

# Opuscula Zoologica

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## Revision of the species *Walchia disparunguis* (Oudemans, 1929) and its group

(ACARINA, TROMBICULIDAE)<sup>1)</sup>

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### ABSTRACT

The species TRAUB & EVANS (1957) called *Gahrliopia* (*Walchia*) *pingue* (Gater, 1932) is redescribed as *Walchia* (*Walchia*) *disparunguis* (Oudemans, 1929). What TRAUB & EVANS considered *G. (W.) disparunguis* *disparunguis* is another species, herein called *Walchia* (*Walchia*) *fulleri* n. sp.

*Walchia* (*Walchia*) *ewingi* Fuller, 1949 and *Walchia* (*Walchia*) *lupella* (Traub & Evans, 1957) are also redescribed.

The *disparunguis* group contains additional species, like *G. (W.) nani-parma* Traub & Evans, 1957, *G. (W.) alpestris* Traub & Evans, 1957 and *G. (W.) chinensis* Chen & Hsu, 1955.

### I. INTRODUCTION

Thanks to the kindness of Dr. Egon POPP, I was able to study a slide containing three chiggers collected on *Mus rattus* in Garoet (W. JAVA) by Mr. van HEURN in August, 1928. This slide was deposited in the collection of the Zoologische Staatssammlung, Abt. Wirbellose Tiere, München, under #V.2142 and labelled *Schöngastiella vanheurni*.<sup>2)</sup>

After thorough study of these three specimens, I compared them with the four mounted on holotype slide #3913 of *Schöngastiella disparunguis* Oudemans, 1929, deposited in the Rijksmuseum of Leiden (HOLLAND). This holotype was also collected by Mr. van HEURN on a *Mus rattus* from Garoet in August, 1928.

The absolute morphological identity of these seven specimens, as well as the identical ecological data relating to them, leaves no room for doubt that they pertain to the same type series.

If we consider the two criteria applied by the revisers of *Gahrliopia* (*Walchia*) *disparunguis disparunguis*, Traub & Evans, 1957 (= *Schöngastiella disparunguis* Oudemans, 1929):

1. setation of posterior coxa: 2-2,
2. external leg-tarsal claw setiform,

<sup>1)</sup> This work was supported by Research Grant AI-03793 from the National Institute of Allergy and Infectious Diseases, National Institutes of Health, U.S. Public Health Service.

<sup>2)</sup> Unpublished name.

and compare them with those observed on the seven specimens of the type series:

1. setation of posterior coxa: 3-3,
2. external leg-tarsal claw setiform,

we may therefore conclude that what TRAUB and EVANS (1957) redescribed as *G. (W.) disparunguis pingue* (Gater, 1932) is *W. disparunguis* s. str., and what these authors considered as *G. (W.) disparunguis disparunguis* is actually another species, which I suggest calling *fulleri*.

These changes do not affect *ewingi* or *lupella*, which are also hereinafter revised and considered as full species.

## II. TAXONOMICAL DISCUSSION

In my recent work, The Chigger Mites of the Far East (1968), the GAHRLIEPIINAE subfamily had to be expanded to make room for new taxonomical concepts. The names *Walchia*, *Schöngastiella*, and *Gateria* were revived, and these groups were expanded as full genera.

O U D E M A N S' species is presently written:

*Walchia (Walchia) disparunguis* (Oudemans, 1929).

It differs in many respects from what was erroneously called *disparunguis* and which I now call:

*Walchia (Walchia) fulleri* n. sp.,

considering it, like *ewingi* and *lupella*, as a full species.

Tabulating the characters of the four species of the *disparunguis* group, we obtain the following:

Species	Cx <sub>3</sub> (mean)	Smaller claw (external)	Ip* (mean)	AW	SD	PL
1. <i>disparunguis</i> s. str.	3/3	very thin	570	25	50	29
2. <i>ewingi</i>	3/3	thin	484	27	50	24
3. <i>fulleri</i>	2/2	very thin	549	27	51	30
4. <i>lupella</i>	2/2	thicker	572	32	56	32

\* Ip = Index pedibus, or mean of the three leg lengths; as a single figure expressing a relative idea of size.

## III. DESCRIPTION

### A — *Walchia (Walchia) disparunguis* (Oudemans, 1929) (Pl. A)

*Schöngastiella disparunguis* Oudemans, 1929; Gater, 1932; Thor & Willmann, 1947.

*Walchia pingue* Gater, 1932; Radford, 1942; Womersley & Heaslip, 1943; Wharton & Fuller, 1952.

*Schöngastia disparunguis*, Buitendijk, 1945.

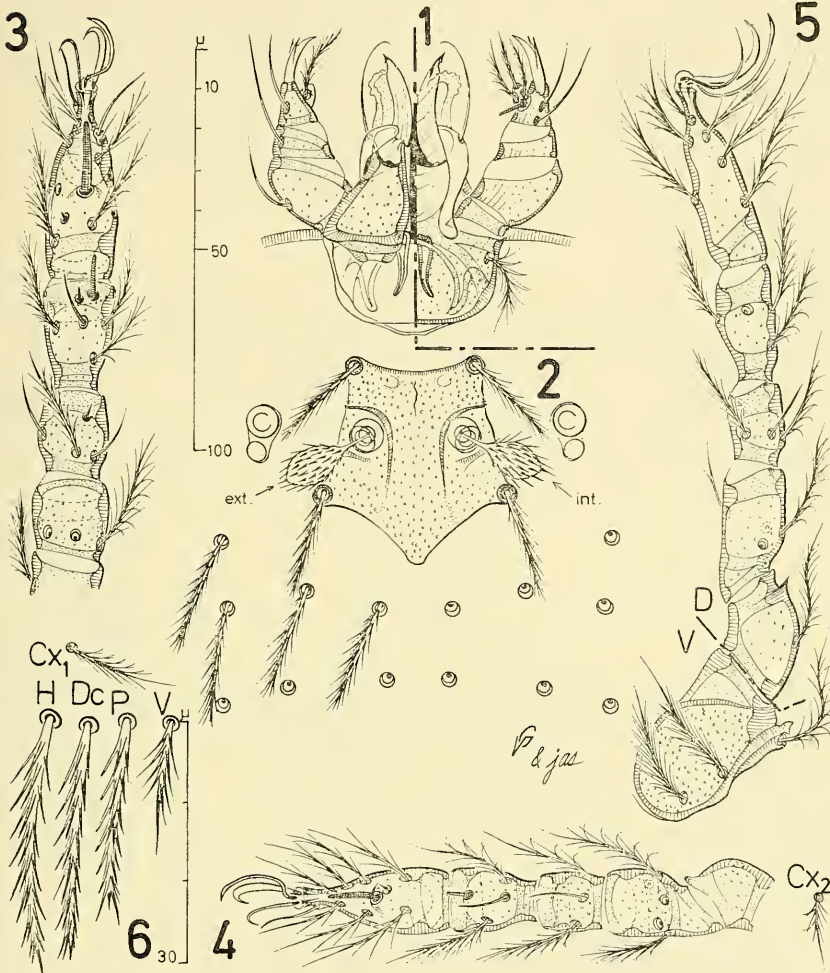
*Walchia pinguis*, Thor & Willmann, 1947; Fuller, 1948.

*Walchia disparunguis*, Fuller, 1948, 1949, 1952; Audy, 1952; Gunther, 1952; Wharton & Fuller, 1952 (in part); Radford, 1954.

*Gahrlipeia (Walchia) disparunguis pingue*, Traub & Evans, 1957; Domrov & Nadchatram, 1963.

*Walchia (Walchia) disparunguis*

(A)



**1. ECOLOGICAL DATA.**

Hosts: *Rattus rattus* ssp. (HT), *R. rattus diardii*, *R. rattus kandianus*, *R. concolor*, *R. ringens*.

Parasitope (PT): ears, head, venter, axillary, ano-genital and inguinal regions.

Loc.: Garoet, W. JAVA, MALAYSIA<sup>3</sup>).

<sup>3</sup>) AUDY, 1951 locates *W. disparunguis* from Kuching, Sarawak (BORNEO). These specimens were described later under the name of *Gahrlipeia (Walchia) maniparma* Traub & Evans, 1957.

Date: August, 1928 (HT).

Type material: Holotype #3913 in Rijksmuseum, Leiden (HOLLAND).

1 paratype in Munich.

**2. BIONOMICAL DATA.**

SIF = 4B-N-3-2110.0000                      fPp = (N)-(N)-(N).N.N  
 (ST, pSt, PT', PT'') = nude                      fsp = 7.6.6  
 fCx = 1/1/3                      fSt = 2/2                      fBT = 2b/b/b  
 fD = 2H + 6.6.6.6.6.4.2 = 38 } NDV = 38 + 52 = 90  
 fV = 8.10.8u8.6.6.4.2 = 52 }

The seven species of the type series that I have seen (Holotype #3913, four specimens, labelled *Schöngastiella disparunguis* by the hand of O U D E M A N S himself and paratype #V.2142, three specimens, labelled *Schöngastiella vanheurni*) measured:

	AW	PW	SB	ASB	PSB	SD	AP	AL	PL	S	
Mean:	29	47	25	20	34	54	34	26	29	23(15×9)	
Extr. {	—:	27	45	24	20	31	51	32	25	28	— —
	+	31	48	25	20	35	55	35	28	31	— —
	H	D	P	V	pa	pm	pp	Ip	Cx <sub>3</sub>		
Mean:	33	30/35	23	17/28	197	163	197	557	3/3		
Extr. {	—:	29	28/34	22	15/18	189	160	194	543	3/3	
	+	34	32/37	24	26/31	202	166	200	564	3/3	

The following biometrical data were obtained from a series of four slides involving a total of 20 species (all from MALAYA) labelled "Walchiella pingue Gater, 1932 = *glabrum* Walch, 1927":

	AW	PW	SB	ASB	PSB	SD	AP	AL	PL	S
Mean:	25	42	20	19	31	50	34	23	29	23(14×8)
Extr. {	—:	24	39	17	18	29	48	32	26	22(14×8)
	+	27	45	21	21	32	52	36	32	24(15×8)
	H	D	P	V	pa	pm	pp	Ip	Cx <sub>3</sub>	
Mean:	31	32/33	25	18/31	205	166	199	570	3/3	
Extr. {	—:	29	28/31	22	16/29	190	146	190	530	3/3
	+	33	34/35	27	21/33	215	176	206	594	4/3

(once)

**3. REMARKS.**

Only *W. ewingi*, which is definitely a smaller species, shares the coxal formula 3/3, Ip = 484 (instead of 570 for *disparunguis*). In *disparunguis* the external claw is much thinner, as indicated by T R A U B & E V A N S, 1957, but claws and empodia are longer than in *ewingi* (Pl. A & B, Figs. 3, 4, 5). The body and leg setae are coarser than in *ewingi* (Pl. A, Fig. 6), and *disparunguis* has two pairs of eyes (diameter 8 and 6 μ) and a long chelostyle (28 μ) without subapical dent.

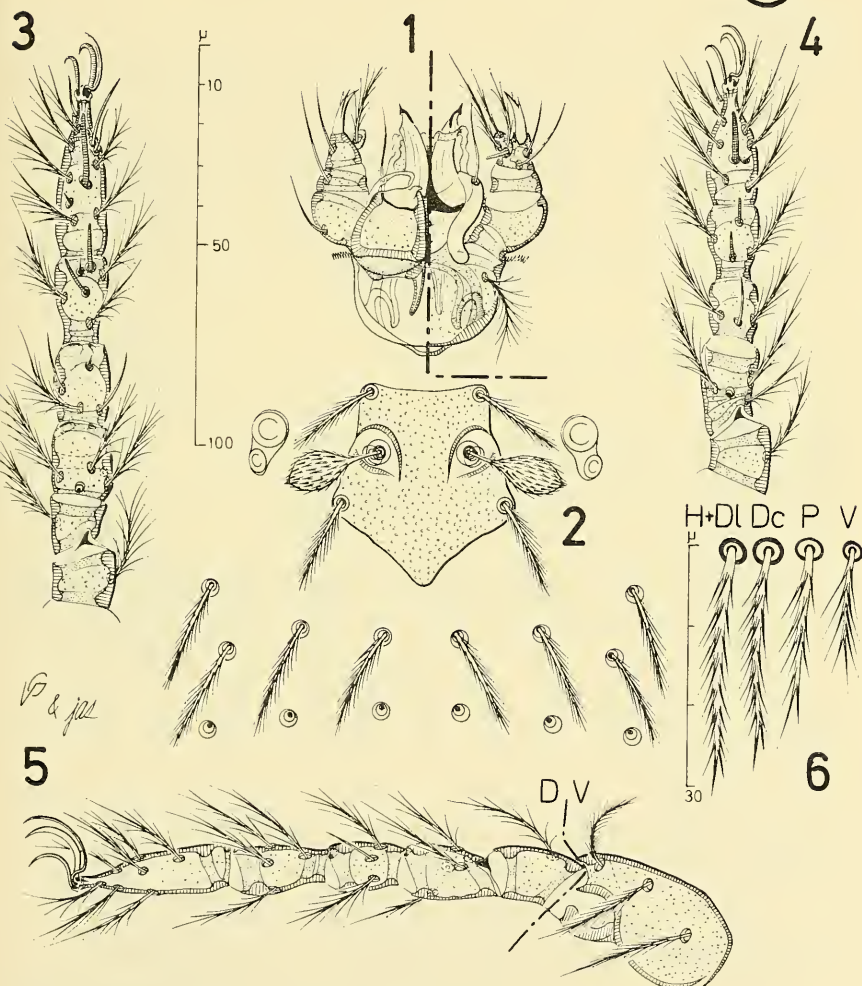


**B — Walchia (Walchia) ewingi** Fuller, 1949  
(Pl. B)

*Trombidium glabrum* Walch, 1927 (nec. *Trombidium glabrum* Duges, 1834<sup>4</sup>);  
Gunther, 1941; Fuller, 1949.  
*Walchia glabrum*, Ewing, 1931; Gunther, 1941, 1952; Radford, 1942, 1954;  
Womersley & Heaslip, 1943; Womersley, 1944; Blake et al., 1945; Grif-  
fiths, 1947; Lawrence, 1947; Fuller, 1952.  
*Trombicula glabrum*, Womersley & Heaslip, 1943; Thor & Willmann, 1947;  
Fuller, 1949.

*Walchia (Walchia) ewingi*

(B)



<sup>4</sup> DONNADIEU (1875) identified *Trombidium glabrum* Duges, 1834 as *Tenuipalpus glaber* which later on (1953) BAKER & PRITCHARD ascribed under the genus *Brevipalpus*.

- Walchi disparunguis* (Oudemans, 1929), Kohls et al., 1945.  
*Walchia glabra*, Thor & Willmann, 1947; Fuller, 1948.  
*Trombidium ewingi*, Fuller, 1949.  
*Walchia ewingi*, Fuller, 1949; Gunther, 1952.  
*Gahrliopia (Walchia) ewingi*, Womersley, 1952.  
*Gahrliopia (Walchia) glabrum*, Womersley, 1952.  
*Gahrliopia (Walchia) glabra*, Womersley, 1952.  
*Gahrliopia (Walchia) pingue*, Womersley, 1952; Audy, 1954 (nec. *pingue* Gater, 1932); Fuller, 1952.  
*Walchia pingue*, Wharton & Fuller, 1952 (nec. *pingue* Gater, 1932).  
*Gahrliopia (Walchia) ewingi*, Womersley & Audy, 1957; Traub & Evans, 1957.

## 1. ECOLOGICAL DATA.

Hosts: *Rattus rattus rattus*, *R. rattus diardii*, *R. rattus sladeni*, *R. argentiventer*, *R. concolor browni*, *R. flavipectus*, *R. fulvescens*, *Rattus* sp., *Crocidura* sp., *Tupaia belangeri*, birds (?).

PT: ?

Loc.: Lampong District (S. SUMATRA) (HT), Jakarta (INDONESIA), MALAYA, BURMA, Macassar (CELEBES), Assam (INDIA).

Date: 1927 (HT).

Type material: Holotype and paratype in Medical School, University of Jakarta (INDONESIA).

## 2. BIONOMICAL DATA.

SIF = 4B-N-3-2110.0000                      fPp = (N)-(N)-(N).N.N  
(ST, pST, PT', PT'') = nude                  fsp = 7.6.6  
fCx = 1/1/3      fSt = 2/2                      fBT = 2b/b/b  
fD = 2H + 6.6.6.6.6.4.4.2 = 42      } NDV = 42 + 52 = 94  
fV = 6.8.10.8u6.6.6.2                      = 52 }

Measurements cited hereinafter were taken on specimens from N. BURMA compared with those of the original *glabrum* of WALCH. In his work the magnitude of Figs. 4 and 5 is 175x, not 225x as indicated.

	AW	PW	SB	ASB	PSB	SD	AP	AL	PL	S
Mean:	27	42	23	17	33	50	29	24	25	25(17×10)
<i>glabrum</i> :	28	42	20	18	32	50	29	23	24	26(18×9)
	H	D	P	V	pa	pm	pp	Ip	Cx <sub>3</sub>	
Mean:	28	26/28	22	16/27	171	142	171	484	3/3	
<i>glabrum</i> :	28	24/28	23	15/27	173	145	183	501	3/3	

## 3. REMARKS.

The coxal formula is 3/3 but sometimes one can see 3/2 or 3/4, rarely 2/2 or 4/4. Small size, Ip = 479 to 501, with claws and empodia rather frail. Two pairs of eyes (diam. 8 and 6 μ). Chelostyle (26 μ) with one subapical dent.

**C — Walchia (Walchia) fulleri n. sp.**  
(Pl. C)

*Walchia disparunguis*, Womersley, 1944; Mohr, 1947; Wharton & Fuller, 1952 (in part).

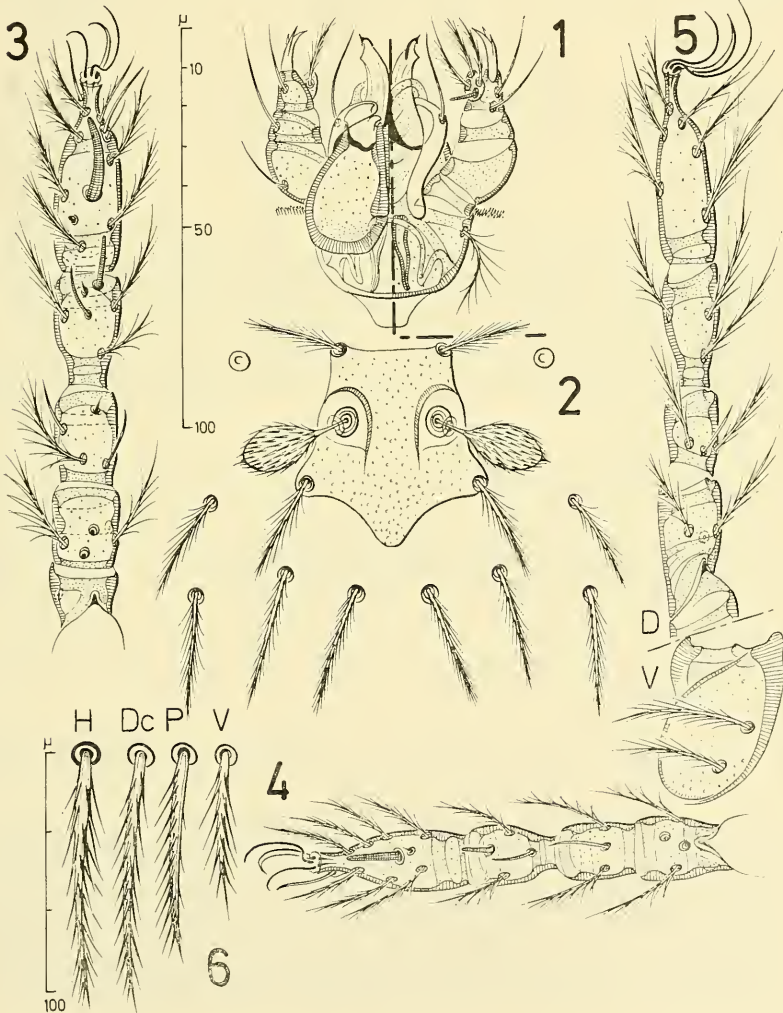
*Gahrlepiea (Walchia) disparunguis*, Womersley, 1952; Womersley & Audy, 1957; Traub & Evans, 1957.

**1. ECOLOGICAL DATA.**

Hosts: *Rattus alticola*, *R. exulans*, *R. fulvescens*, *R. muelleri*, *R. rajah*, *R. sabanus*, *R. whiteheadi*.

PT: ?

*Walchia (Walchia) fulleri*



Loc.: Ban Theuang, Xieng Khouang (LAOS) (HT), THAILAND, Sapsapor (DUTCH NEW GUINEA), Morotai (CELEBES), S. BURMA.

Date: 28 August 1960 (HT).

Type material: Holotype #103387 in U.S. National Museum.

**2. BIONOMICAL DATA.**

SIF = 4B-N-3-2110.0000                      fPp = (N)-(N)-(N).N.N  
 (St, pSt, PT', PT'') = nude                      fsp = 7.6.6  
 fCx = 1/1/2                      fSt = 2/2                      fBT = 2b/b/b  
 fD = 2H + 6.6.8.6.4.4.2 = 38 }  
 fV = 6.8.8.8u8.6.4.4 = 52 } NDV = 38 + 52 = 90

	AW	PW	SB	ASB	PSB	SD	AP	AL	PL	S	
Mean:	27	44	24	20	31	51	34	25	30	26(17×9)	
Extr. {	—:	26	44	20	20	30	50	32	24	29	24(16×9)
	+:	28	46	25	21	32	53	35	28	36	27(18×10)

	H	D	P	V	pa	pm	pp	Ip	Cx <sub>3</sub>	
Mean:	32	34/32	25	20/30	194	164	192	550	2/2	
Extr. {	—:	31	33/31	24	18/21	185	160	188	533	2/2
	+:	34	35/34	26	28/31	206	168	204	578	2/2

**3. REMARKS.**

The coxal formula 2/2 is shared by *lupella*. It is to be emphasized that by comparison with *disparunguis*, whose empodia and claws are the same length as those of *fulleri*, the empodia and external claws of *fulleri* are noticeably thinner, almost filiform, in contrast with the thick internal claw.

Body setae stronger and more coarsely barbed than in *disparunguis*. One pair of eye lenses (diameter 5 μ). Chelostyle (28 μ) with a sub-apical dent.

**D — Walchia (Walchia) lupella** (Traub & Evans, 1957)  
 (Pl. D)

*Gahrlipeia (Walchia) ewingi lupella* Traub & Evans, 1957; Womersley & Audy, 1957<sup>5)</sup>.

**1. ECOLOGICAL DATA.**

Hosts: *Bandicota* sp. (HT), *B. indica*, *Rattus rattus* ssp., *R. rattus diardii*.

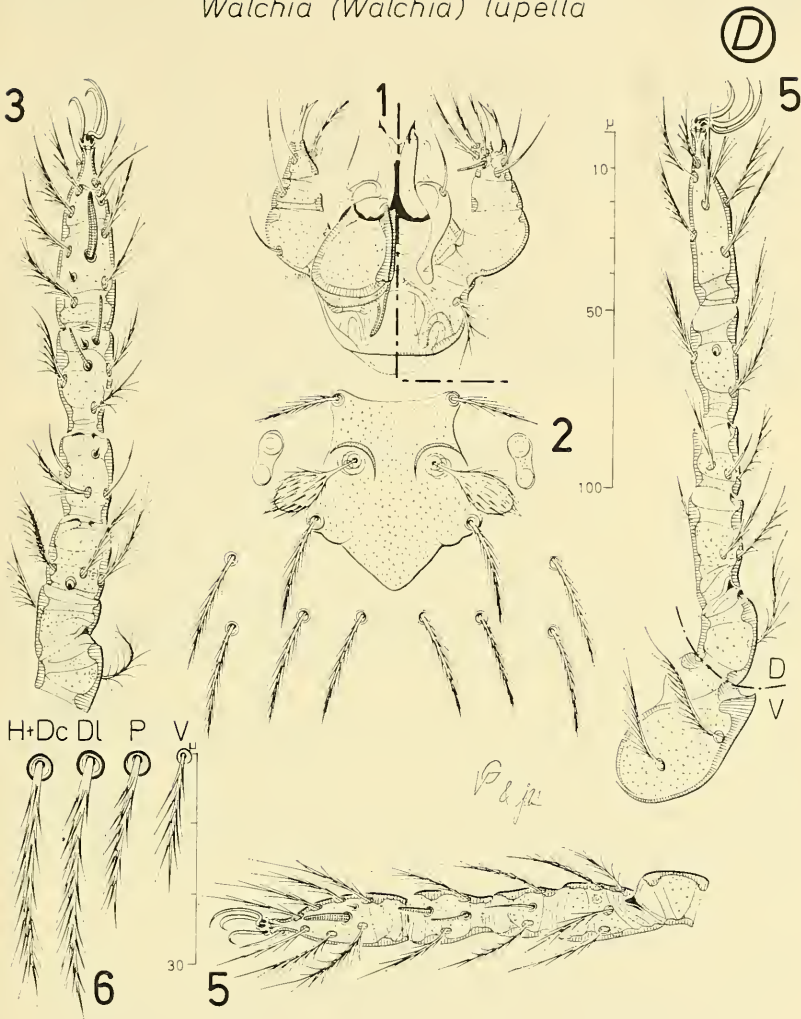
PT: ?

Loc.: Ban Non Koon, Pookhiew, Chaiyaphum (THAILAND) (HT), LAOS.

<sup>5)</sup> TRAUB & EVANS described *lupella* on page 335 of the Studies from the Institute for Medical Research, No. 28, 1957. By an unfortunate concurrence of circumstances, WOMERSLEY & AUDY mentioned *Gahrlipeia (Walchia) ewingi lupella* Traub & Evans, 1957 on page 287 of the same publication. This constitutes an evident case of nomen nudum. However, since there is practically no offense and no harm has been done, I suggest, to avoid sterile academic discussion, that the name of *lupella* be maintained as valid. On the other hand, I also suggest considering it as a full species because of several characters separating it from *ewingi*.



*Walchia (Walchia) lupella*



Date: 11 December 1952 (HT).

Type material: Holotype in U.S. National Museum (#2438).

**2. BIONOMICAL DATA.**

SIF = 4B-N-3-2110.0000	fPp = (N)-(N)-(N).N.N
(ST, pST, PT', PT'') = nude	fsp = 7.6.6
fCx = 1/1/2      fSt = 2/2	fBt = 2b/b/b
fD = 2H + 6.6.8.6.6.4.4 = 42	}NDV = 42 + 54 = 96
fV = 6.8.8.8u8.6.6.4 = 54	

	AW	PW	SB	ASB	PSB	SD	AP	AL	PL	S	
Mean:	33	44	23	20	36	56	35	25	32	29(16×10)	
Extr. {	—:	30	43	20	18	34	53	33	24	31	— —
	+:	34	45	25	21	38	59	36	25	34	— —

	H	D	P	V	pa	pm	pp	Ip	Cx <sub>3</sub>	
Mean:	33	33/35	24	20/32	203	169	200	572	2/2	
Extr. {	—:	30	31/34	22	19/22	200	164	194	558	2/2
	+:	37	34/37	25	31/33	208	171	206	581	2/2

### 3. REMARKS.

The coxal formula 2/2 is shared with *fulleri*. External and smaller claw slightly thinner than the internal one and inconspicuously thinner than the empodium. Coarsely barbed and strong setae on body and legs. Two pairs of eye lenses (diameter of both 6  $\mu$ ). Strong rostrum with chelostyle (26  $\mu$ ) deprived of subapical dent.

### IV. ADDITIONAL CONSIDERATIONS

To a certain extent, three species could be added to the *disparunguis* group.

One, collected from a rat from Kuching, Sarawak (BORNEO) (three slides seen — 24564, 24565 & 23469), was labelled by WOMERSLEY as *Walchia disparunguis* (Oudemans, 1929). It was described later under the name of *Gahrliopia (Walchia) naniparma* Traub & Evans, 1957; it is a small species (Ip = 425) with filiform empodia and external claws.

Another is *Gahrliopia (Walchia) alpestris* Traub & Evans, 1957, a larger, species (Ip = 600) with poorly barbed setae on leg and body (NDV = 78) and two coxalae III.

A third species, *Gahrliopia (Walchia) chinensis* Chen & Hsu, 1955, is slightly stronger than *W. naniparma* (Ip = 465).

These three species possess only two coxalae III and a very small eye lens (diameter to 5  $\mu$ ).

### REFERENCES

- AUDY, J. R., 1952: Check-lists of trombiculid mites. In Annual Report of the Institute for Medical Research for the Year 1951. Government Press, Kuala Lumpur, Malaya, pp. 89—97.
- — 1954: Malaysian Parasites IX. Notes on the taxonomy of trombiculid mites with description of a new subgenus. Stud. Inst. Med. Res., Malaya, 26: 123—170.
- BLAKE, F. G., MAXCY, K. F., SADUSK, J. F., JR., KOHLS, G. M., & BELL, E. J., 1945: Studies on tsutsugamushi disease (scrub typhus, mite-borne typhus) in New Guinea and adjacent islands: Epidemiology, clinical observations and etiology in the Dobadura area. Amer. J. Hyg., 41: 243—373.
- BUITENDIJK, A. M., 1945: Vorloopige catalogues van de Acari in de Collectie Oudemans. Zool. Med., Rijksmus. Nat. Hist., Leiden, 24: 281—391.
- CHEN, H.-T. & HSU, P., 1955: Report on 12 species and varieties of chiggers in China, including six new species and two new varieties, and the creation of a new genus. Acta Zool. Sinica, 7: 101—146.

- DOMROW, R. & NADCHATRAM, M., 1963: Two field collections of Malayan ticks and mites. *Malay. Nature J.*, **17**: 145—164.
- EWING, H. E., 1931: A catalogue of the Trombiculinae or chigger mites of the new world with new genera and species and a key to the genera. *Proc. U. S. Natl. Mus.*, **80**: 1—19.
- FULLER, H. S., 1948: Some remarks on the Trombiculinae Ewing, 1929, in *Das Tierreich, Trombidiidae*, by Sig Thor and Willmann. *Bull. Brooklyn Ent. Soc.*, **43**: 101—111.
- — 1949: A new name for the genotype of *Walchia* Ewing (Acarina: Trombiculidae). *Proc. Biol. Soc. Wash.*, **62**: 1—2.
- — 1952: The mite larvae of the family Trombiculidae in the Oudemans Collection: Taxonomy and medical importance. *Zoolog. Verhandl. Rijksmus. Nat. Hist., Leiden*, **18**: 1—261.
- GATER, B. A. R., 1932: Malayan Trombidiid larvae, Part I. (Acarina: Trombidiidae), with descriptions of 17 new species. *Parasitol.*, **24**: 143—174.
- GRIFFITHS, J. T., Jr., 1947: A further account of tsutsugamushi fever at Sansapor, Dutch New Guinea. *J. Parasitol.*, **33**: 367—373.
- GUNTHER, C. E. M., 1941: The synonymy, hosts, and type material of *Guntheria bipygalis* (Gunther) (Acarina: Trombidiidae). *Proc. Linn. Soc. N. South Wales*, **66**: 155.
- — 1952: A check list of the trombiculid larvae of Asia and Australasia. *Proc. Linn. Soc. N. South Wales*, **77**: 1—60.
- KOHL, G. M., ARMBRUST, C. A., IRONS, E. N. & PHILIP, C. B., 1945: Studies on tsutsugamushi disease (scrub typhus and mite-borne typhus) in New Guinea and adjacent islands: Further observations on epidemiology and etiology. *Amer. J. Hyg.*, **41**: 374—396.
- LAWRENCE, T. J., 1947: Species of trombiculid mites in Manipur and Burma. Brief notes including a list of undescribed species. In AUDY, J. R., *Scrub typhus, War Office Report 1947, Pt. 3, App. 7*: 1—6.
- MOHR, C. O., 1947: Notes on chiggers, rats and habitats on New Guinea and Luzon. *Ecology*, **28**: 194—199.
- OUDEMANS, A. C., 1929: Acarologische aantekeningen XCV. *Ent. Ber. Amst.*, **7**: 393—399.
- RADFORD, C. D., 1942: The larval Trombiculinae (Acarina, Trombidiidae) with descriptions of twelve new species. *Parasitol.*, **34**: 55—81.
- — 1954: The larval genera and species of 'harvest mites' (Acarina: Trombiculidae). *Parasitol.*, **44**: 247—276.
- THOR, S. & WILLMANN, C., 1947: Trombidiidae. *Das Tierreich. Eine Zusammenstellung und Kennzeichnung der rezenten Tierformen. Acarina 3. Lieferung 71 b. pp. XXIX—XXXVI*, 187—541.
- TRAUB, R. & EVANS, T. M., 1957: Malaysian Parasites XXVIII. Records and descriptions of chiggers of the subgenus *Walchia* Ewing, 1931, from Southeast Asia (Acarina, Trombiculidae). *Stud. Inst. Med. Res., Malaya*, **28**: 297—358.
- VERCAMMEN-GRANDJEAN, P. H., 1968: The chigger mites of the Far East (Acarina: Trombiculidae & Leeuwenhoekidae). An illustrated key and a synopsis; some new tribes, genera and subgenera. *U. S. Army Med. Res. & Dev. Command, Washington, D. C.*, 135 p.
- WALCH, E. W., 1927: *Nederlandsch-Indische Trombiculae en verwante mijten. (derde mededeeling.) soorten uit de Lampongsche districten en de omgeving van Makassar. Geneesk. Tijds. Ned.-Indië*, **67**: 922—933.
- WHARTON, G. W. & FULLER, H. S., 1952: A manual of the chiggers. *Mem. Ent. Soc., Washington*, no. 4: 185 p.
- WOMERSLEY, H., 1944: Notes on and additions to the Trombiculinae and Leeuwenhoekinae (Acarina) of Australia and New Guinea. *Trans. Roy. Soc. S. Australia*, **68**: 82—112.

- — 1952: The scrub-typhus and scrub-itch mites (Trombiculidae, Acarina) of the Asiatic-Pacific region. *Rec. S. Austral. Mus.*, **16**: 435 p.
- — & A U D Y, J. R., 1957: Malaysian Parasites XXVII. The Trombiculidae (Acarina) of the Asiatic-Pacific region: A revised and annotated list of the species in Womersley (1952), with descriptions of larvae and nymphs. *Stud. Inst. Med. Res., Malaya*, **28**: 231—296.
- — & H E A S L I P, W. G., 1943: The Trombiculinae (Acarina) or itch-mites of the Austro-Malayan and Oriental regions. *Trans. Roy. Soc. S. Australia*, **67**: 68—142.

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