

NOTES ON THE WATER-BUGS OF SOLOMON ISLANDS AND NEW HEBRIDES

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Abstract: Distribution data given for four species of *Anisops* and two species are described. Some observations are made on the development of the musculature associated with flight and two forms of each of the new species are described, one being flightless, the other capable of flight.

INTRODUCTION

The following notes are concerned with the genus *Anisops*, (Hemiptera-Heteroptera, Notonectidae). Only one previous record appears to have been published for these groups of islands, Brooks 1951. Distribution data is given below for known species and two new species are described. All the material from the Solomon Islands with one exception was collected by Mr. E. S. Brown, and is in the British Museum (Natural History), B. M. 1957-201. Each habitat collected from was given a number with, in some cases, data on the characteristics of the habitat; where a locality is mentioned more than once, the number only is given for subsequent references. The greater part of the material from the New Hebrides was collected by Miss L. E. Cheesman. I wish to thank Dr. W. E. China for bringing the New Hebrides material to my notice and Mr. E. S. Brown for supplying additional data on the Solomon Islands material.

Anisops tahitiensis Lundblad

Anisops tahitiensis Lundblad, 1934, Bull. B. P. Bishop Mus. Poly. Ethn. Nat. Hist. **113**: 121-23, figs. 1-5.

This species has already been recorded from the Solomon Is. (Guadalcanal), and the New Hebrides; Brooks *l. c.* and is found on many islands of the Pacific.

MATERIAL EXAMINED: New Hebrides, Solomon Is., Ontong Java.

NEW HEBRIDES: 0-15 m, E. coast Esp. Santo I., Hog Harbour, 1. II. 1927, J. R. Baker and Percy Sladen Mem. Fd. 1927, 2♂♂, 2♀♀ in the Hope Dept. Ent., Oxon; Santo, VIII-X. 1929, L. E. Cheesman, B. M. 1929-537, 1♂, 5♀♀; Malekula, Atchin I., VI. 1929, L. E. Cheesman, B. M. 1929-410, 7♂♂, 6♀♀; N. E. Malekula, VI. 1929, L. E. Cheesman, B. M. 1929-410, 1♀.

SOLOMON IS.: Guadalcanal, Honiara distr., Poha River, 25. VII. 1954, (Sta. no. 547), pools left in dried bed, 8'×2'×6" deep, much debris and dead twigs shaded, water clear, 1♂, 3♀♀; Guadalcanal, Honiara Distr., Kiskugu, 1. VIII. 1954, (Sta. no. 624), ditches in

agricultural Station Gardens, 1 ♂, 1 ♀; Kolombangara, Stanmore Estate, 13. X. 1954, (Sta. no. 1320), Bomb crater 5' × across, water 18" deep in center, dead leaves on bottom, fairly clear and not strongly shaded, 1 ♂, 1 ♀; Guadalcanal, Lunga, 1. I. 1955, (Sta. no. 1770), stagnant drain under secondary forest, water clear, 1 ♂, 1 ♀.

ONTONG JAVA: Kapae, 29. I. 1955, brackish wells, 2 ♂♂, 7 ♀♀; Kemaru, 30. I. 1955, brackish wells, 15 ♂♂, 11 ♀♀; same data, 6. II. 1955, 5 ♂♂, 5 ♀♀; Levaniura, 5. II. 1955, brackish wells, 4 ♂♂.

GUADALCANAL: Konga road head, 15. IV. 1955, (Sta. no. 2787), pool 30 × 15' in grassland on red soil, 18 ♂♂, 19 ♀♀; Rua Jura, 17. VIII. 1955, (Sta. no. 3545), small stone lined well at W. end of island, 2-3' deep, more or less exposed, 7 ♂♂, 4 ♀♀; Ysabel, Gatere, 19. II. 1956, (Sta. no. 4666), pools on ground in clearings in coconut plantations, 2 ♂♂, 8 ♀♀; Kokumbona River, 13. V. 1956, 5 ♂♂, 2 ♀♀.

Anisops philippinensis Brooks

Anisops philippinensis Brooks, 1951, Univ. Kansas Sci. Bull. **34** (8): 383-84, pl. 44, fig. 44. Sta. no. 4666, 2 ♂♂.

Anisops nasuta Fieber

Anisops nasuta Fieber, 1851, Abhandl. Konigl. bohm. Ges. Wiss. **5**: 484-85.

MATERIAL EXAMINED: New Hebrides, Russell Is.

NEW HEBRIDES: Dolphin I. nr. Esp. Santo I., 5. III. 1927, J. R. Baker & Percy Sladen Mem. Fd. 1927. Gregarious and abundant 0-15 m by S. lake, 1 ♂, 5 ♀♀, in Hope Dept. Ent. Oxon; Gaua, Hot Springs, 19. XII. 1933, J. R. Baker Oxf. Univ. Exped. B. M. 1934-290, 1 ♂, 1 ♀; Sta. no. 2787, 27 ♂♂, 28 ♀♀.

RUSSELL IS.: Ufa, 4. IX. 1955, (Sta. no. 3692), 1 ♀; same data, (Sta. no. 3696), pools in quarry, muddy with much debris dead sticks etc., probably up to 1' deep, 10 ♂♂, 27 ♀♀.

Anisops leucothea Esaki

Anisops leucothea Esaki, 1926, Insects of Samoa, part 11, pp. 76-80, fig. 6. Sta. no. 1320, 4 ♀♀; Sta. no. 2787, 17 ♂♂, 11 ♀♀; Sta. no. 3696, 15 ♂♂, 44 ♀♀.

Anisops cheesmanae Lansbury n. sp. Fig. 1.

Two forms are described of this species, one with fully developed wing musculature, the second with atrophied musculature. In the case of the latter, the musculature of the wings is reduced as to render the insect flightless. The winged form can be separated from the flightless by having a black scutellum with the lateral margins, apex and commissure orange, whereas the flightless form has the scutellum yellowish white with no coloring laterally (see Young 1961 for comments on this characteristic of the aquatic Heteroptera). Striking differences in the relative length of the head, pronotum and legs are present and the 2 forms run out to different couplets in Brooks key. The chaetotaxy of the ♂ front legs are identical in both forms.

Size: ♂♂ length 5.5-6 mm, greatest width across body 1-1.75 mm, ♀♀ length 6-6.75 mm, greatest width across body 1.75-2 mm.

Winged form: color, head yellowish white, eyes gray, pronotum anteriorly yellowish

white, distally gray. Scutellum black with lateral margins apex and commissure orange. Elytra hyaline shining appearing dark due to underlying dorsal pigmentation. Legs pale yellow. Abdomen ventrally black with keel and segmental margins of connexivum yellowish white.

Male structural characteristics: viewed from above the outline of head is rounded, greatest width of head about $6/7$ pronotal humeral width and just over $6\times$ anterior width of vertex. Synthlipsis wide, just over $1/3$ anterior width of vertex. Along the median longitudinal axis head is just over $1/2$ as long as pronotum. Pronotal humeral width just under $2\times$ median length, lateral margins diverging and just under $1/2$ median length, posterior margin convex and medianly emarginate. Facial tubercle simple. Rostral prong longer than rostral segment 3, apex acuminate (fig. 1C). Labrum with basal width $1/3$ greater than median length, apex rounded. Stridulatory comb of approximately 27 pegs in broken row (fig. 1B). Chaetotaxy of ♂ front leg as shown in fig. 1A. Relative lengths of the parts of legs are as follows:

	Femur	Tibia	Tar. 1	Tar. 2
Fore leg	100	109	80	
Median leg	100	82	38	23
Hind leg	100	90	34	35

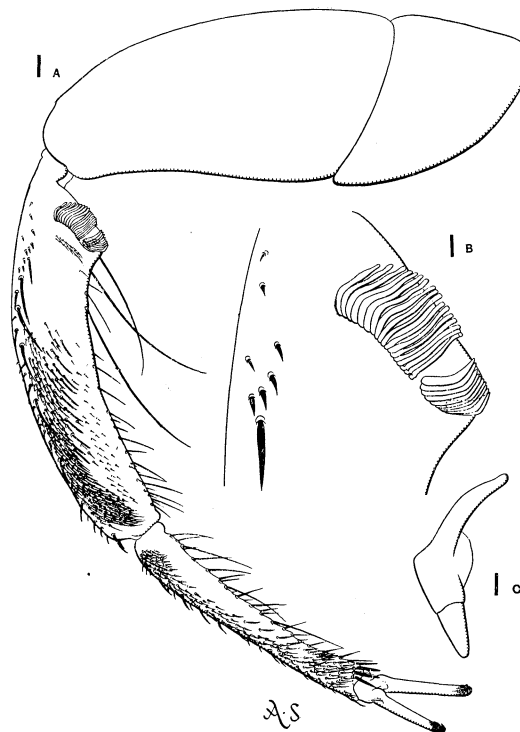


Fig. 1. *Anisops cheesmanae* Lansbury n. sp.: a, inner surface view of ♂ fore leg; b, enlarged view of stridulatory comb; c, lateral view of rostral segments 3 and 4.

Female structural characteristics: viewed from above the outline of head is rounded, greatest width of head $5/6$ pronotal humeral width and $6\times$ anterior width of vertex. Synthlipsis wide, $1/2$ as wide as anterior width of vertex. Along the median longitudinal axis head is $1/2$ as long as pronotum. Pronotal humeral width $2\times$ median length, lateral margins diverging and just under $1/2$ median length, posterior margin convex and medianly emarginate. Relative lengths of the parts of legs are as follows:

	Femur	Tibia	Tar. 1	Tar. 2
Fore leg	100	126	55	37
Median leg	100	84	40	25
Hind leg	100	97	31	31

Flightless form: color, eyes gray, head, pronotum and scutellum yellowish white, elytra hyaline shining, abdomen dorsally yellowish brown, ventrally black with keel and segmental margins of connexivum yellowish white.

Male structural characteristics: viewed from above the outline of head is rounded. Greatest width of head almost equalling pronotal humeral width (43 : 44) and $8\frac{1}{2}\times$ anterior width of vertex. Synthlipsis width, $2/5$ anterior width of vertex. Along the median longitudinal axis head is almost as long as pronotum. Pronotal humeral width $2\times$ median length, lateral margins diverging and $1/2$ median length, posterior margin convex and medianly emarginate. Facial tubercle simple. Labrum with basal width $1/6$ greater than median length. Rostral prong and chaetotaxy of ♂ front leg similar to winged form. Relative lengths of the parts of legs are as follows:

	Femur	Tibia	Tar. 1	Tar. 2
Fore leg	100	103	77	
Median leg	100	68	29	19
Hind leg	100	86	16	14

Female structural characteristics: viewed from above the outline of head is rounded, greatest width of head just over $1/6$ wider than pronotal humeral width and $7\times$ anterior width of vertex. Synthlipsis wide, $1/2$ as wide as anterior width of vertex. Along the median longitudinal axis head is just over $1/2$ as long as pronotum. Pronotal humeral width just under $2\times$ median length, lateral margins diverging and $1/2$ median length, posterior margin convex and medianly emarginate. Relative lengths of the parts of legs are as follows:

	Femur	Tibia	Tar. 1	Tar. 2
Fore leg	100	120	55	25
Median leg	100	72	33	26
Hind leg	100	81	32	18

Comparative notes: the macropterous form runs out to couplet 19 in Brooks key. The chaetotaxy of the ♂ front leg is very distinctive having stridulatory comb broken; this character separates this species from all others in the genus. The flightless form runs out to couplet 49 in Brooks and appears to be very similar to *A. cleopatra* Distant from which it can be separated on the characters mentioned above.

Distribution data: Holotype ♂, allotype ♀, paratypes 3♂♂, 18♀♀, New Hebrides, Erromanga, IX. 1930, L. E. Cheesman, B. M. 1930-551, paratype 1♂, New Hebrides, N. E. Malekula, VII. 1929, L. E. Cheesman, B. M. 1929-514.

Known only by the type series.

This species is dedicated to Miss L. E. Cheesman the great traveller, collector and Entomologist who has done so much to advance our knowledge of the Pacific.

Anisops browni Lansbury n. sp. Fig. 2.

Two color forms of this species are described, the pale form being flightless and the dark form macropterous. However, unlike *A. cheesmanae*, the two forms of *A. browni* do not differ in the relative size of the head, pronotum and legs and the chaetotaxy of ♂ front legs are identical as in *A. cheesmanae*.

Size: ♂♂ length 5–5.5 mm, greatest width across body 1.25–1.5 mm, ♀♀ length 5.5–5.75 mm, greatest width across body 1.5–1.75 mm.

Color: pale form; vertex, eyes, pronotum and scutellum gray, elytra hyaline, shining appearing dark brown due to underlying dorsal pigmentation.

Dark form: vertex dark brown, eyes gray flecked with brown. Pronotum dark brown to black, scutellum reddish brown, lateral margins of scutellum, hemelytral pit and commissure red. Elytra hyaline shining appearing black due to underlying dorsal pigmentation. Legs pale yellow. Abdominal venter black with keel and segmental margins of connexivum pale yellow.

Male structural characteristics: viewed from above the outline of head is rounded with anterior margin straight. Greatest width of head approximately 1/11 less than pronotal humeral width and 10× anterior width of vertex. Synthlipsis narrow, just less than 1/3 anterior width of vertex. Along the median longitudinal axis head is approximately the same length as pronotum. Pronotal humeral width just over 2× median length, lateral margins diverging and just over 1/3 median length, posterior margin convex and medianly emarginate. Facial tubercle raised. Labrum with basal width slightly greater than median length, apex broadly rounded. Rostral prong shorter than rostral segment 3 (fig. 2C), apex acuminate. Stridulatory comb of approximately 22 pegs of equal length (fig. 2B).

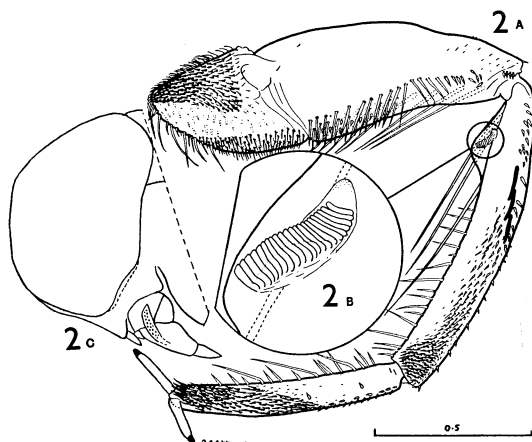


Fig. 2. *Anisops browni* Lansbury n. sp.: a, inner surface view of ♂ fore leg; b, enlarged view of stridulatory comb; c, lateral view of head with rostral prong stippled.

Chaetotaxy of ♂ front leg as shown in fig. 2A. Relative lengths of the parts of legs are as follows:

	Femur	Tibia	Tar. 1	Tar. 2
Fore leg	100	120	84	
Median leg	100	85	37	30
Hind leg	100	88	31	33

Female structural characteristics: viewed from above the outline of head is rounded with anterior margin straight. Greatest width of head $1/12$ less than pronotal humeral width and $10\times$ anterior width of vertex. Synthlipsis wide, just under $1/2$ anterior width of vertex. Along median longitudinal axis head is slightly longer than pronotum. Pronotum with humeral width slightly more than $2\times$ median length, posterior margin convex and medianly emarginate. Relative lengths of the parts of legs are as follows:

	Femur	Tibia	Tar. 1	Tar. 2
Fore leg	100	118	51	29
Median leg	100	82	37	31
Hind leg	100	95	26	33

Comparative notes: *A. browni* runs out to couplet 93 in Brooks *l. c.* and is very closely allied to *A. rigoensis* and *A. biroi* Brooks. Both of these species appear to have a large spine on the inner distal margin of the fore tibia which is absent in *A. browni*. Arrangements of the stridulatory comb in *A. rigoensis* appear to be very distinctive, approximate inner 3rd pegs being much shorter than the remainder. Peg arrangement of *A. biroi* is very similar to *A. browni*, but the number of stout spines on fore tibia is greater than for *A. browni*. Tarsus of *A. browni* also has 2 very small median spines which are absent on *A. rigoensis* and *A. biroi*. *A. browni* also has affinities with *A. waltirensis* Brooks from which it can be separated by having a much wider synthlipsis. *A. waltirensis* has a very narrow synthlipsis, about $1/8$ anterior width of vertex.

Location of types: holotype ♂, allotype ♀, paratypes 10 ♂♂, 18 ♀♀, Guadalcanal, Honiara distr., Mt. Austen, 13. VI. 1954, (Sta. no. 277), c. 150 m, shady pools in forest in course of stream now isolated, $3\times$ feet across, stagnant water, fairly clear with dead leaves and debris on bottom; 1 ♂ paratype, Guadalcanal, Honiara dist., Ilu, 10. VI. 1954; 4 ♂ paratypes, Guadalcanal, Lunga, 1. I. 1955, (Sta. no. 1770), stagnant drain under secondary forest; 6 ♂ paratypes, Guadalcanal, Rua Jura, 17. VIII. 1955, (Sta. no. 3545), small stone lined well at W. end of island, 2-3' deep, more or less exposed; 9 ♂, 5 ♀ paratypes, Guadalcanal, Kokumbona River, 13. V. 1956; 7 ♂, 8 ♀ paratypes, Solomon Is., Ugi I., 6. V. 1934, R. A. Lever, B. M. 1952-304.

REFERENCES

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