. Most commodities of wood are unlikely to act as pathways. However, waste wood that may have been in contact with a hive for some time could conceivably carry a part of a colony

PHYTOSANITARY MEASURES

The major risk of spreading of *A. ahngerianus* is with soil or waste wood in which eggs, larvae, and other stages and forms may occur. Soil should be inspected for the presence of live insects or eggs, and wood should be inspected for cavities hollowed out by a termite colony.

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