THREE NEW SPECIES, AND A REDESCRIPTION OF MITES OF THE GENUS SCHWIEBIA (ACARINA : TYROGLYPHIDAE)

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ABSTRACT.

Three new species of the genus *Schwiebia* are described : *S. zingiberi* from various hosts and localities ; *S. similis* on *Gerbera* from Australia and on taro from Hong Kong, and *S. receptacula* on paeony rose from Japan. *S. elongata* (Banks) is re-described and transferred from the genus *Rhizoglyphus*.

INTRODUCTION.

The genus *Schwiebia* was first erected by OUDEMANS (1916) when he described *S. talpa* from one female found in rotting leaves from the neighbourhood of Bonn. The species was inadequately described, but a comprehensive re-description was subsequently provided by HUGHES (1957). ZACHVATKIN (1941) gave an account of the genus and divided it into two subgenera, *Megninietta* and *Schwiebia* s. str., but both HUGHES (1957) and WOODRING (1966) agreed that this division was unwarranted. WOODRING (1966) described four new species of this genus and listed all the known species. He also defined the genus *Schwiebia* and showed its relationships to similar genera.

In appearance, mites of the genus *Schwiebia l* are very like a small *Rhizoglyphus*, but differ in the following points : Many of the body setae are lacking, e.g. the supra coxal seta, sc.i., d1, d2, h.i., h.v. and sa.e. may be absent. There is usually only one pair of anal setae compared to two or more pairs in *Rhizoglyphus*. The number of protruding apical setae on tarsus I and II differs in the two genera. VAN EYNDHOVEN (pers. comm.) first suggested this possibility and an examination of the respective genera confirmed this difference. In *Rhizoglyphus* there are five apical setae on tarsus I and four apical setae (in each case, including the sensory rod) on tarsus II, whereas in *Schwiebia* there are four or fewer apical setae on tarsus I and usually three apical setae on tarsus II.

In the following descriptions, the terminology is that of HUGHES (1961) and all measurements are given in microns (μ). All holotype slides (except for *S. elongata*) are deposited in the Department of Agriculture, Levin. Paratype slides are located, as indicated, under the descriptions of the various species.

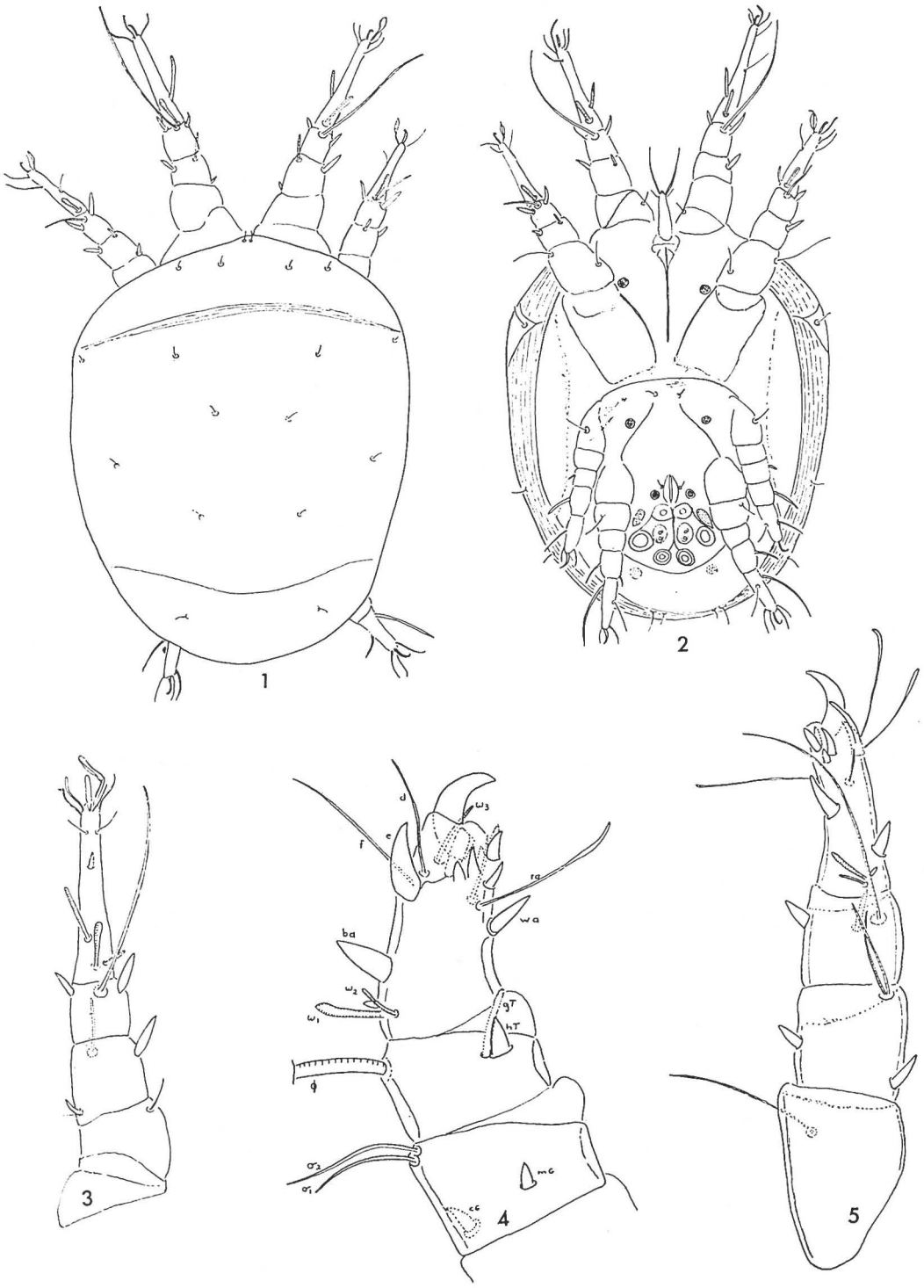

FIG. 1-5 : *S. zingiberi.*

1. — Dorsal view of hypopus. 2. — Ventral view of hypopus. 3. — Leg I of hypopus 4. — Leg I of female. 5. — Leg I of heteromorphic male.

Schwiebia zingiberi n. sp.

(figs 1-10)

This is a variable species but the characteristic indentation, or cleft, in the propodosomal shield, together with the distinctive " hat-shaped " spermathecae should distinguish it from other species.

Female : Description from 25 specimens. Length of idiosoma 483-694 μ ; greatest width of idiosoma 296-454 μ. Propodosomal shield with a deep broad indentation, arising from the posterior margin and extending almost half the length of the shield (fig. 6). This indentation is more clearly visible in some specimens than in others and in some instances is very difficult to detect. Lengths of propodosomal setae : v.i. 69-130 ; v.e. not apparent ; sc.e. 111-200 ; sc.i. usually absent, but present in 5 specimens, length 3-57. There is great variability in the presence of the various hysterosomal setae and also in their lengths. In some instances only v.e. and h.e. may be absent, while at the other extreme v.e., h.e., h.i., h.v., d1, d2 and sa.e. may be absent. Lengths and presence of hysterosomal setae as follows : d1 present in 10 specimens, 7-73 long ; d2 present in 10 specimens, 41-117 long, d3 29-101 ; d4 52-162 ; h.i. present in 3 specimens, 10-47 long ; h.e. 95-165 ; h.v. absent ; la present in 8 specimens, 44-101 long ; lp 54-159 ; sa.e. present on 1 specimen only, 28 long ; sa.i. 57-171.

ω1 of leg I slightly enlarged apically ; ω2 about half as long as ω1. Genu I with σ1 and σ2 almost the same length, although σ1 slightly shorter ; seta mG spine-like. Epimeres III and IV separate. Spermathecae consisting of two blunt finger-like projections near the circular opening, sometimes giving the impression of being " hat-shaped ". (fig. 7) ; duct a narrow tube leading to the opening of the bursa copulatrix, just posterior of the anal slit. Length of post anal setae, pa 73-162. Mean leg segment lengths :

	Leg I	II	III	IV
tarsus	76	77	68	77
tibia	29	28	24	26
genu	33	32	22	24
femur	64	64	48	47

Homeomorphic Male : not observed.

Heteromorphic Male : Description from ten specimens.

Length of idiosoma 525-586 μ ; greatest width of idiosoma 270-375 μ. Propodosomal shield present, similar to that of female, but the indentation not quite so deep. In some specimens the propodosomal shield is poorly defined and the posterior identation not apparent. Lengths of propodosomal setae : v.i. 92-146 ; v.e. not apparent ; sc.e. 159-200 ; sc.i. absent. Lengths of hysterosomal setae : d1 and d2 absent ; d3 22-57 ; d4 143-206 ; h.i. absent ; h.e. 133-168 ; h.v. absent ; la absent ; lp 70-111 ; sa.e. absent ; sa.i. 152-196.

Legs longer than in female and leg III much stouter than in female. ω2 of leg I almost two thirds the length of ω1 ; setae cG and mG on genu I short and spine-like. Epimeres III and IV separate. Penal structure broad, with the four suckers placed anteriorly to this. Anal suckers prominent, a curved sclerotized band running anteriorly from each anal sucker to just

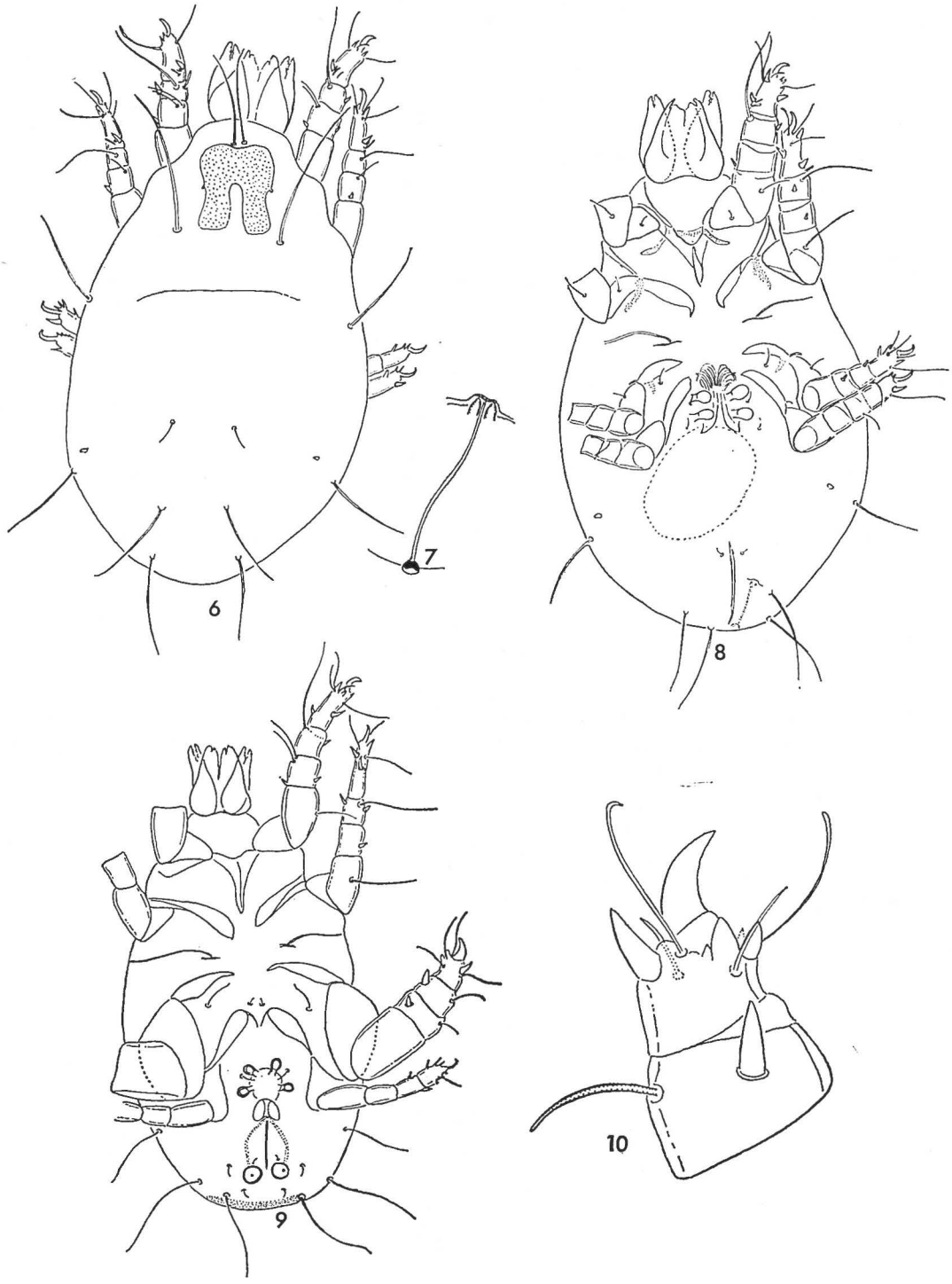

FIG. 6-10 : *S. zingiberi*.

6. — Dorsal view of adult female. 7. — Enlarged view of spermathecae. 8. — Ventral view of adult female. 9. — Ventral view of heteromorphic male. 10. — Tarsus and tibia III of heteromorphic male.

posterior of the penis. A sclerotized band is present at the posterior body margin, running transversely between setae pa2 and sometimes extending beyond these. Lengths of post anal setae pa1 15-25 ; pa2 155-193 ; pa3 10-22. Mean leg segment lengths :

	Leg I	II	III	IV
tarsus	92	94	58	71
tibia	35	35	37	33
genu	43	46	39	37
femur	79	79	94	65

Hypopus : (figs 1, 2, 3).

Length of idiosoma 212-244 (6 specs). Broadly oval, smooth, shining, convex, with minute pale coloured spots. v.i. setae short, 6-7 long ; sc.i. and sc.e. setae present as short slender hairs. Transverse division between propodosoma and hysterosoma. Dorsal setae d1-d4, h.i., h.e., and la present as short slender hairs. Length of apical setae of gnathosoma 27-32. Sternum distinct, terminating abruptly near the base of coxae II. Apodemes II running diagonally towards the mid line. Apodeme III directed diagonally forwards initially and then running transversely, meeting its opposite member. Apodemes IV directed diagonally, at the termination of each being a small seta.

Holotype : Female, ex rotting ginger, China, Hong Kong and Malaya. 3-I-68, N. H. HYDE.

Paratypes : 50 females, 25 heteromorphic males, 19 hypopi with same data as holotype. 3 females ex yams, Tonga, 28-II-68, N. H. HYDE. 6 females ex yams, Tonga, 19-VI-69, N. H. HYDE. 1 female ex taro seeds, Pacific Is., 8-I-68, C. A. JAQUES. 6 females, 2 heteromorphic males ex taro, India, 3-VII-70, A. J. MCCAUGHAN.

Paratypes deposited in the United States National Museum, Washington D. C., U.S.A., the British Museum (N. H.), London, and Entomology Division, D.S.I.R., Nelson.

Schwiebia similis n. sp.

(figs 11-13, 16)

The shape of the spermathecae is distinctive, consisting of a cluster of large cells similar to that of *S. receptacula* and *S. elongata*. It can be separated from these species by the differing shape of the basal and distal cells, giving it a " parachute-shaped " appearance. The heteromorphic male has a distinctive " semi-circular " shaped opisthosomal shield.

Female : Description from 11 specimens. Length of idiosoma 439-547 ; greatest width of idiosoma 260-454. Propodosomal shield present, rectangular, longer than wide, some specimens with the shield cleft. Lengths of propodosomal setae : v.i. 60-98 ; v.e. not apparent ; sc.e. 111-162 ; sc.i. absent. Hysterosomal setae d1, d2, h.i., h.v. and sa.e. absent ; d3. 22-41 ; d4 70-107 ; h.e. 66-114 ; la 19-32, lp 35-76 ; sa.i. 67-101.

ω1 of leg I slightly enlarged apically ; ω2 about two-thirds as long as ω1. Genu I with σ1 and σ2 about the same length ; seta mG seta-like. Epimeres III and IV separate. Spermathecae " parachute-shaped ", consisting of a cluster of large cells, the basal and distal cells of differing shapes (fig. 12) ; a narrow duct leading directly to the bursa copulatrix, which projects

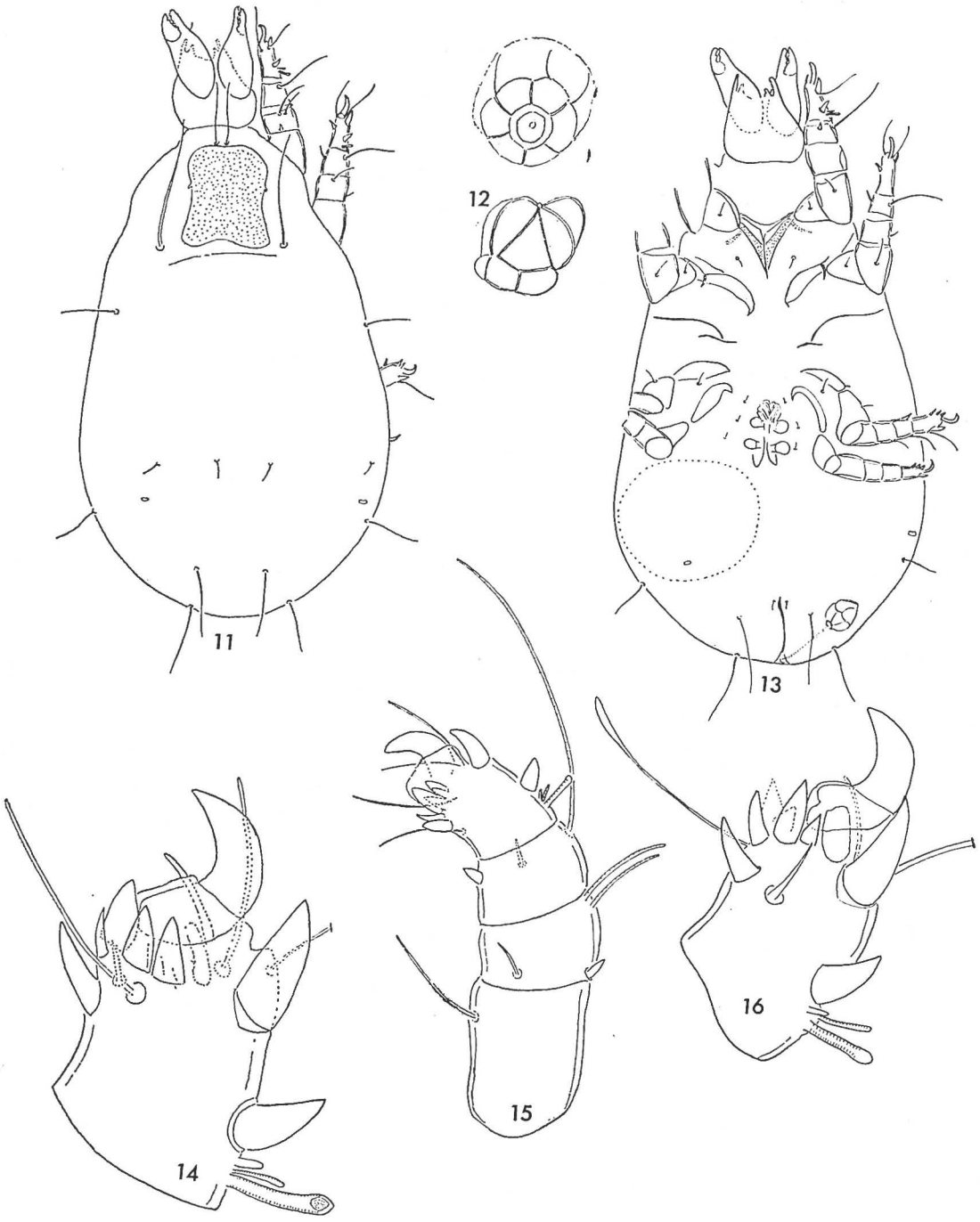

FIG. 11, 12, 13 and 16 : *S. similis.*

11. — Dorsal view of adult female. 12. — Enlarged view of spermathecae. 13. — Ventral view of adult female.

FIG. 14 — Tarsus I. of *S. receptacula.*

FIG. 15 — Leg I of adult female of *S. elongata*

FIG. 16 — Tarsus I of *S. similis*

slightly from the posterior body margin as a cone-shaped nozzle. Length of post anal setae pa 66-108.

Mean leg segment lengths :

	Leg I	II	III	IV
tarsus	62	61	53	57
tibia	25	24	18	20
genu	27	25	18	17
femur	57	58	40	38

Homeomorphic male not observed.

Heteromorphic Male : Description from seven specimens.

Length of idiosoma 390-476 μ ; greatest width of idiosoma 219-292. Propodosomal shield present, similar to that of female with some specimens showing a posterior indentation or cleft. Lengths of propodosomal setae : v.i. 66-98 ; v.e. not apparent ; sc.e. 111-139 ; sc.i. absent. Lengths of hysterosomal setae : d1 and d2 absent ; d3 19-44 ; d4 98-120 ; h.i. absent ; h.e. 77-95 ; h.v. absent ; la 13-47 ; lp 42-60 ; sa.e. absent ; sa.i. 95-130.

Epimeres III and IV separate. Usually a narrow sclerotised band running transversely at posterior body margin, and anterior of this a similar band, semi-circular in shape, running posteriorly and laterally of the anal discs, although in some instances this band is indefinite and almost absent. Opisthosoma with a distinct sclerotised semi-circular shield. Lengths of post anal setae pa1 10-17 ; pa2 87-120 ; pa3 10-17. Mean leg segment lengths :

	Leg I	II	III	IV
tarsus	64	63	37	52
tibia	25	24	25	25
genu	29	28	27	27
femur	58	57	66	45

Hypopus not observed.

Holotype : Female, on the dirt-encrusted roots of *Gerbera*, Australia, 21-X-70, A. TOLLADAY.

Paratypes : Thirty two females, nine heteromorphic males with same data as holotype ; three females ex taro (*Colocasia* sp.), Hong Kong, 29-X-64, P. C. HUNT.

Paratypes deposited in the United States National Museum, Washington D. C., U.S.A. and the British Museum (N. H.) London.

(figs 14, 17-18)

Schwiebia receptacula n. sp.

This species is similar to *S. similis* and *S. elongata* in that the spermathecae consists of a cluster of large cells. It can be distinguished from the former in that the cells tend to be of uniform size and from the latter in that the ratio of the length of leg I to body length in the females

is usually less than 3, whereas in *elongata* it is usually greater than 3. Also seta la is longer in *receptacula* (17-24) than in *elongata* (9-11).

Female : Description from 4 specimens. Length of idiosoma 505-597 ; greatest width of idiosoma 306-388. Propodosomal shield present, rectangular, longer than wide. Lengths of propodosomal setae : v.i. 82-101 ; v.e. not apparent ; sc.e. 108-130 ; sc.i. absent. Presence and lengths of hysterosomal setae as follows : d1 absent ; d2 absent in three specimens ; 13 long in the fourth ; d3 29-38 ; d4 86-101 ; h.i. absent ; h.e. 89-108 ; h.v. absent ; la 17-24 ; lp 82-86 ; sa.e. absent ; sa.i. 86-101.

ω1 of leg I slightly enlarged apically ; similar to that of *S. similis* ; ω2 about half as long as ω1. Genu I with σ1 and σ2 almost the same length ; seta mG seta-like. Epimeres III and IV separate. Spermathecae consisting of clusters of large cells of about uniform size, a short narrow duct leading to the exterior. Length of post anal setae p.a. 70-99.

Mean leg segment lengths :

	Leg I	II	III	IV
tarsus	70	69	59	65
tibia	29	28	22	22
genu	30	29	20	20
femur	62	62	45	43

Ratio of length of leg I to body length — 2.84 ; 2.74 ; 2.83.

Homeomorphic male not observed.

Heteromorphic male not observed.

Hypopus not observed.

Holotype : Female, ex paeony rose, Japan, 29-XI-63, M. R. EALES.

Paratypes : Three females with same data as holotype. Deposited in the United States National Museum, Washington D. C., U.S.A. and the British Museum (N. H.), London.

Schwiebia elongata (Banks) new combination

(figs 15, 19-20)

Rhizoglyphus elongatus Banks, 1906. Tech. Ser. 13, Bur. Ent., U. S. Dept. Agr. p. 22.

Through the courtesy of Mr R. SMILEY, it has been possible to obtain the holotype slide of this species. The specimens were remounted and the species is here re-described. JACOT (1939) and WOODRING (1966) believed this species was of the genus *Schwiebia* and an examination of the type material supports this conclusion.

S. elongata is very similar to *S. receptacula* but the ratio of the length of leg I to body length in the females is usually greater than *receptacula*. Also, seta la in *elongata* is shorter (9-11) than in *receptacula* (17-24).

Female : Description from 6 specimens. Length of idiosoma 428-557 ; greatest width of idiosoma 240-324. Propodosomal shield present, rectangular, longer than wide, not cleft. Lengths of propodosomal setae : v.i. 57-79 ; v.e. not apparent ; sc.e. 76-143 ; sc.i. absent. Pre-

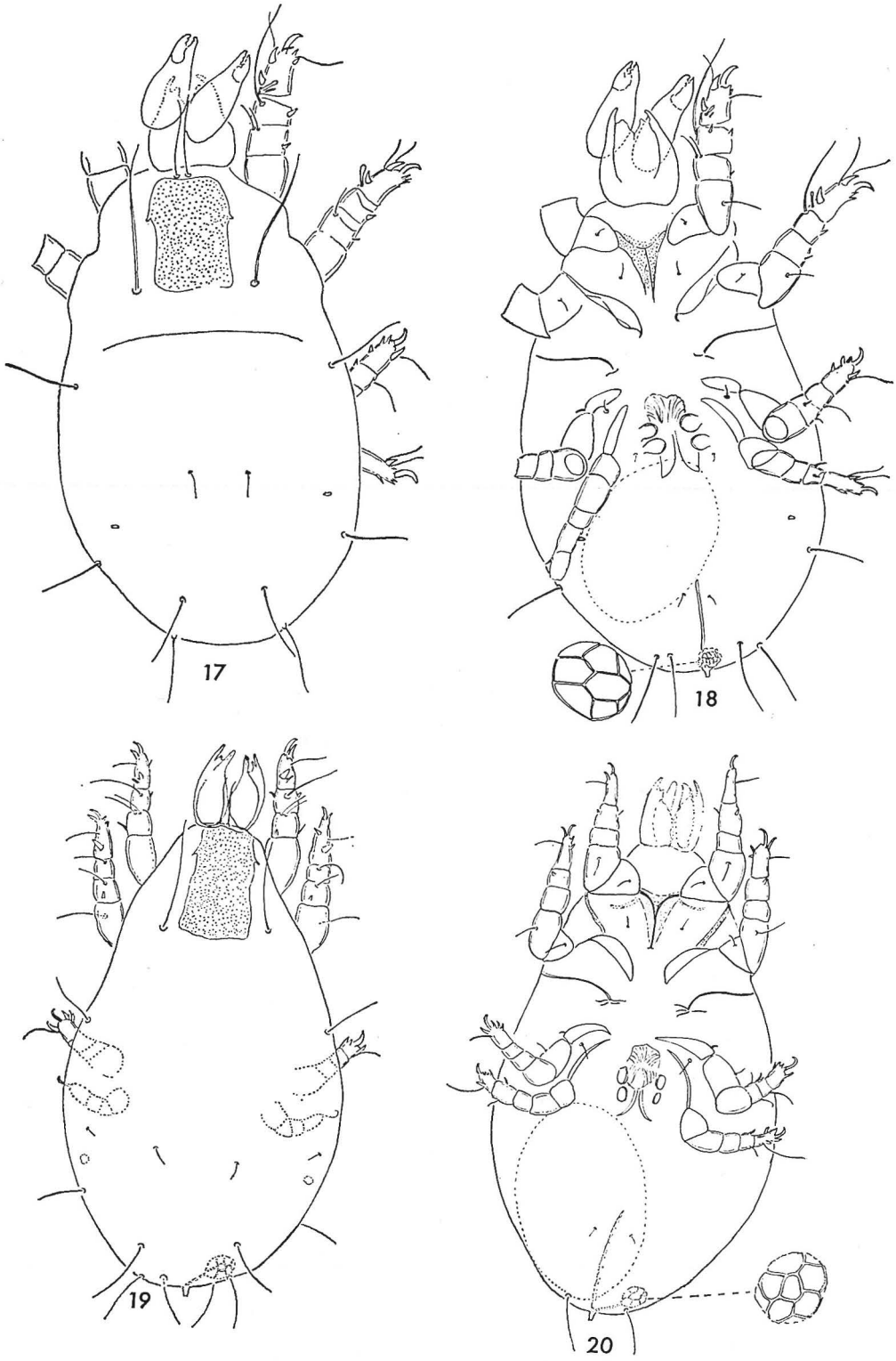

FIG. 17-18 : *S. receptacula.*
17. — Dorsal view of adult female. 18. — Ventral view of adult female.

FIG. 19-20 : *S. elongata.*
19. — Dorsal view of adult female. 20. — Ventral view of adult female.

sence and lengths of hysterosomal setae as follows : d1 and d2 absent ; d3 10-18 ; d4 63-89 ; h.i. absent ; h.e. 60-98 ; h.v. absent ; la 9-11 ; lp 54-80 ; sa.e. absent ; sa.i. 73-86.

Solenidion ω1 on tarsus I slightly but distinctly swollen apically ; ω2 about half as long as ω1. Genu I with σ1 and σ2 almost the same length ; seta mG seta-like. Epimeres III and IV separate. Spermathecae consisting of a cluster of large cells, similar to that of *S. receptacula*, a short narrow duct leading to the exterior where it projects as a blunt cone-shaped nozzle. Length of post-anal setae p.a. 66-89.

Mean leg segment lengths :

	Leg I	II	III	IV
tarsus	60	58	45	41
tibia	25	22	16	17
genu	27	23	15	16
femur	54	54	31	34

Leg segment lengths all shorter than the corresponding lengths in *S. receptacula*. Ratio of length of leg I to body length 3.17 ; 3.12 ; 3.23 ; 3.34 ; 2.92 ; 3.10.

Homeomorphic male not observed.

Heteromorphic male not observed.

Hypopus not observed.

Lectotype : Female, on roots of clover, Oct. 7/79, probably in Missouri, U.S.A.
In United States National Museum, Washington D. C., U.S.A.

Syntypes : Five females with same data as lectotype.
Also deposited in the United States National Museum.

ACKNOWLEDGEMENTS

My thanks are due to Dr G. L. VAN EYNDHOVEN for first suggesting the placement of these species in the genus *Schwiebea*. Dr J. P. WOODRING has kindly read through the manuscript and made several valuable comments.

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