

REDESCRIPTION OF *PARASCORPIOPS MONTANA* BANKS (SCORPIONIDA, VAEJOVIDAE)¹

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ABSTRACT: *Parascorpiops montana* Banks is redescribed, and a lectotype is designated. This monotypic genus is endemic to Borneo, and its relationships with the two other genera of the subfamily Scorpiopsinae are analyzed from morphological and zoogeographical viewpoints.

DESCRIPTORS: Scorpionida, Vaejoidea, Scorpiopsinae, *Parascorpiops*; redescription, lectotype, monotypic genus, Southeast Asia, Borneo, subfamilial zoogeography.

The higher categories of Vaejoidean scorpions have been recently treated by Stahnke (1974). This author however, failed to examine two supposedly monotypic genera which because of their geographical distribution are very important to our understanding of the systematics and evolution of Vaejoidea. The Brazilian taxon, *Physoctonus physurus* Mello-Leitão, retained by Stahnke in the subfamily Vaejovinae, and whose holotype I have recently examined, belongs to the family Buthidae (redescription in preparation), eliminating the zoogeographic puzzle formerly created by this genus in an otherwise exclusively North American subfamily. The Bornean species *Parascorpiops montana* Banks belongs in the subfamily Scorpiopsinae, and taxonomically is known only from the brief original description which appeared in 1928.

I have recently examined the 11 syntypes of *P. montana*, and since knowledge of this species is important in understanding the phylogeny of the subfamily Scorpiopsinae, a redescription is made here, followed by some taxonomic observations on the subfamily.

Parascorpiops montana Banks

Parascorpiops montana Banks 1928, pp. 505-506; Takashima 1945, p. 71; Stahnke 1974, p. 124. *Parascorpiops montanus* Werner 1934, p. 283.

Lectotype – Adult male (measurements in Table 1). New designation.

Prosoma. Carapace fusco-ferrugineous with distinct variegated fuscous pattern; median and lateral eyes piceous; posterior one-half of lateral margins, and posterior margin moderately, uniformly infusate. Anterior margin strongly, abruptly emarginate

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medially; median notch approximately two times wider than deep, extending to posterior margin of second pair of lateral eyes (Fig. 1). Two pairs of lateral eyes, subequal in size, and slightly smaller than median eyes. Anterior median furrow moderately deep, wide. Ocular prominence moderately raised above carapacial surface, with vestigial longitudinal furrow medially. Median eyes separated by slightly more than their own diameter, located at anterior two-fifths of carapace length. Posterior median and posterior marginal furrows vestigial. Posterior lateral furrows arcuate, moderately deep and wide. Texture: submedially with moderately dense, small granules; medially and laterally sparsely granulose. Venter ochreous-fuscescent, maxillary lobes vestigially infusate. Sternum pentagonal, posterior one-third with deep median longitudinal furrow bifurcating submarginally.

Mesosoma. Tergites fusco-ferrugineous with distinct fuscous pattern: I-II with coarsely reticulated fuscosity; III-IV antero-laterally with sparse and fine reticulations, uniformly infusate on other regions; V-VI uniformly infusate throughout; VII with distinct reticulated fuscosity. Tergite width tapering distally: I approximately as wide as carapace; VII about two-thirds as wide as carapace, and approximately as long as wide. Tergites shagreened to vestigially granulose, keel-less. Genital operculi ochreous, median longitudinal membranous connection absent (Fig. 2). Genital papillae present. Pectinal basal piece ochreous, anterior margin shallowly notched medially. Pectines flavous: two marginal lamellae, one middle lamellae, fulcra absent; pectinal tooth count 6-6, each tooth approximately three times longer than wide (Fig. 4). Sternites ochreous fuscescent: III-VI vestigially infusate laterally; VII with margins moderately infusate, disc diffusely infusate. Stigmata about three times longer than wide. Sternite VII acarinate, smooth.

Metasoma. Preanal segments fusco-ferrugineous with moderately dense, reticular fuscosity; telson ochreous fuscescent. Dorsal lateral carinae: on I weak to vestigial, smooth to sparsely granose, ending abruptly in small subconical granule; on II moderately strong, subgranose tending to serrate, ending abruptly in small granule; on III-IV moderate to strong, serrate, ending abruptly in medium sized granule. Lateral supramedian carinae: on I moderately strong, coarsely granulose; on II-IV weak to vestigial, subgranose. Lateral inframedian carinae: on I weak to moderate, subgranose, complete; on II-IV obsolete. Ventral lateral carinae: on I weak to moderate, subgranose, moderately convergent distally; on II-IV weak, subgranose, subparallel. Ventral submedian carinae: on I vestigial, smooth, feebly convergent distally; on II vestigial, smooth, parallel; on III vestigial to obsolete, smooth; on IV weak to vestigial, subgranose. Segments I-IV dorsally flat, without median longitudinal depression; intercarinae smooth to vestigially rugose and shagreened.

Segment V over one and one-half times longer than segment IV. Dorsal lateral carinae vestigial, subgranose. Lateral median keels present on basal one-third, vestigial, with scattered small granules. Ventral lateral and ventral median carinae moderate, distinctly granulose. Telson slightly deeper than wide; vesicle with weak postero-lateral bilobations ventrally, aculeus short and strongly curved.

Chelicera. Ochreous: chela with fine fuscous variegations dorsally; fingers with moderately dense, uniform fuscosity. Ventral surfaces of chela and fingers densely covered with long, whitish hairs. Dentition shown in Fig. 5.

Pedipalp. Fusco-ferrugineous with moderately dense, uniform or sparsely variegated fuscosity. Femur wider than deep. Dorsal internal carina strong, granulose. Dorsal

external keel moderately strong, granulose. External carina moderate, complete, granulose. Ventral external keel present on basal one-half, weak to vestigial, subgranose. Ventral internal keel strong, granulose. Ventral face vestigially shagreened. Internal face shagreened, with sparse to moderately dense small granules. Dorsal and external faces shagreened. Three femoral trichobothria: internal, dorsal, and external.

Tibia wider than deep. Dorsal internal keel obsolete; basal tubercle strong, subconical. Dorsal median carina moderately strong, granulose. Dorsal external keel strong, coarsely granose. External keel moderately strong, granulose. Ventral external keel strong, granulose tending to serrate. Ventral median keel obsolete. Ventral internal keel moderate, granulose; basal tubercle weak. Tibial faces shagreened, with sparse to moderately dense small granules. Neobothriotaxic: one internal, two dorsal, 17 external, and 10 ventral trichobothria arranged as shown in Figs. 7-9.

Chela hexagonal in cross-section, with conspicuous dorso-ventral compression. Dorsal face flat: basal one-half with vestigial reticular patterning of small granules; distally with dense, small granulation. External face moderately granulose, distinctly reticulated. Ventral face shagreened to densely, minutely granose. Internal face shagreened to moderately granulose. Dentate margins of fingers with strong, matching lobations basally (Fig. 11); when fingers are closed a distinct gap appears at basal region of lobes. Orthobothriotaxic, with 26 trichobothria arranged as shown in Figs. 10-12.

Legs. Ochreous fuscous to brunneous. Basal segments shagreened, distal segments smooth. Tibial spur absent. Internal and external pedal spurs present. Tarsomere II truncate distally, armed ventrally with median longitudinal row of small spines flanked by three pairs of submedian setae. Ungues equal in size, subunguicular spine well developed.

Allolectotype – Adult female (measurements in Table 1). New designation. Differs from lectotype as indicated below.

Prosoma. Carapace with posterior median and posterior marginal furrows weak to moderately deep.

Mesosoma. Tergites distal taper not as pronounced; VII about seven-ninths as wide as carapace, distinctly wider than long. Tergites lustrous, vestigially granulose posteriorly. Genital operculi elongate-ellipsoidal, with complete median longitudinal membranous connection. Genital papillae absent. Pectinal tooth count 6-6, each tooth about three times longer than wide, but smaller than on male (Fig. 3). Sternite VII with submedian and lateral carinae vestigial, smooth.

Metasoma. Proportionately slightly shorter, but otherwise very similar in morphology and sculpturing.

Pedipalp. Chelal fingers curvature not as strong, thus chela appearing slightly more elongate. Dentate margins on fingers straight or nearly so, leaving no gap between them when closed. Dentate margin of fingers granulose, with all granules subequal in size except for terminal ones. Dentate margin of movable finger divisible into three regions according to granular placement, as follows: basal one-fifth with single median longitudinal row of granules; distal one-fifth with oblique, imbricated rows of granules;

intervening three-fifths without recognizable pattern, granules randomly placed three to four abreast (Fig. 6). Trichobothrial pattern as on male; especially on external face of fixed finger, where trichobothrial relative positions are not affected by presence or absence of lobation on dentate margin.

Type locality. Mt. Poi (5,400 ft), Sarawak (Island of Borneo), Federation of Malaysia; no date (Dr. E. Mjöberg). Primary types permanently deposited in the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.

Distribution. Presently this species appears to be endemic to the Island of Borneo. In the original description Banks (1928) also reported specimens from Mt. Dulit (4,000 ft), Sarawak.

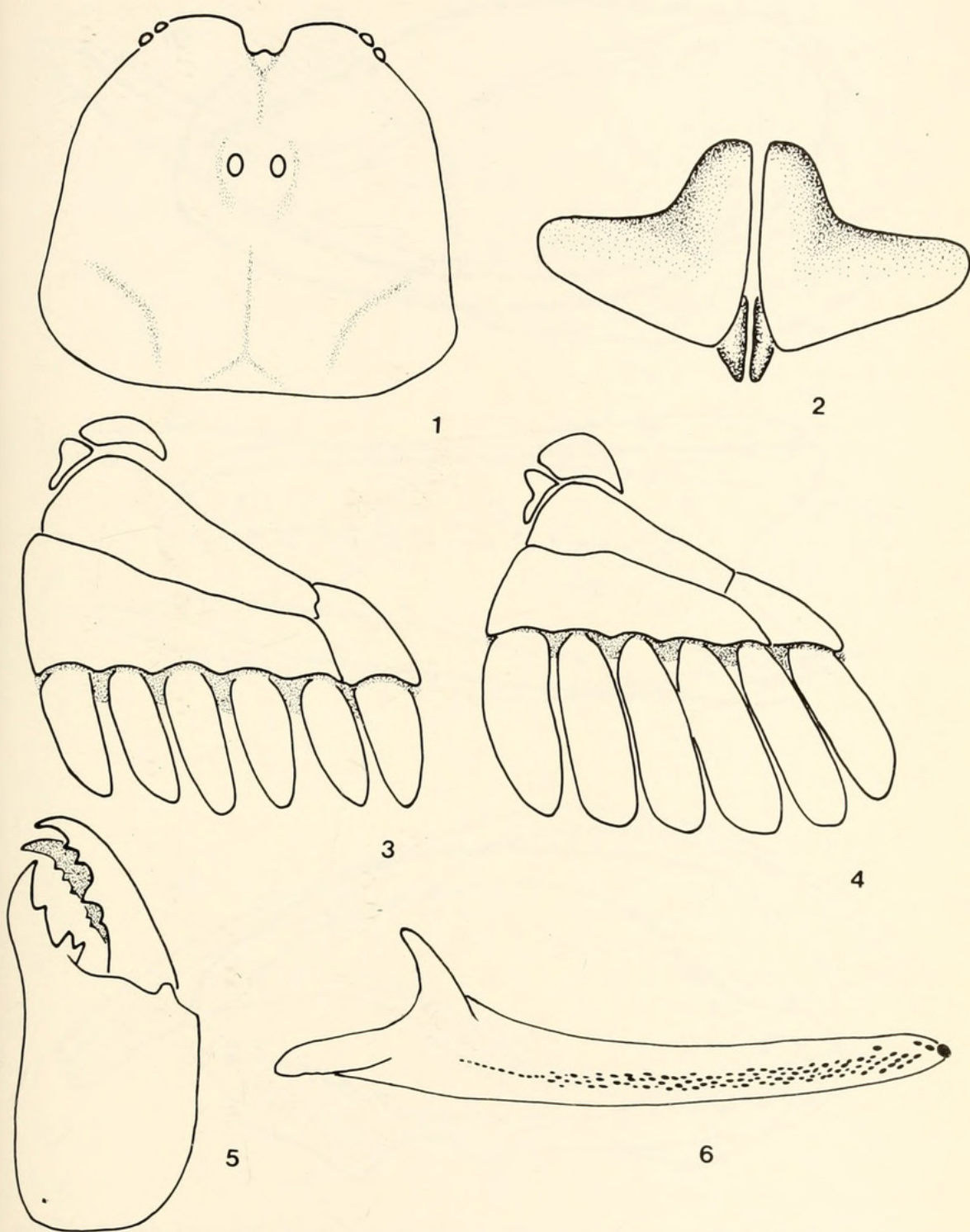
Intraspecific variability. In addition to the primary types, the following paralectotypes have been examined:

- One adult male, differing from the lectotype in being slightly darker, and the pedipalp chelae appearing slightly more robust. This specimen is missing the third leg on the left side.
- Five adult females, one of which appears to have molted a short time before capture as indicated by its softer exoskeleton and lighter coloration. The four other paralectotypes differ little from the allolectotype, except for one having a pectinal tooth count of 5-6.
- Three juvenile males with carapace lengths of 5.5mm, 5.3mm, and 4.6mm respectively. In these specimens the base color is ochreous and the fuscous patterning on all structures is very conspicuous. The pedipalp chelae are morphologically similar to that of adult females, with the fingers shallowly curved and straight edged. Tergite VII however, shows the proportions of adult males, i.e., as long as wide.

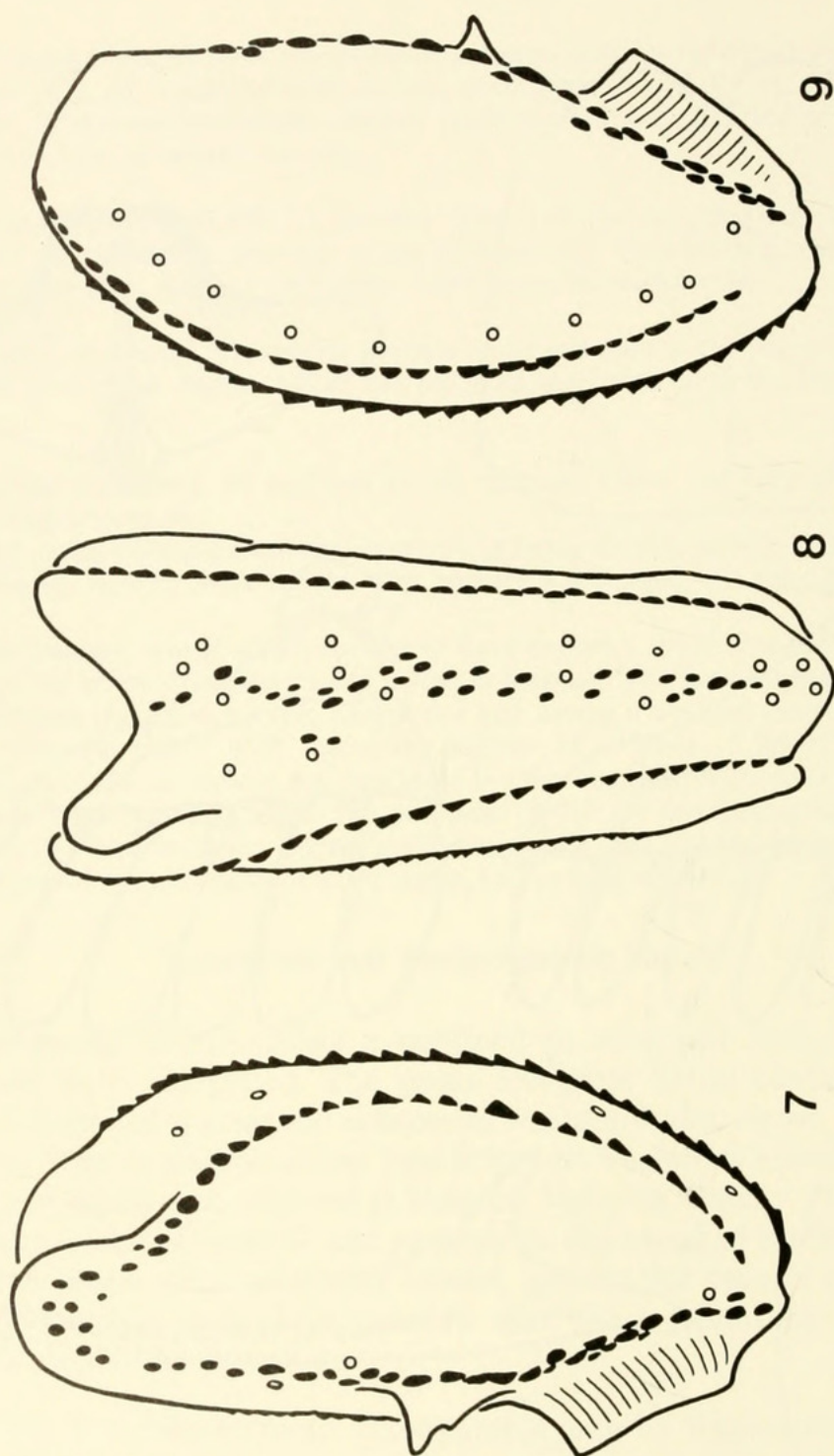
Taxonomic and Zoogeographic Notes

The subfamily Scorpiopsinae is confined to southeast Asia, where three genera have been recognized. The genus *Scorpiops* Peters contains approximately 13 described species and subspecies found in India, Nepal, Bangladesh, and Burma. The monotypic genus *Dasyscorpiops* Vachon is known only from the holotype, which was collected at Malacca, Malaysia. Finally, *Parascorpiops* Banks which is also monotypic and endemic to the island of Borneo (Fig. 13). These three genera are very closely related, and on the basis of morphologic and zoogeographic data it is possible that they should be lowered to subgeneric rank under *Scorpiops*.

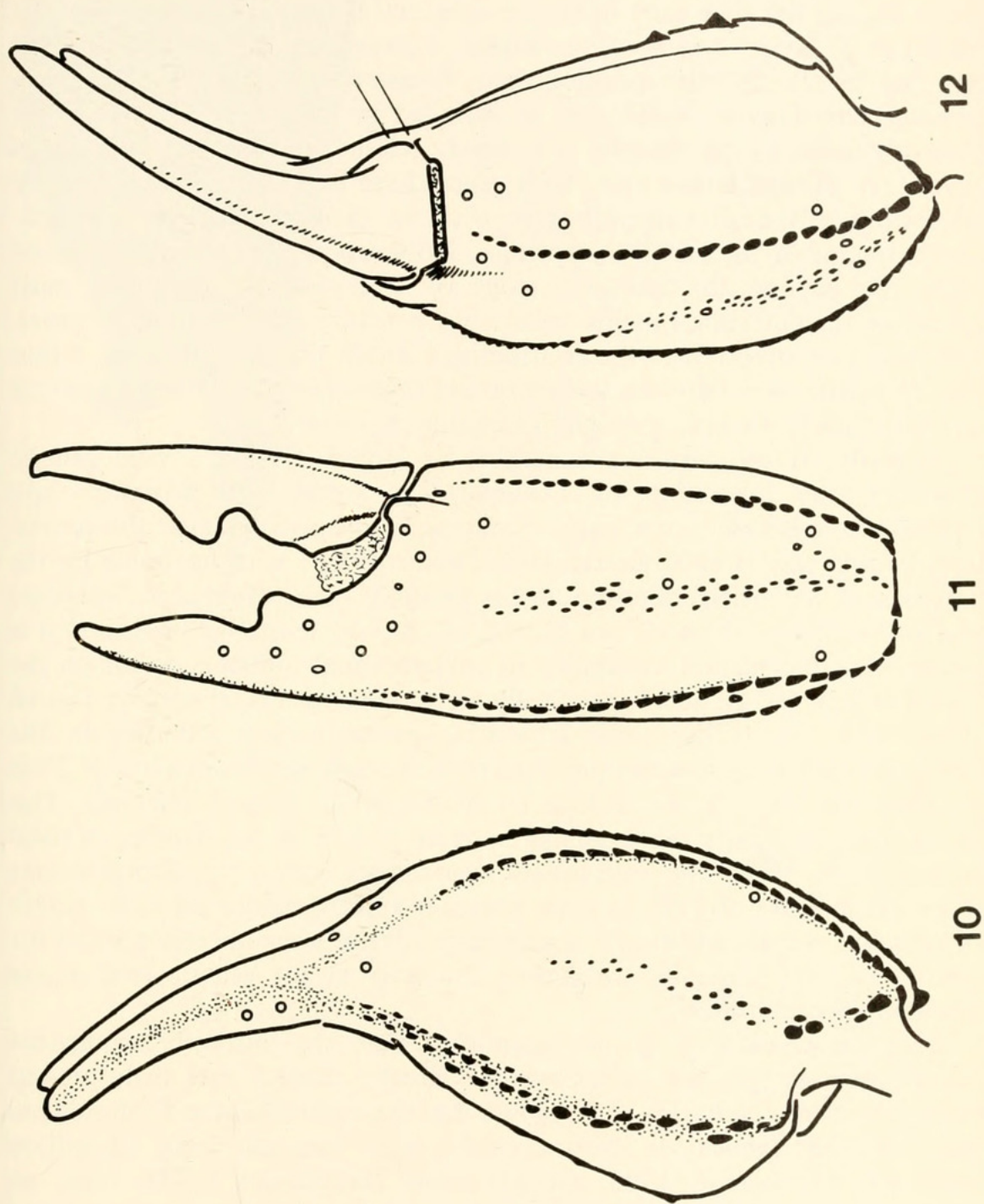
Scorpiops and *Parascorpiops* are separable only by the number of lateral eyes, *Scorpiops* with three pairs and *Parascorpiops* with two pairs. Although this character has been formerly used extensively in scorpion taxonomy, I find it to be quite variable on many taxa and consequently rank it very low on the weighted hierarchy of taxonomic characters. The majority of Vaejovid scorpions have three pairs of lateral eyes, and this character has been used, quite erroneously in my opinion, as a familial character. However, *Anuroc-*



Figures 1-6. *Parascorpiops montana* Banks, type specimens from Mt. Poi, Sarawak, Federation of Malaysia. Lectotype male figs. 1, 2, 4, 5; allolectotype figs. 3, 6. 1- Carapace, dorsal aspect. 2- Genital region, showing operculi and papillae. 3 and 4- Pectines, showing one extensive middle lamella and absence of fulcrum. 5- Right chelicera, dorsal aspect. 6- Dentate margin of movable finger of right pedipalp chela.



Figures 7-9. *Parascorpiops montana* Banks, lectotype male. Tibia of right pedipalp showing carinal development and trichobothrial pattern (open circles). 7- Dorsal aspect. 8- External aspect. 9- Ventral aspect.



Figures 10-12. *Parascorpiops montana* Banks, lectotype male. Chela of right pedipalp showing carinal development and trichobothrial pattern (open circles). 10- Dorsal aspect, 11- External aspect, 12- Ventral aspect.

tonus Pocock has four pairs of lateral eyes, and in some *Uroctonus* spp. the third pair of lateral eyes is often vestigial or completely missing (Gertsch and Sologlad 1972). Strictly speaking then, *Parascorpiops* which has only two pairs of lateral eyes should not be included in the family Vaejovidae (as presently defined); but because it is closely related to *Scorpiops* which does have three pairs of lateral eyes, both genera have been referred to the family Vaejovidae. Although I do not agree with the placement of the subfamily Scorpiopsinae in the family Vaejovidae, a discussion of this problem would carry me beyond the intended scope of this contribution and I must apologize for deferring on this topic until a future contribution. However, returning our attention to the relationships within the Scorpiopsinae, I find that the distinction between *Scorpiops* and *Parascorpiops* is rather superficial and is founded on a taxonomically unreliable character.

Similarly, if we dismiss the number of lateral eyes as a valid generic character, the separation of *Dasyscorpiops* from both *Scorpiops* and *Parascorpiops* is based on a single character, whose usefulness at the generic level in this case is also questionable. *Dasyscorpiops* is recognizable by the presence of 85-86 trichobothria on the pedipalp tibia, whereas in *Scorpiops* and *Parascorpiops* these do not exceed 44. Among scorpions in general it is known that the highest variability in trichobothrial numbers occurs on the tibia (Vachon 1974); and I specifically mention the genus *Euscorpius* Thorell (Chactidae), which has some interesting morphological affinities to the Scorpiopsinae. In *Euscorpius* the tibial trichobothria vary from a low of 27 in *E. germanus* (Koch), to a high of 49-50 in *E. italicus* (Herbst). This intrageneric variability represents an increase of 85% in the number of tibial trichobothria, while the intergeneric variability within the Scorpiopsinae shows an increase of 91%. In both instances approximately the same extent of variation occurs, and thus it is justifiable to raise some questions about the validity of this particular taxonomic character at the generic level in the subfamily Scorpiopsinae.

Zoogeographically it is not surprising that the currently recognized Scorpiopsine genera are perhaps more closely related than their present taxonomic status indicates. It is known that the entire Malayan Peninsula has been emergent (above sea level) since the early Cenozoic some 62 million years ago (Umbgrove 1938, Gobbett and Hutchinson 1973); thus, no apparent marine isolating barriers have existed between *Scorpiops* and *Dasyscorpiops* since that time. This does not imply that these two taxa originated before that time, but it does suggest that the apparent discontinuous distribution might be the result of insufficient sampling in the intervening area rather than representing a discrete gap between them.



Figure 13. Map of Southeast Asia showing the known distribution of the three genera currently recognized in the subfamily Scorpiopsinae: *Scorpiops* Peters (stippled area), *Dasyscorpiops* Vachon (square), and *Parascorpiops* Banks (circle).

Similarly, extensive land connections between the Malayan Peninsula and Borneo have been dated back to the Pleistocene, spanning the period from two million to 10 thousand years ago (Umbgrove 1938, Gobbett and Hutchinson 1973). Therefore, *Parascorpiops* does not appear to have been geographically isolated from its mainland relatives for more than a few thousands of years. I find it unlikely, although not entirely impossible, that differentiation has proceeded at the rather fast rate required to attain the extent of divergence conducive to generic recognition.

Recapitulating the views expressed in this contribution, both morphological and zoogeographical data tend to support my contention that the Scorpionsine taxa are very closely related, and that the recognition of three distinct genera might no be valid. However, the genus *Scorpiops* with its 13 described species and subspecies must be revised before any taxonomic changes are made. At that time it should also be possible to investigate into greater depth the relationships among the Eurasian "Vaejovidae" and "Chactidae", and between these and their New World counterparts.

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Table 1. Measurements (in Millimeters) of *Parascorpiops montana* Banks

	Lectotype	Allolectotype
Total length	49.15	55.10
Carapace length	6.75	7.80
Anterior width	3.95	4.40
Width at median eyes	6.50	7.90
Posterior width	7.45	9.10
Mesosoma length	15.90	20.10
Metasoma length	26.50	27.20
I length/width/depth	2.70/2.50/1.90	2.80/2.70/2.20
II length/width/depth	3.20/2.10/2.00	3.30/2.40/2.20
III length/width/depth	3.50/2.00/2.00	3.60/2.20/2.20
IV length/width/depth	4.00/2.00/2.00	4.10/2.10/2.20
V length/width/depth	6.50/1.90/2.00	6.50/1.95/2.10
Telson length	6.60	6.90
Vesicle length/width/depth	5.00/2.40/2.50	5.50/2.40/2.60
Aculeus length	1.60	1.40
Pedipalp length	26.60	29.70
Femur length/width/depth	6.50/2.80/1.80	7.10/3.10/2.20
Tibia length/width/depth	5.70/2.80/1.90	6.50/3.30/2.35
Chela length/width/depth	14.40/5.10/3.80	16.10/5.60/3.90
Movable finger length	7.00	8.50
Fixed finger length	5.20	6.90
Chelicera: chela length/width	2.05/1.50	2.50/1.90
Movable finger length	1.65	2.20
Fixed finger length	0.80	1.30



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