

THE GENUS *BLOMIA* OUDEMANS (ACARI : GLYCYPHAGIDAE)  
I. DESCRIPTION OF *BLOMIA TROPICALIS* SP. N. FROM HOUSE DUST  
IN TROPICAL AND SUB-TROPICAL REGIONS

BY

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Since the rediscovery of the role of mites in provoking house-dust allergies (VOORHORST et al. 1964) more attention has been paid to the mite fauna of house dusts of different geographical areas. *Blomia* has been found in house dust in Taipei (Taiwan) and Paramaribo (Surinam), some times in large numbers (OSHIMA 1970, BRONSWIJK 1972). Allergological investigations (MIYAMOTO et al. 1969) showed a cross antigenicity with *Dermatophagoides farinae* Hughes 1961 indicating that *Blomia* could be important in the house-dust allergy problem in Japan. Taxonomical investigations revealed that a not yet described species *Blomia tropicalis* sp. n. is involved.

DESCRIPTION

FEMALE (measurements of idiosoma are shown in table 1).

*venter* : (Fig. 1) epimera I free ; vulva closed by three valves ; short disc-shaped genital suckers present ; anal opening terminal and ventral ; 6 pairs of anal setae present, 2 pairs dislocated to the dorsal side ; copulatory tube long and bent, gradually tapering towards its end (Fig. 2) ; bursa copulatrix partly sclerotized and visible, entrances to oviduct wineglass shaped.

*gnathosoma* : (Fig. 1) pedipalpal coxae with two pairs of setae, the lateral being pectinate ; pedipalps with two free segments, the proximal one with 2 setae (one pectinate, one smooth) and the distal segment with one smooth seta and one solenidion ; epistome well developed ; chelicera with 6 upper and 3 under teeth and one mandibular spine.

*legs* : (Fig. 3) five free segment present ; tarsi elongated ; claws not visible ; chaetotaxy and solenidiotaxy shown in tables 2 and 3.

*dorsum* : (Fig. 2) no suture between propodosoma and hysterosoma ; all dorsal setae pectinate except for d2 (however, under the scanning electron microscope some pectinations can be seen) ; bases of vertical setae form a trapezium ; ve implanted anteriorly to vi ; supracoxal setae is a branched rod ; Grandjean's organ small ; one pair latero-abdominal oil glands

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FIG. 1. — *Blomia tropicalis* sp. n., female, holotype, venter.

present, they open within the triangle d3-12-13; 4 pairs of cupulae present among the lateral setae.

MALE (measurements of idiosoma are shown in Table 1).

venter : (Fig. 4) epimera I free ; genital opening between coxa III and IV ; small disc-shaped genital pappillae present ; penis is a short bent tube (Fig. 5) ; anus ventral and terminal or sub-terminal ; 3 pairs anal setae present all located at the ventral side ; at both sides of the posterior part of the anus a small pit is located.

gnathosoma : as in the female.

legs : as in the female except for tarsus IV which (in slides in Hoyer's) is always bent to the rostral

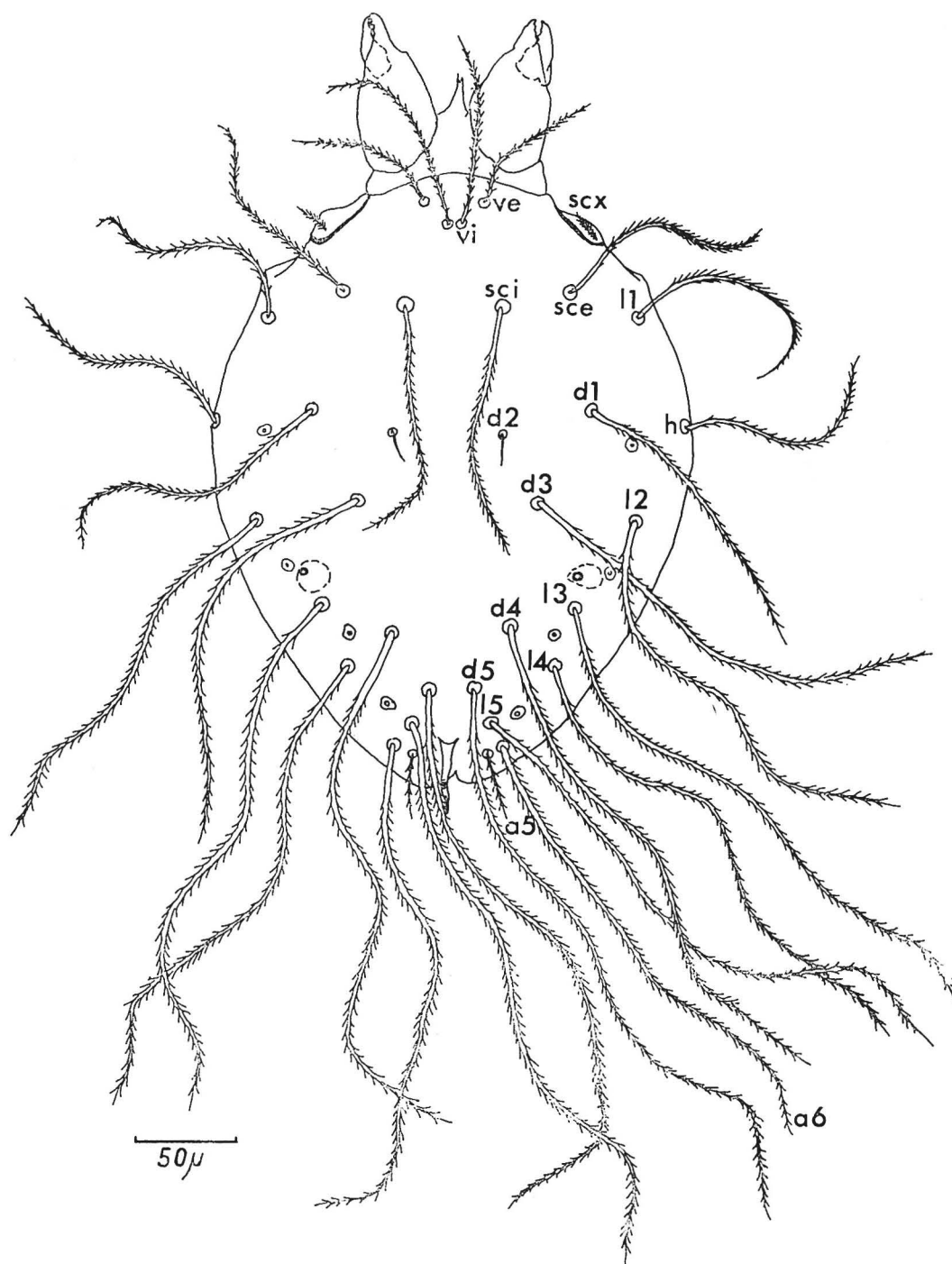


FIG. 2. — *Blomia tropicalis* sp. n., female, dorsum.

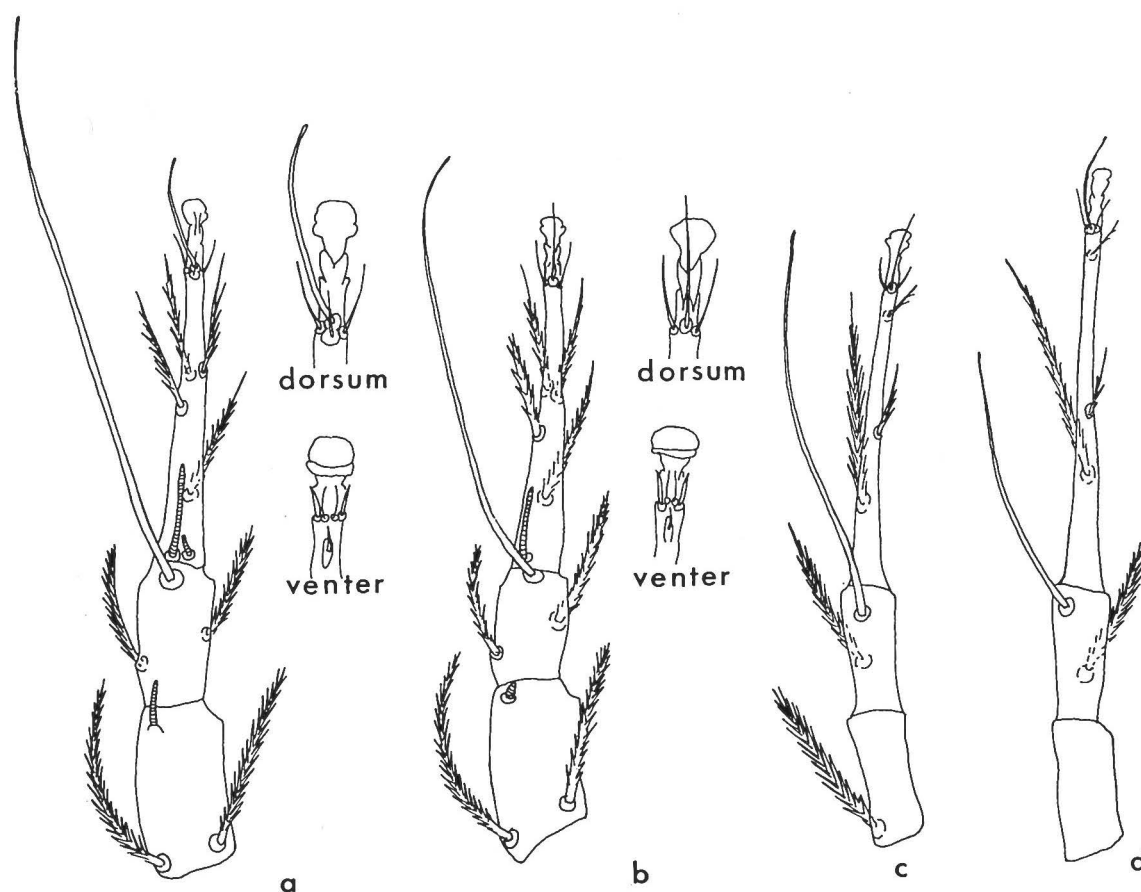


FIG. 3. — *Blomia tropicalis* sp. n., female, legs, a. leg I, b. leg II, c. leg III, d. leg IV.

TABLE I : Growth phenomena in *Blomia tropicalis*.  
Ten specimens are measured in every stage. Sizes in  $\mu$ .

developmental stage	detail measured				
	length	width	length d2	length $\omega$ I on tarsus I	length $\omega$ I on tarsus II
larva	140-179	98-128	16-32	12-14	6-9
protonymph	169-271	140-211	11-18	13-17	8-12
tritonymph	237-276	171-211	10-18	14-19	9-14
male	246-406	190-347	10-29	20-25	13-18
female	320-457	247-382	11-19	20-27	15-20

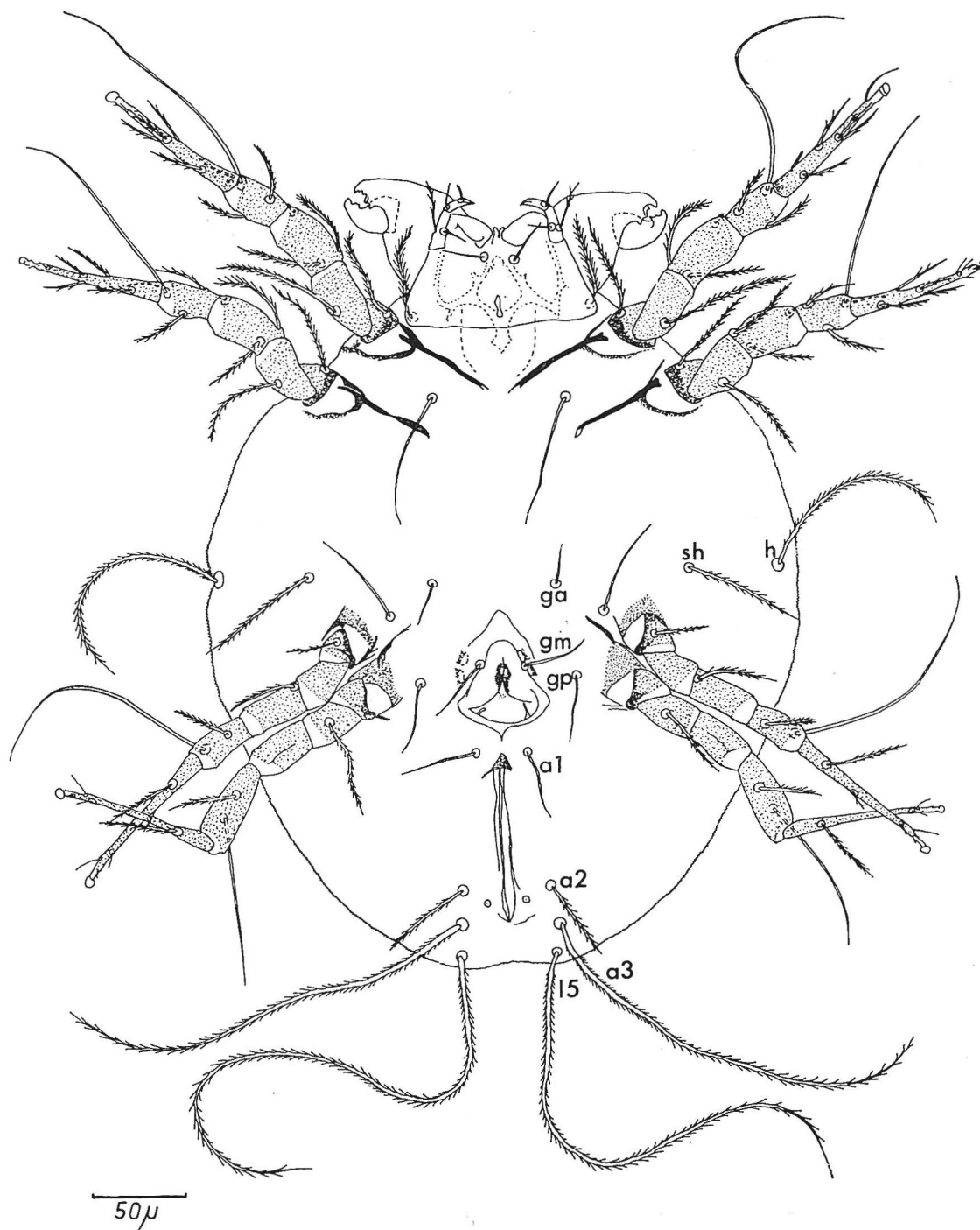


FIG. 4. — *Blomia tropicalis* sp. n., male, paratype, venter.

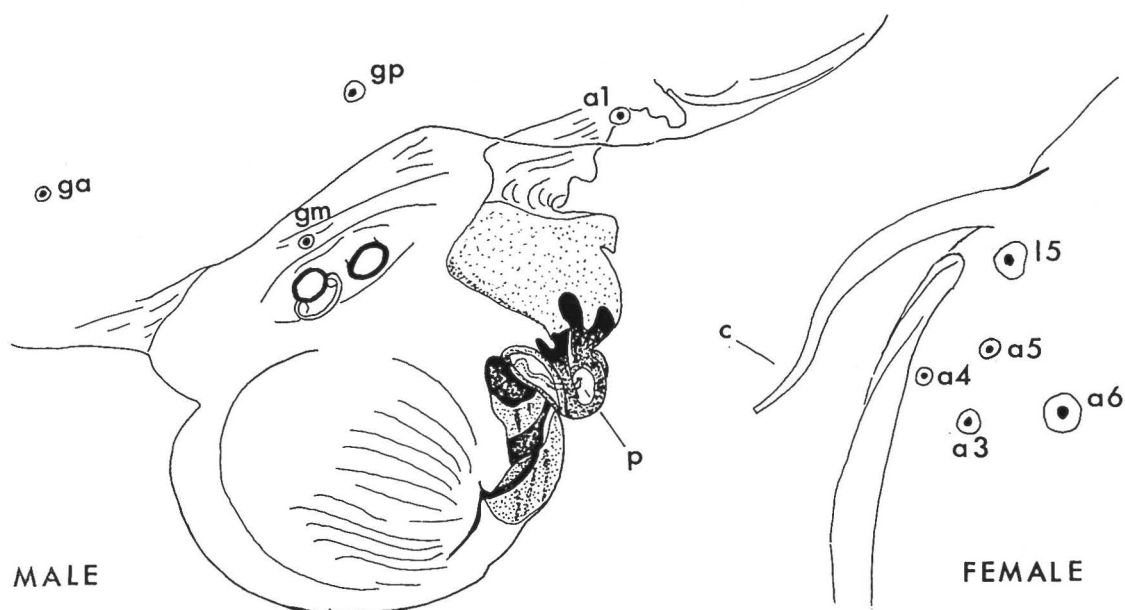


FIG. 5. — Lateral view on copulation apparatus of *Blomia tropicalis* sp. n., showing the very short curved penis (p) of the male and the very long copulatory tube (c) of the female. Only bases of hairs are shown.

TABLE 2 : Chaetotaxy of the legs of *Blomia tropicalis*.

leg segment	developmental stage				
	female	male	tritonymph	protonymph	larva
tarsi	I2-I2-II-II	I2-I2-II-8	I2-I2-II-II	I2-I2-II-7	I2-I2-II
tibiae	2-2-I-I	2-2-I-I	2-2-I-I	2-2-I-0	2-2-I
genua	2-2-I-0	2-2-I-0	2-2-I-0	2-2-I-0	2-2-I
femora	I-I-0-I	I-I-0-I	I-I-0-I	I-I-0-0	I-I-0
trochantera	I-I-I-0	I-I-I-0	I-I-I-0	0-0-0-0	0-0-0
coxal fields	I-0-I-0	I-0-I-0	I-0-I-0	I-0-I-0	I-0-I

side due to the peculiar arthrodial membrane at the tarsal-tibial joint ; the chaetotaxy of tarsus IV is reduced (table 2).

*dorsum* : as in female, but no anal setae are located here.

TRITONYMPH (measurements of idiosoma in table 1)

*venter* : (Fig. 6) epimera I free or just touching ; genital slit and papillae in between coxae IV ; anus ventral and terminal ; 3 pairs of anal setae present ; a3 pectinated, usually located terminally sometimes dorsally.

*gnathosoma* : as in female.

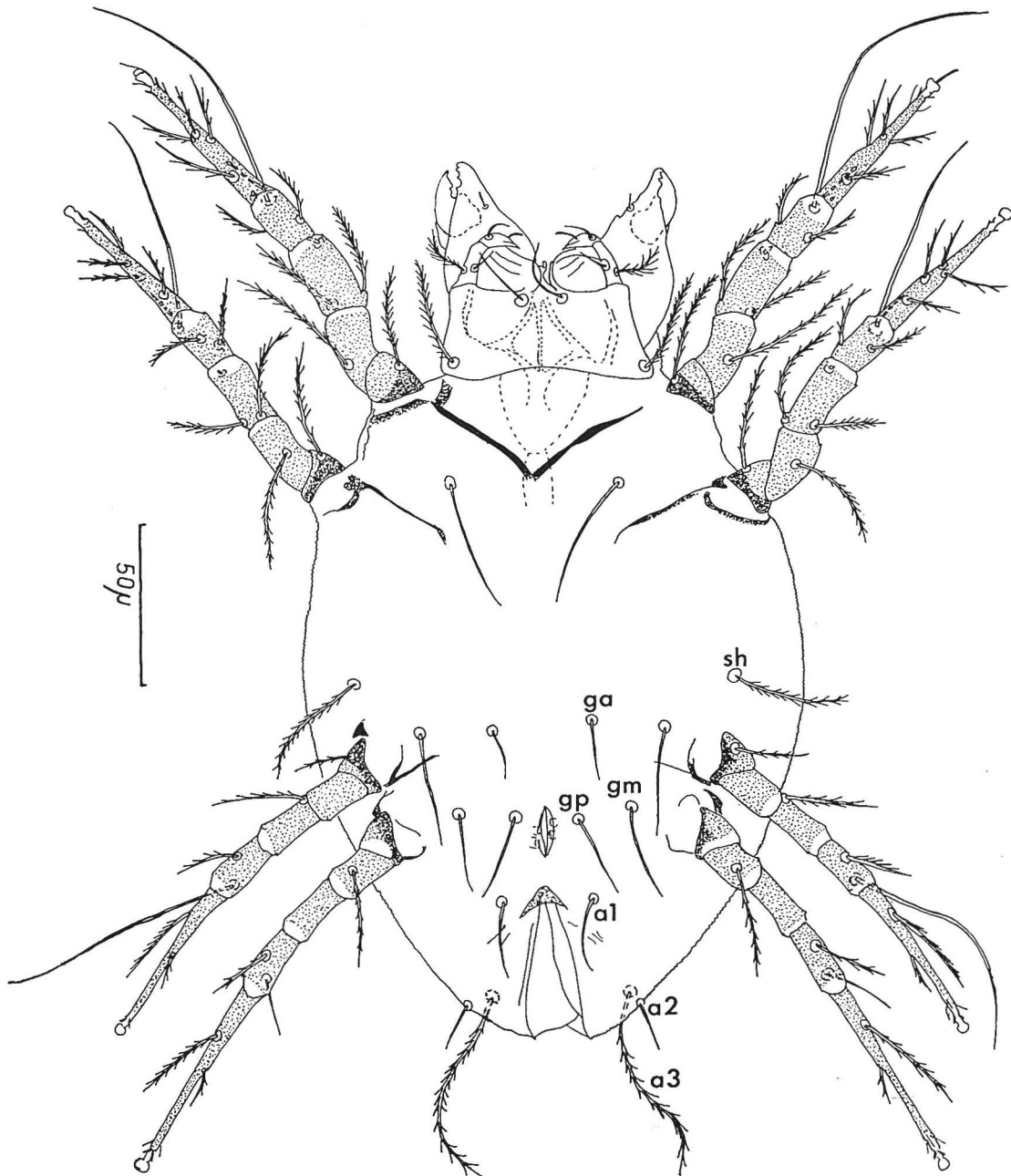


FIG. 6. — *Blomia tropicalis* sp. n., from Bandung, tritonymph, venter.

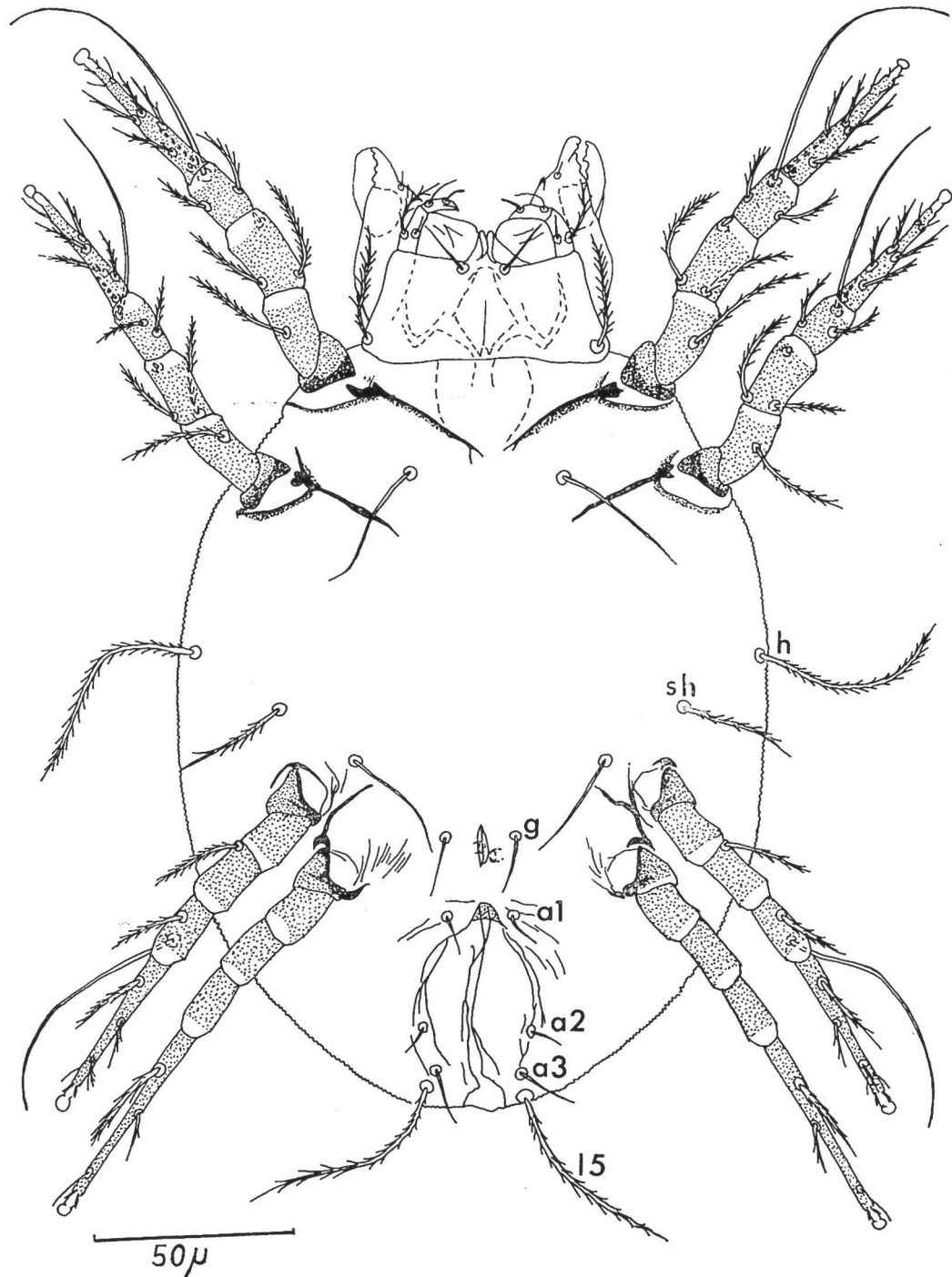


FIG. 7. — *Blomia tropicalis* sp. n. from Bandung, protonymph, venter.



*legs* : as in female but shorter ; chaetotaxy and solenidiotaxy is shown in tables 2 and 3 ; solenidion  $\omega$  on tarsus I club-shaped.

*dorsum* : as in male, setae generally shorter.

TABLE 3 : Solenidiotaxy of the legs of *Blomia tropicalis*.

leg segment	developmental stage				
	female	male	tritonymph	protonymph	larva
tarsi	3-I-0-0	3-I-0-0	3-I-0-0	2-I-0-0	I-I-0
tibiae	I-I-I-I	I-I-I-I	I-I-I-I	I-I-I-0	I-I-I
genua	I-I-0-0	I-I-0-0	I-I-0-0	I-I-0-0	I-I-0

PROTONYPH (measurements of idiosoma in table 3)

*venter* : (Fig. 7) as in tritonymph but  $a_3$  are smooth setae always located at the ventral side.

*gnathosoma* : as in female.

*legs* : as in tritonymph, but chaetotaxy of tarsus IV is reduced (Table 2).

*dorsum* : as in tritonymph, but  $d_2$  is pectinated.

LARVA (measurements of idiosoma shown in table 1)

*venter* : (Fig. 8) epimera I free ; Claparède's organ rudimentary (sclerotized ring) ; anus ventral and terminal ; no anal setae present.

*gnathosoma* : as in female, but larger in comparison with the body.

*legs* : as in protonymph.

*dorsum* : (Fig. 9) all idiosomal setae pectinate ;  $d_4$  and  $r_4$  lacking ;  $d_2$  comparatively longer and  $r_3$  plus  $d_5$  comparatively shorter than in the adults ; only three pairs of cupulae.

#### MATERIAL EXAMINED

- Holotype and paratypes were recovered from a culture on dried *Daphnia* of a sample of floor dust from Bandung (Indonesia). This sample was collected by dr. I. YOUNG on 26-12-70.
- Another mass culture was obtained from a sample of floor dust collected by Mr. R. D. GUERRERO in Daro, Dumaguette City, Philippines on April 11th 1971.
- The third culture was obtained from the dust of a tobacco factory in Tamwe, Rangoon, Birma, January 16, 1967. This sample was collected by the third author. The allergological studies of MYIAMOTO et al. (1969) were based on this culture.
- All stages were obtained from house dust of Taipei (Taiwan) in the 1960th by mr. T. C. Maa.
- Seventeen specimens were found in the floor dust of a wooden dwelling in Kanazawa (Japan) on October 26th, 1969. Collector dr. S. OSHIMA.
- Numerous specimens were found in an investigation of the floors of several houses in Para-



FIG. 8. — *Blomia tropicalis* sp. n. from Bandung, larva, venter.

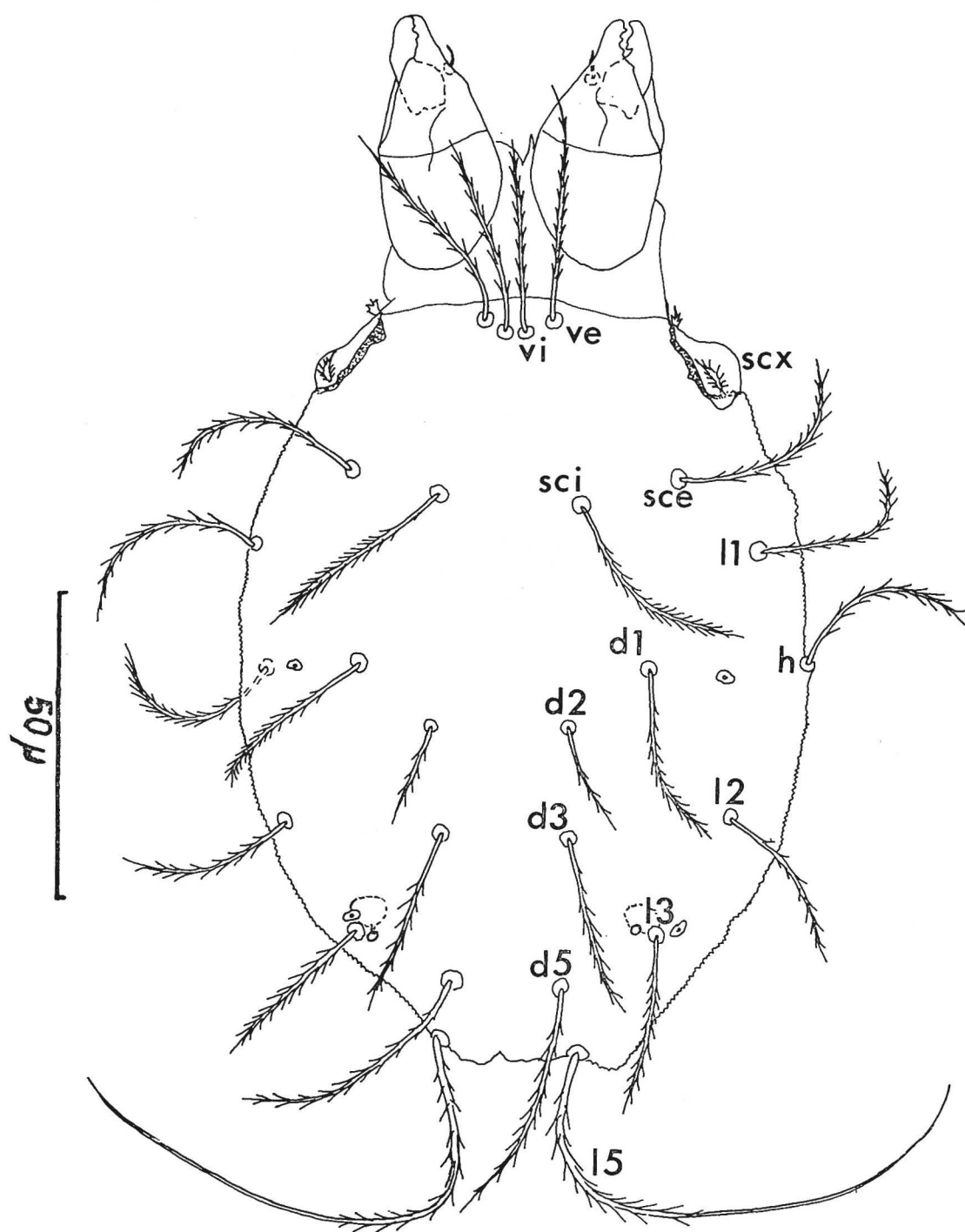


FIG. 9. — *Blomia tropicalis* sp. n. from Bandung, larva, dorsum.

maribo (Surinam) in November 1969. A few specimens were found in mattress dust in August 1971. The dust was collected by dr. F. S. LUKOSCHUS and drs. N. KOK respectively.

- g. One female was sent on loan to us by dr. R. N. SINHA. The label read : " Private morai of mr. B. C. NAITY, Gopalnagar, 1 ½ mi. n. of Singurfield stn, Dist. Hooghly, W. Bengal., July 22/27 ".
- h. One male was obtained by courtesy of dr. I. P. Dixit from floor dust in Bhilai (M. P.), India, January 1972.

#### ECOLOGY AND MEDICAL IMPORTANCE

*B. tropicalis* occurs in association with the numerous pyroglyphid and acarid mites inhabiting houses (OSHIMA 1970, BRONSWIJK 1972). It was reared most successfully on dried *Daphnia*. In a comparative study at room temperature (approximately 22°C) and 75 % relative humidity the population increased 430 × on dried *Daphnia*, 38 × on ground wheat, and 0.03 × on ground unpolished rice (the population was initiated with 10 adults or older nymphs, 2 series of 3 replicas each were run for 8 weeks). The multiplication on dried *Daphnia* not only is very high, the food is also rapidly exhausted. On 5 g. of food almost all mites were dead after 67 days. It could be seen under the microscope that much unaltered food was left. This could indicate that the mites do not live on the dried *Daphnia* but on some other material e. g. microorganisms present.

For copulation the male grasps the posterior part of the female with its fourth pair of legs, which are adapted to this action by a peculiar tarsal-tibial joint. Gnathosoma of male and female point in opposite directions. The position of the male and female genital apparatus can be seen in Fig. 5. Male and female have never been seen attached for more than 15 minutes.

No parthenogenesis occurred when 10 females were grown up in isolation.

In mounted females never more than one egg has been observed. Eggs have been laid at random in the culture vessels preferably under some substrate particles. One week after copulation many eggs and larves were present. Two weeks after copulation new adults could already be observed.

The evidence suggests that *B. tropicalis* is a regular and sometimes abundant inhabitant of houses in tropical and subtropical regions. This means that skin and lungs of a great many people are exposed to it. This opens up the possibility of provoking bronchial allergies (asthma and rhinitis). In fact it was demonstrated (MIYAMOTO et al. 1969) that extracts of *B. tropicalis* show cross-antigenicity with *Dermatophagoides farinae* Hughes, which contains house dust allergen. Skin irritation caused by *Blomia* has until now not been described. Another member of the family Glycyphagidae, *Glycyphagus domesticus* (de Geer), has been associated with grocers'itch (BAKER et al. 1956). According to these authors any heavy infestation with Acari-dae will probably cause skin irritation.

#### ACKNOWLEDGEMENTS

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