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**TWO NEW ACHAEARANEAE SPECIES FROM PAPUA
NEW GUINEA WITH NOTES ON OTHER THERIDIID
SPIDERS (ARANEAE: THERIDIIDAE)**

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Abstract. Two new species of theridiid spiders from Papua New Guinea, *Achaearana wau* and *A. kaindi*, are described and illustrated. Two species, *Achaearana wau* and *A. vervoorti*, are social. The name *Argyrodes scutatus* is synonymized with *A. fissifrons*, that of *Lithyphantes cingulatus* with *Steatoda subannulata*, n. comb., and *Achaearana krausi* with *A. camura*, n. comb. *Achaearana polygramma*, n. comb., *A. decorata*, *A. vervoorti*, and *A. valoka* are illustrated.

This is the first of 3 taxonomic papers (Levi 1982, Levi in prep.) dealing with web spiders found in northeastern Papua New Guinea. It is intended to facilitate behavioral and ecological studies.

The most common theridiid spiders of the Papua New Guinea region were illustrated in 2 papers by the late Father Chrysanthus (1963, 1975). *Achaearana vervoorti* Chrysanthus and a new species described here, *Achaearana wau*, are social. About 70 females of *A. wau*, n. sp., found together in a retreat were observed collaborating to overpower prey caught in the web (Lubin, in prep.).

We hesitate to describe new species in the genus *Achaearana*, since most species have been described in *Theridion*, the second largest genus of spiders and a catchall for theridiid spiders not readily placed. We do so here to permit publication of behavior observations. It was impossible to check the types of the many poorly described species from other South Pacific areas [in the western Pacific region, including India, Roewer's catalog (1942) lists 183 species; many have been described since its publication]. Although it seems unlikely, it is possible that the new species have been described from other areas.

A number of apparently new theridiid spiders from New Guinea are in the Mu-

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seum of Comparative Zoology, Harvard University. These include several species of *Achaearana* and about 18 species of *Argyrodes*. For each of these, there are only 1 or 2 specimens of the same sex.

The 1975 paper of Chrysanthus was published posthumously. Two of his *Achaearana* species (*A. valoka*, *A. vervoorti*) did not have the internal genitalia illustrated; perhaps Chrysanthus passed away before the work was completely finished. Because knowledge of the genitalia is essential for determination, they are illustrated here (Fig. 8–13).

Achaeareaneus camura (Simon), *A. mundula* (L. Koch), *A. vervoorti* Chrysanthus, *A. wau*, n. sp., and *A. kaindi*, n. sp., belong to 1 species-group, judging by the palpal anatomy with its long embolus and conductor. These species also all have similar webs, consisting of a horizontal sheet, a barrier web above, and a curled leaf retreat, all made of non-sticky silk. The *A. mundula* [= *A. tessellata* (Keyserling)] web was described by Eberhard (1972). The web differs from that of *A. tepidariorum* (C. L. Koch), which is an irregular tangle with sticky droplets on some attachment lines (gum-footed webs). There may be a slight platform, often curved, under which the spider sits. *A. tepidariorum* belongs to a different species-group, whose members are characterized by having a short embolus in the palpus and by the web type. No intermediates have been found between the 2 web types. The prey-capture behavior of the 2 groups is similar, but this is probably true throughout the theridiids (observations by Y.D.L.).

Specimens cited below were collected by the authors and are deposited in the Museum of Comparative Zoology (MCZ); paratypes of both sexes of the new species are deposited in the Rijksmuseum van Natuurlijke Historie, Leiden (RNHL). Other paratypes and named specimens have been sent to the Australian Museum, Sydney (AM); B. P. Bishop Museum, Honolulu (BPBM); British Museum (Natural History), London (BMNH); Queensland Museum, Brisbane (QM); Senckenberg Museum, Frankfurt (SMF); and the Wau Ecology Institute, Wau, PNG (WEI).

Argyrodes fissifrons O. P.-Cambridge

Fig. 1

Argyrodes fissifrons O. P.-Cambridge, 1869: 380, pl. 12, fig. 31–38, ♂. Holotype ♂ from Ceylon in BMNH, examined by Chrysanthus.—Chrysanthus, 1963: 737, fig. 55–58, ♂; 1975: 41, fig. 156–159, ♀.
A. scutatus Chrysanthus, 1975: 43, fig. 153–155, ♀. Paratype ♀ from Ajamaroe, West New Guinea, in RNHL, examined. **New synonymy.**

Mated females of this species, like those of some other *Argyrodes* species, have the epigynum covered by a secretion that is impossible to remove, and is presumably produced by the male. R. Braun (1956) described this secretion from *Steatoda triangulosa* (Walckenaer) (= *Teutana triangulosa*) and called it “Begattungszeichen”; an English term might be “chastity belt.” This covering probably prevents the female from mating with other males, thereby protecting the male’s investment. The types of *A. scutatus* have the epigynum thus covered; other specimens examined by Father Chrysanthus do not, and were correctly placed in *A. fissifrons*.

Steatoda subannulata (Kulczynski), **new combination**

Teutana subannulata Kulczynski, 1911: 444, fig. 18, 19, ♀. Holotype ♀ from Manokwari, New Guinea, in the Polska Akademia Nauk, Warszawa, examined.

Lithyphantes cingulatus Chrysanthus, 1975: 35, fig. 132, 133, ♀. Holotype ♀ from Liebliche Inseln, SW coast of New Britain, in RNHL, not examined. **New synonymy.**

The synonymy is made because the excellent illustrations of genitalia made by Father Chrysanthus match genitalia of the holotype of *S. subannulata*.

Achaearanea polygramma (Kulczynski), **new combination**

Fig. 2–3

Theridium polygramma Kulczynski, 1911: 442, fig. 16, 17, ♀. Holotype ♀ from Sentani, New Guinea, in the Polska Akademia Nauk, Warszawa, examined.

Description. ♀. Yellowish brown with white lines down sides of abdomen. Epigynum with a transverse, translucent window behind depression (Fig. 3). Total length, 5.4 mm. Carapace, 1.7 mm long. First femur, 3.2 mm; patella and tibia, 3.2 mm; metatarsus, 2.7 mm. Second patella and tibia, 1.9 mm; 3rd, 1.6 mm; 4th, 2.6 mm.

Note. The illustrations were made from the holotype specimen, which was temporarily cleared in clove oil.

Achaearanea camura (Simon), **new combination**

Fig. 4–5

Theridium camurum Simon, 1877: 85. Original specimen, ♂, from Philippine Is, Bassilan [Basilan I], Malamoy, Muséum National d'Histoire Naturelle, Paris, examined and labeled holotype.—Kulczynski, 1911: 441.

Achaearanea krausi Chrysanthus, 1963: 744, fig. 89–94, ♀♂. Holotype ♀ from Mindiptana, West New Guinea, in RNHL, not examined. **New synonymy.**

Note. The illustrations were made from the male holotype of *A. camura*. Chrysanthus provided excellent illustrations and Chrysanthus-determined females were available. Chrysanthus' *A. krausi* female has been collected with a male of *A. camura*.

Additional records. PNG: NEW GUINEA (NE): Morobe Prov: Buso Forestry Reserve, 23.X.1979, 1 ♀, Y. Lubin (mcz); 24.X.1979, 1 ♀, Lubin (mcz); Wau, Mt Kaindi Rd, 3.III.1979, 1 ♀, H. Levi, Lubin, M. Robinson (BPBM); 1800 m, 20.I.1980, 1 ♀, 2 ♂, Lubin (mcz); Mt Kaindi, nr Kunai Crk, 23.I.1980, 1 ♀, Lubin (mcz); Aseki, 22.VIII.1980, 1 ♀, Lubin (mcz); Wau Ecology Inst., 13.VI.1980, 1 ♂, Lubin (mcz).

Achaearanea decorata (L. Koch)

Fig. 6–7

Theridium decoratum L. Koch, 1867: 188. Holotype ♀ from Brisbane in the Zoologisches Museum, Hamburg, examined by Chrysanthus.

Achaearanea decorata: Chrysanthus, 1963: 743, fig. 84–88, ♀.

Note. The illustrations were made from a microscope slide mount prepared by Fr. Chrysanthus of material from Merauke, West New Guinea.

Achaearanea hammeni Chrysanthus

Achaearanea hammeni Chrysanthus, 1963: 746, fig. 95–98, 100, ♀. Holotype ♀ from nr Mindiptana, West New Guinea, in RNHL, not examined.

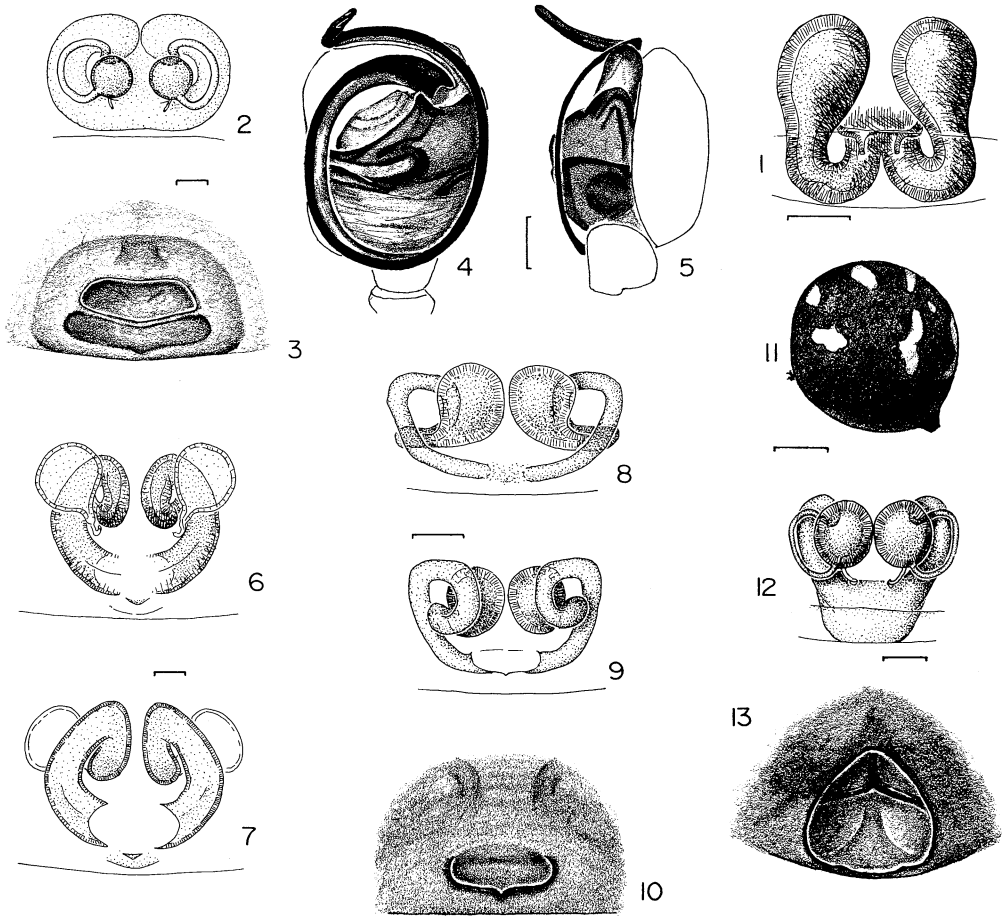


FIG. 1-13. 1. *Argyrodes fissifrons*, epigynum, dorsal view. 2-3. *Achaearana polygramma*: 2, epigynum, dorsal view; 3, epigynum. 4-5. *Achaearana camura*, left ♂ palpus: 4, ventral; 5, lateral. 6-7. *Achaearana decorata*: 6, epigynum, dorsal view; 7, epigynum, cleared. 8-10. *Achaearana vervoorti*, epigynum: 8, dorsal view, cleared; 9, ventral view, cleared; 10, ventral view. 11-13. *Achaearana valoka*: 11, abdomen, left side; 12, epigynum, dorsal view; 13, epigynum. Scale lines: 0.1 mm; except Fig. 11, 1.0 mm.

Additional records. PNG: NEW GUINEA (NE): Morobe Prov: Wau, 20 km SE, roadside, 13.III.1979, 3 ♀, H. Levi, Y. Lubin, M. Robinson (MCZ, BPBM); Wau Ecology Institute, zoological garden area, 11.III.1979, 1 ♀ 1 ♂, Levi (MCZ).

Achaearana mundula (L. Koch)

Theridium mundulum L. Koch, 1872: 263, pl. 22, fig. 3, ♀. ♀ from Port Mackay [Queensland] in the Zoologisches Museum, Hamburg, examined by Chrysanthus.

Achaearana mundula: Chrysanthus, 1963: 741, fig. 76, 83, ♀.

Additional records. PNG: NEW GUINEA (NE): Madang Prov: 25 km N of Madang, teak forest, 20.III.1979, 5 ♀, H. Levi, Y. Lubin, B. Robinson (MCZ); Morobe Prov: Wau, coffee plantation, 7.III.1979,

1 ♀, Levi, Lubin, Robinson (WEI); Mt Missim, 9.III.1979, 1 ♀, Levi, Lubin, Robinson (BMNH); nr Wau airport, in leaf and web, 12.III.1979, 1 ♀, Levi, Lubin, Robinson (BPBM); Wau, roadside, 19.III.1979, 1 ♀, Levi (SMF); Wau Ecology Institute, 21.VIII.1979, 2 ♀, Lubin (MCZ); 11.I.1980, 1 ♂, Lubin (MCZ); Buso Forestry Reserve, IV.1979, 4 ♀, Lubin (MCZ). BISMARCK ARCH: E NEW BRITAIN: Keravat, VII.1980, 6 ♀, Lubin (MCZ); Vunapaladig, Gazelle Penin., VII.1980, 2 ♀, 1 ♂, Lubin (MCZ). PNG: NEW GUINEA (SE): Port Moresby, Univ. campus, 2.V.1980, 2 ♀, Lubin (MCZ).

***Achaearanea tepidariorum* (C. L. Koch)**

Theridium tepidariorum C. L. Koch, 1841: 75, fig. 646–648. ♀ from greenhouse of the botanical gardens of the Univ. Erlangen [Bavaria].

Achaearanea tepidariorum: Chrysanthus, 1975: 45, fig. 168, ♀.

This is a common cosmopolitan spider often referred to as the house spider in North America.

Additional records. PNG: NEW GUINEA (NE): Morobe Prov: Mt Kaindi, top, 2430 m, 13.III.1979, 11 ♀, H. Levi, M. Robinson (9 ♀ MCZ, 1 ♀ BPBM, 1 ♀ WEI); 16.IX.1979, on building, 1 ♀, 1 ♂, Lubin (MCZ); Buso Forestry Reserve, canopy walkway, 24.X.1979, 1 imm., Lubin (MCZ); East Highland Prov: Goroka, 1680 m, 24.II.1980, 1 ♀, Lubin (MCZ).

***Achaearanea valoka* Chrysanthus**

Fig. 11–13

Achaearanea valoka Chrysanthus, 1975: 47, fig. 172, 173, ♀. Holotype ♀ from Valoka, New Britain, in the Zoologisk Museum, Copenhagen, examined.

Additional records. PNG: NEW GUINEA (NE): Madang Prov: 40 km S of Madang, forest, 21.III.1979, 2 ♀, H. Levi, Y. Lubin (MCZ, RNHL); swamp forest, 22.III.1979, 2 ♀, Levi, Lubin, B. Robinson (MCZ, WEI); Morobe Prov: Wau, fields, 16.III.1979, 1 ♀, Levi (MCZ); from retreat in curled leaf, 27.III.1979, 2 ♀, Levi, Lubin, M. Robinson (MCZ, BPBM).

Achaearanea valoka was described from Valoka, New Britain, Bismarck Archipelago, but seems to be common in eastern New Guinea.

Notes. The illustrations (Fig. 12, 13) were made from the holotype ♀. New Guinea specimens have the abdomen nearly black with paired light spots (Fig. 11). The epigynal openings are wider than long and less pointed anteriorly than the holotype illustrated by Fig. 13. The narrow part of the connecting ducts appears slightly longer and more looping than that of the type illustrated in Fig. 12.

***Achaearanea vervoorti* Chrysanthus**

Fig. 8–10, 26

Achaearanea vervoorti Chrysanthus, 1975: 145. Holotype ♀ from Ok Tenma, 1500 m, West New Guinea, in RMNL, examined.

Remarks. The species is slightly smaller than *A. wau* and *A. kaindi*. It also has less color on the abdomen. The markings are similar to *A. kaindi* (Fig. 17, 18) but differ in being brown only, and in having a dark mark posteriorly on the sternum. The ducts are longer (Fig. 8, 9) than those of *A. wau* and thinner than those of *A. kaindi*. The depression of the epigynum is also sclerotized posteriorly like that of *A. kaindi*. Most important, *A. vervoorti* has the posterior median eyes almost 2 diameters apart, slightly more than 1 diameter from laterals; those of the other 2 species are almost equally spaced.

Note. The illustrations were made from the female holotype by temporarily clearing the specimen. Chrysanthus' original collection contained 4 specimens, which suggests that this might be a social species. Two females and a male collected at Bulldog Road, Edie Creek, 15 June 1980 were living in a colony. The male is very similar to that of *A. wau*, 2.2 mm in total length (Fig. 26).

***Achaearanea wau* Levi, Lubin & Robinson, new species**

Fig. 14–19

Description. ♀. Carapace yellowish with median gray patch. Sternum yellowish surrounded by reddish brown. Legs yellowish, indistinctly banded. Dorsum of abdomen with paired black patches surrounded by reddish brown on light area. Some tiny white spots in light areas. A dark patch on venter between spinnerets and epigynum. Eyes subequal in size. Anterior median eyes almost their diameter apart, 0.6 diameters from laterals. Posterior median eyes their diameter apart, slightly less than their diameter from laterals. Abdomen is oval. Epigynum illustrated by Fig. 14–16. Total length, 4.5 mm. Carapace, 1.7 mm long, 1.2 mm wide. First femur, 2.0 mm; patella and tibia, 2.1 mm; metatarsus, 2.0 mm; tarsus, 0.8 mm. Second patella and tibia, 1.5 mm; 3rd, 1.2 mm; 4th, 1.9 mm.

♂. Carapace orange. Sternum orange. Legs orange, not banded. Dorsum of abdomen orange with indistinct paired gray patches. Venter reddish on anterior. Anterior median eyes slightly larger than others, slightly less than their diameter apart, 0.4 diameters from laterals. Posterior median eyes their diameter apart, their diameter from laterals. Palpus illustrated by Fig. 19. Total length, 1.9 mm. Carapace, 0.9 mm long, 0.8 mm wide. First femur, 0.9 mm; patella and tibia, 1.1 mm; metatarsus, 0.9 mm; tarsus, 0.5 mm. Second patella and tibia, 0.8 mm; 3rd, 0.6 mm; 4th, 0.8 mm.

Remarks. The epigynum differs from that of *A. vervoorti* in having a lip around the anterior and lateral edges of the depression (Fig. 16). *A. vervoorti* has a lip on the posterior and lateral edges. The ducts of the internal genitalia of *A. wau* loop only to the level of the middle of the seminal receptacle (Fig. 14, 15); those of *A. vervoorti* almost to the anterior edge of the seminal receptacles. Additionally, *A. wau* has both reddish brown and black pigment on the abdomen, as does *A. kaindi*, n. sp.; *A. vervoorti* has only brown. The posterior eyes of both *A. kaindi*, n. sp., and *A. wau* are about equally spaced, while *A. vervoorti* has the posterior median eyes farther apart from each other and closer to the laterals.

Natural history. This species lives in a retreat above the sheet web, formed of several curled leaves tied together; about 70 females together with egg-sacs occupied the retreat of the colony examined. Colonies are found in tree-fall gaps in montane forest and along forest trails, the forest edge, and overgrown coffee plantations.

Holotype ♀ from colony of 71 ♀ paratypes and 4 ♂ paratypes. PNG: NEW GUINEA (NE): Morobe Prov: Wau, 27.III.1979, H.W. Levi (MCZ, except for 1 ♀, 1 ♂ RNHL, 2 ♀ BPBM, 2 ♀ SMF, 2 ♀ WEI, 2 ♀ BMNH, 2 ♀ QM, 2 ♀ AM). Paratypes. PNG: NEW GUINEA (NE): Morobe Prov: Wau, Mt Kaindi Rd, 5.III.1979, 1 ♀, 7.III.1979, 1 ♀, H. Levi, Y. Lubin, M. Robinson (MCZ); Wau, coffee plantation, 8.III.1979, 2 ♀, Levi (MCZ); Wau, 28.IV.1977, 11 ♀, Robinson (MCZ); Wau Ecology Institute, 13.VI.1979, 1 ♂, Lubin (MCZ).

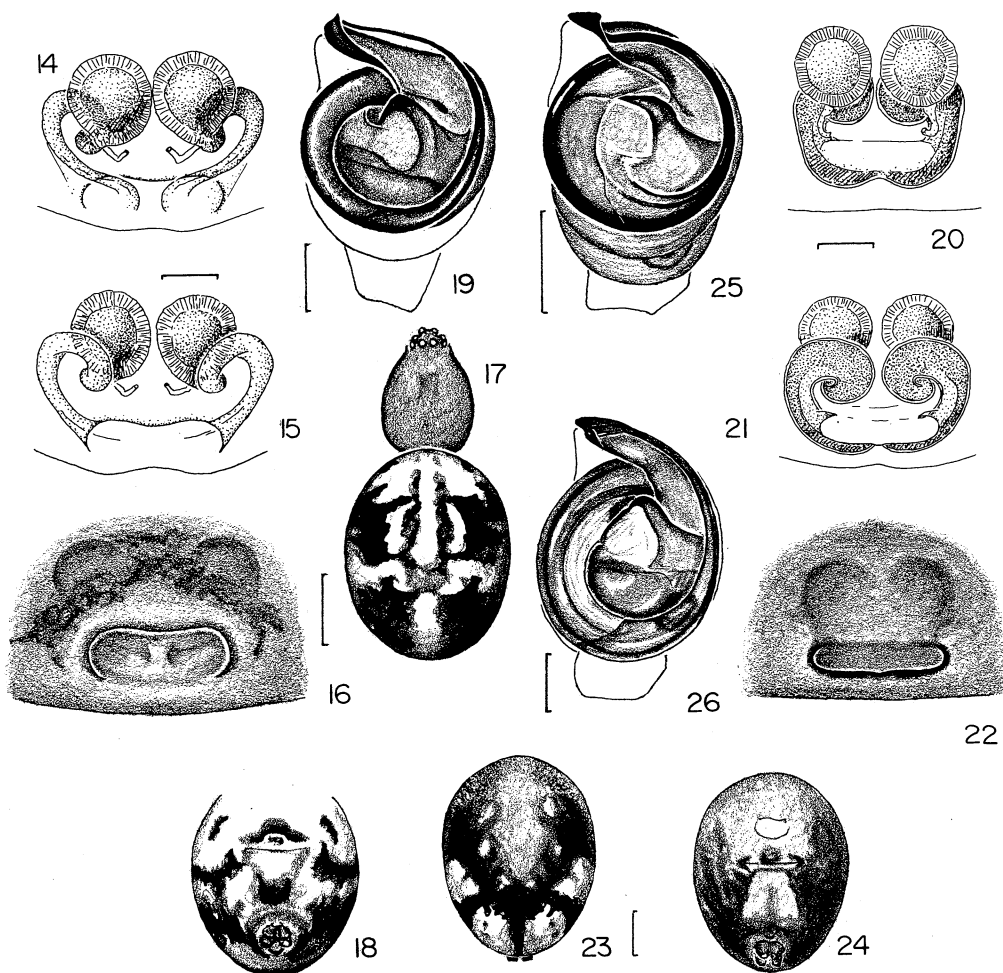


FIG. 14-26. 14-19. *Achaearanea wau*: 14-16, ♀ epigynum: 14, dorsal, cleared; 15, ventral, cleared; 16, ventral; 17, ♀, dorsal view without legs; 18, ♀ abdomen, ventral; 19, left ♂ palp. 20-25. *Achaearanea kaindi*. 20-22, ♀ epigynum: 20, dorsal, cleared; 21, ventral, cleared; 22, ventral. 23-24, ♀ abdomen: 23, dorsal; 24, ventral. 25, ♂ palp. 26. *Achaearanea vervoorti*, ♂ palp. Scale lines: 0.1 mm; except Fig. 17, 18, 23, 24, 1.0 mm.

Achaearanea kaindi Levi, Lubin & Robinson, new species

Fig. 20-25

Description. ♀. Carapace yellowish brown. Legs yellowish brown, not banded; distal ends of 4th tibiae darker. Dorsum of abdomen black-brown with some white pigment; anterior ½ lighter than posterior, without distinct markings. Venter between epigynum and spinnerets with a colorless trapezoidal area. Eyes subequal in size. Anterior median eyes 0.8 diameters apart, 0.6 from laterals. Posterior median eyes their diameter apart, 0.9 from laterals. Epigynum

illustrated by Fig. 20–22. Total length, 6.8 mm. Carapace, 2.4 mm long, 1.9 mm wide. First femur, 3.4 mm; patella and tibia, 3.5 mm; metatarsus, 2.4 mm; tarsus, 1.0 mm. Second patella and tibia, 2.5 mm; 3rd, 1.7 mm; 4th, 3.0 mm.

♂. Orange-yellow. Carapace and legs darker than abdomen. Palpus illustrated by Fig. 25. Total length, 1.4 mm. Carapace, 0.7 mm long, 0.6 mm wide. First femur, 0.9 mm; patella and tibia, 0.9 mm; metatarsus, 0.7 mm; tarsus, 0.4 mm. Second patella and tibia, 0.6 mm; 3rd, 0.5 mm; 4th, 0.6 mm.

Remarks. The species is very similar to *Achaearanea wau* and *A. vervoorti*, but has the posterior lip of the epigynum sclerotized rather than the anterior (Fig. 22). The male is smaller than that of *A. wau*. The tip of the conductor also differs (Fig. 25). *A. kaindi* differs from both *A. wau* and *A. vervoorti* by having shorter, wider connecting ducts (Fig. 20, 21) and having different markings: a reddish brown back with small light patches all around; a white pigment spot on each side (not shown in illustrations); and 2 pairs of light patches posteriorly on sides (Fig. 23). The venter has a median light patch (Fig. 24). Unlike those of *A. vervoorti*, the eyes of the posterior row are equally spaced.

Holotype ♀, PNG: NEW GUINEA (NE): Morobe Prov, Wau, 7.III.1979, H.W. Levi (MCZ). Paratypes. PNG: NEW GUINEA (NE): Morobe Prov: Mt Kaindi Rd, 3.III.1979, 1♀, H. Levi, Y. Lubin, M. Robinson (SMF); 7.III.1979, 1♀, 1♂; 15.III.1979, 1♀, Levi, M. Robinson (AM); 21.VIII.1979, 1♀, 1♂, Lubin (MCZ); 11.IX.1979, 1♀, 1♂, Lubin (MCZ); Wau Ecology Institute, 11.I.1980, 1♀, 1♂, Lubin (RNHL); Buso Forestry Reserve, 25.X.1979, 1♀, Lubin (BMNH).

Additional records. PNG: NEW GUINEA (NE): Morobe Prov: Aseki, 22–23.VIII.1980, 3♀, Lubin (MCZ).

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