

Description of *Rafalus* gen.n. (Aranei: Salticidae), with special reference to the Near East fauna

Описание *Rafalus* gen.n. (Aranei: Salticidae) с особым упором на фауну Ближнего Востока

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KEY WORDS: Aranei, Salticidae, *Rafalus*, taxonomy, Near East, Asia, Africa.

КЛЮЧЕВЫЕ СЛОВА: пауки, Salticidae, *Rafalus*, таксономия, Ближний Восток, Азия, Африка.

ABSTRACT: Description of *Rafalus* gen.n. is given, a genus containing small, deserti- to semideserticolous jumping spiders, cryptically colored and related to the well-known genera *Aelurillus* Simon, 1884 and *Lango-na* Simon, 1901. *Rafalus christophori*, *R. feliksi*, *R. karskii* and *R. stanislawi* spp.n. are described as new, *Aelurillus wittmeri* Prószyński, 1978, *Aelurillus lymphus* Próchniewicz & Hęciak, 1994, *Habrocestum insignipalpe* Simon, 1882 and *Saitis nigriritibiis* Caporiacco, 1941 are reclassified into *Rafalus* (all comb.n.), and the transfer of *Aelurops variegatus* Kroneberg, 1875 to *Rafalus* by Logunov & Rakov [1998: 134] is reconfirmed.

РЕЗЮМЕ: Дано описание рода *Rafalus* gen.n., включающего мелких криптически окрашенных пустынных и полупустынных пауков-скакунов, родственных родам *Aelurillus* Simon, 1884 и *Lango-na* Simon, 1901. Описаны новые виды *Rafalus christophori*, *R. feliksi*, *R. karskii* и *R. stanislawi* spp.n. В род *Rafalus* переведены *Aelurillus wittmeri* Prószyński, 1978, *Aelurillus lymphus* Próchniewicz & Hęciak, 1994 и *Saitis nigriritibiis* Caporiacco, 1941 (все comb.n.). Подтверждено также перенесение в род *Rafalus* вида *Aelurops variegatus* Kroneberg, 1875 [Logunov & Rakov, 1998: 134].

Introduction

The present paper is one in a series [Logunov, 1996; Prószyński, 1989, 1993, 1998] dealing with the still poorly known Near East fauna of Salticidae spiders. Additional extensive information on Near East Salticidae is launched on the Internet by Prószyński: Salticidae Diagnostic Drawings Library, available at <http://spiders.arizona.edu/salticid/diagnost/tit-pg.htm>, and as catalogue data in the current edition of the Catalogue of Salticidae of the World, available at <http://spiders.arizona.edu/salticid/catalog/0-tit-pg.htm>.

The present contribution is based on a study of specimens kept in the following collections:

HUJ — Israel National Arachnid Collection in The Hebrew University, Jerusalem;

MCDE — the Mitrani Center for Desert Ecology of the Blaustein Institute for Desert Research, Ben Gurion University at Sede Boquer.

The author wishes to express cordial thanks to the curators of the above collections. Special thanks are due to persons who assisted in this research carried out in Israel, in particular: Profesor F.D. Por and Dr. Gershom Levy, both of Department of Evolution, Systematics and Ecology, Hebrew University, Jerusalem, as well as Dr. Yael Lubin, of Mitrani Ecological Research Center, Ben Gurion University at Sede Boquer. Dr. Stefania Hęciak, of Siedlce, Poland, contributed several diagnostic drawings. I benefited also from professional discussions with Dr. D. V. Logunov, of Novosibirsk, Russia. I used also the working facilities in Wyższa Szkoła Pedagogiczna in Siedlce, Poland, and in Department of Zoology, Eastern Illinois University, Charleston, Ill., USA.

The following abbreviations are used in the text:

F — female; M — male; ALE — anterior lateral eyes; AME — anterior median eyes; DWE 1–3 — difference of width of eye rows I–III, Eyes I — eyes of the first row; Eyes II — eyes of the second row; Eyes III — eyes of the third row; HC — height of cephalothorax, LA — length of abdomen, LC — length of cephalothorax, LDC — length of flat surface of cephalothorax; LE — length of eye field, WE1 — width of cephalothorax at eyes I, WE3 — width of cephalothorax at eyes III, MWC — maximal width of cephalothorax, MWA — width of abdomen; L. tar — length of tarsus, L. met — length of metatarsus, L. tib — length of tibia, L. pat — length of patella, L. fem — length of femur. Ratios between parts of body are shown as percentage of cephalothorax length; ratios between leg lengths are shown as percentage of length of 5 segments of leg I.

Rafalus gen.n.

Type species: *Rafalus christophori* sp.n.

REMARKS: Description of this genus was prompted by the discovery of several new species distributed over the eremic environments of the Near East, together with some closely related forms known from Central Asia. Data for particular species, known mainly from a single or few specimens, are scarce. The *Rafalus* species are cryptically colored, ground dwelling, small spiders, most probably occurring singly, and are difficult to find. Behavioral observations are lacking and the matching of sexes, done for two species, is tentative. Search by the author for *Rafalus* females at two localities in the Negev Desert, where males were captured by pitfall trapping, gave no results. The existing collections mainly contain specimens taken as single individuals, no males and females have been collected at the same locality. The present descriptions are based on all known specimens kept in the arachnological collections of the world. The species described here as new derive from the desert regions of Israel and Sinai; presumably similar ecological requirements are true also for the Yemen and Aden species reclassified here.

Additional species and *Aelurillus wittmeri* Prószyński, 1978, from Bhutan, should also be reclassified into this genus and I confirm the transfer of *Aelurillus variegatus* (Kroneberg, 1875), from Uzbekistan, by Logunov & Rakov [1998: 134]. *Aelurillus lymphus* Próchniewicz & Hęciak [1993: 34, figs 1a–f], from Kenya, also seems to be a *Rafalus*.

The geographical distribution of *Rafalus* seems to confirm the impression of significant relationships between the Salticidae faunas of the Near East and Central Asia as based on years of research on various salticids conducted by D.V. Logunov and by the present author.

DIAGNOSIS: An Aelurillinae salticid, meaning as being related to *Aelurillus* Simon, 1884, *Langona* Simon, 1901, *Phlegra* Simon, 1876 and their relatives, characterized by legs III being the longest (rarely about equal to legs IV) in both sexes and by a higher, convex cephalothorax; in males a single tibial apophysis without bunch of stiff setae; female epigyne with two indistinct posterior openings, channels long and broad, bent S-like, very small spermathecae located transversely.

General characters of the genus

Rafalus gen.n. can be easily recognized by the genital organs. In males, the palpal organ is of the Aelurillinae type,

with a single, thin, palpal apophysis comparable to that of *Langona* Simon, 1901, from which it differs by lack of a characteristic bunch of hard bristles and setae; scales are also different. In females, the epigyne is comparable externally with that of *Phlegra* Simon, 1876, but it has a much more simple internal structure; from *Aelurillus* Simon, 1884, it differs by the absence of sclerotized "wings". Both sexes differ from *Phlegra* and even more so from *Langona* by the gently rounded profile of the cephalothorax, which appears short and relatively higher, with the eye field gently inclined anteriorly, rising to the highest point at eyes III, followed by a gentle thoracic slope which, at a variable distance, turns into a more abrupt posterior slope. Legs III are longer than legs IV in both sexes, this making a clear difference from the remaining Aelurillinae: *Aelurillus*, *Langona* and *Phlegra*, where legs IV are the longest (except for cases of individual variation in which legs III and IV are almost equal or, more rarely, legs III are indistinctly longer). ALE set somewhat above AME, the difference being about 1/6th of ALE diameter in males, 1/4th in females, this resembling some *Aelurillus*, except for the *conveniens* group, where ALE are set higher. The eye field is narrower posteriorly (mean 8%), whereas in *Phlegra* it is practically rectangular.

Body proportions in *Rafalus*

Cephalothorax: length varying in all specimens of all species studied as 1.70–2.80–4.11 mm (shortest–mean–longest), height varying as 45–53–58%; width of cephalothorax at eyes III as 65–72–83%, maximal width of cephalothorax as 65–75–87%. Eye field of variable length, rather short, extending over 35–43–50% of cephalothorax, trapezoidal, narrowing posteriorly (by 0 to mean –5% to maximum –8%), its width at eyes I as 53–63–73% and 50–58–66% at eyes III; eyes III located close to dorsolateral edge. The profile of the cephalothorax is gently rounded and without really flat surface; anterior slope of eye field rising gently as a flat inclined surface approaching eyes III, which are located at the highest point of the cephalothorax; eye field depressed between ALE, slightly so also between eyes III; there is a gentle, rounded slope from eyes III to about 82% of the length of the cephalothorax where a steep posterior slope begins.

Shape of abdomen elongate-oval: length 81–91–107%, width 61–67–79%, broadest behind the middle, slightly narrower than width of cephalothorax; dorsally flat; anterior tip hardened and forming a small scutum usually hidden under

Table 1. Biometrics of the *Rafalus* species studied
Таблица 1. Морфометрические данные по изученным видам рода *Rafalus*.

species	<i>feliksi</i>	<i>christophori</i>				<i>insignipalpe</i>	<i>karski</i>	<i>stanislawi</i>			uncertain		
specimen	F	holotype	Elat	Elat	F	F	F	M	M	M	F#3	F#1	F#2
LC mm	4.11	2.96	2.70	2.44	3.03	3.00	3.40	1.70	1.96	1.87	3.12	2.80	3.27
LE %	41	41	43	47	44	40	35	45	39	38	46	50	44
HC %	53	54	51	52	54	57	45	58	56	52	49	55	53
WE I %	59	66	67	71	64	63	57	58	53	54	66	73	62
WE III %	55	61	60	66	59	57	53	58	50	53	58	66	55
DWE 1-3%	–4	–5	–7	–7	–5	–6	–4	0	–3	–1	–8	–7	–7
WC III %	83	72	67	71	73	73	66	81	67	67	78	79	65
Max WC %	83	74	69	74	73	—	—	87	75	67	78	79	65
LA %	94	87	81	89	—	93	73	100	95	94	—	89	107
Max WA %	69	61	57	63	—	—	—	71	67	73	—	63	79

Table 2. Total length of 5 segments of legs in % of leg I.
Таблица 2. Общая длина 5 члеников ног в процентном отношении к длине ноги I.

species		Leg I	Leg II	Leg III	Leg IV
MALES					
<i>R. christophori</i>	holotype M	5.40=100%	103%	134%	117%
	Elat M	4.88=100%	100%	134%	116%
		4.63=100%	101%	136%	114%
	Sinai M	4.12=100%	102%	145%	131%
<i>R. stanislawi</i>	M	3.02=100%	100%	142%	132%
		3.22=100%	105%	137%	140%
		3.10=100%	101%	134%	147%
FEMALES					
<i>R. christophori</i>	Sinai F	4.65=100%	108%	138%	142%
	W. Mish. F	4.85=100%	109%	155%	136%
<i>R. feliksi</i>	F	7.57=100%	91%	136%	122%
<i>R. karski</i>	F	3.35=100%	106%	140%	115%
<i>R. sp 1</i>	F	4.90=100%	107%	155%	154%
<i>R. sp 2</i>	F	5.58=100%	104%	141%	120%
<i>R. sp. 3</i>	F	5.58=100%	101%	143%	121%

setae. Legs robust, similar; their lengths (in % of 5 segments of leg I) in decreasing order in males: III 134-137-145%, IV 116-128-147%, II 100-102-105%, I 100%; in females III 136-144-155%, IV 115-130-154%, II 91-104-109%, I 100%.

Biometrical data are provided also in Tables 1 & 2.

NAME. Honors the late Dr. Jan Rafalski (1909-1995), Professor of Zoology at the Adam Mickiewicz University in Poznań, Poland. Dr. Rafalski, arachnologist, supervised and advised the research of two generations of arachnologists and other zoologists in Poland, which resulted in conferring over 100 magister (=MSc) degrees, 16 Dr. (=PhD) and 18 Dr. hab. (=DSc) degrees. He is remembered with gratitude by a large number of followers, including the author of this paper.

Key to species of *Rafalus*

1. MM

— FF

- 2.(1) Clypeus with two rows of white setae, orbital setae around eyes I orange or fawn, fans of setae on pedipalps orange, pedipalpal tibia straight and thin *R. christophori*
- Clypeus with a single, broad row of white setae, orbital setae around eyes I whitish-grey, fans of setae on pedipalps white, pedipalpal tibia bent, broader *R. stanislawi*
- 3(1) Cephalothorax covered with striking dense white setae, long and adpressed; abdomen with indistinct yellow spots surrounded by grey *R. karskii*
- Cephalothorax without dense white setae, ... 4
- 4(3) Thorax high, flattened area absent or short 5
- Thorax lower, flattened area longer 6
- 5(4) Flattened curvature behind eye field extending over 1/3rd of thorax *R. christophori*
- Thoracic slope beginning immediately behind the eye field, flattened curvature absent, no rounded surface *R. sp. 2*

- 6(4) Flattened curvature behind eye field extending over 3/4th of thorax; specimens distinctly larger; cephalothorax brown; eye field with mixed setae white, much denser in the center; abdomen covered densely with light sandy brown setae *R. feliksi*
- Flattened curvature extending over about 3/5th of thorax 7
- 7(6) Specimens light sandy, eye field's anterior setae predominantly white, darker between eyes III; abdominal median streak light *R. sp. 3*
- Specimens dark brown; eye field's anterior setae predominantly dark with white setae in the center; a darker abdominal median streak delimited by two rows of seven indistinct white spots *R. sp. 1*
8. External appearance unknown, epigyne as in Figs 15 & 16 *R. insignipalpe*

Rafalus christophori sp.n.

Figs 1-12.

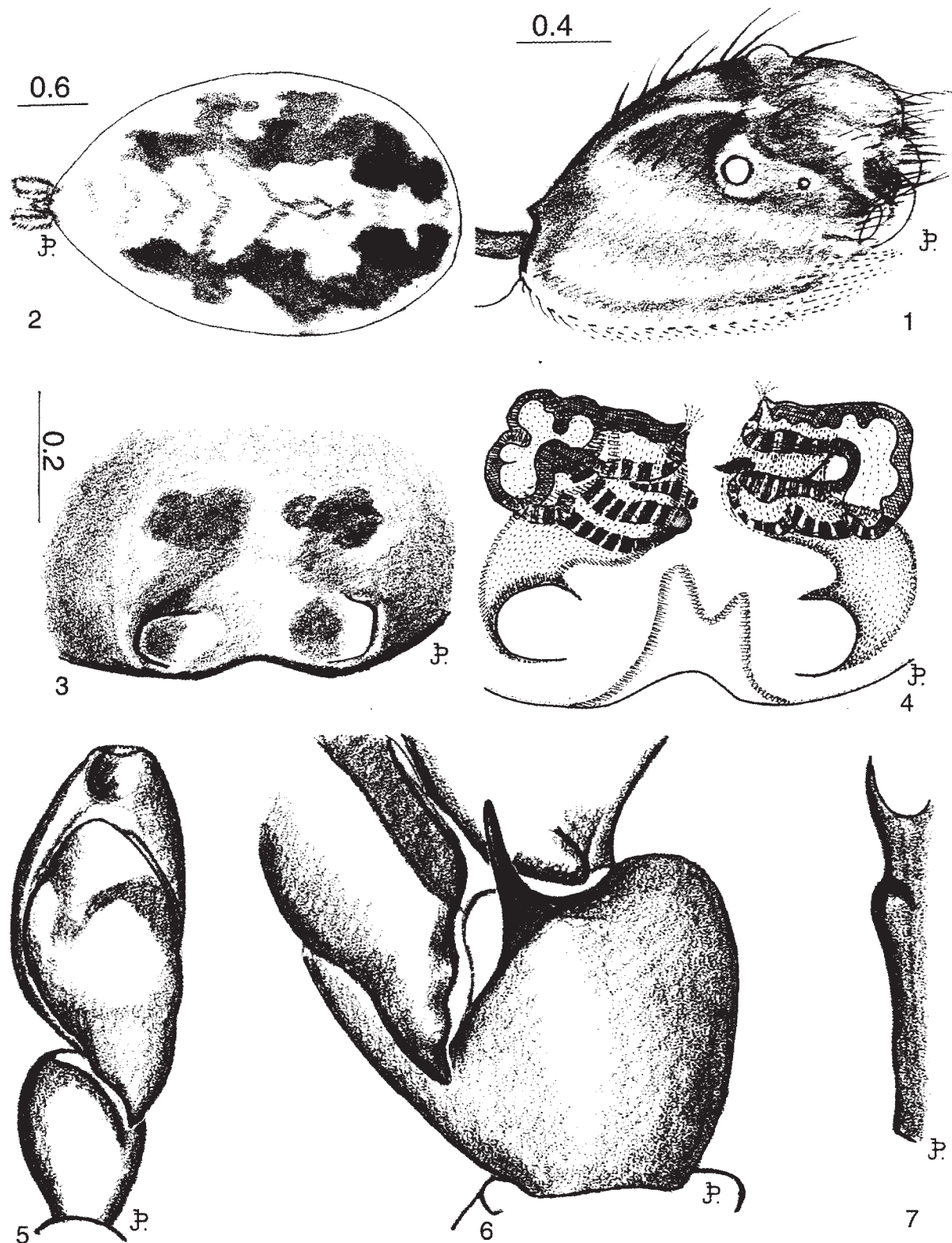
Holotype ♂, Israel, Makhtesh Ramon [= Ramon Crater, near Shen Ramon], 31.I.1987; leg. Y. Lubin (No. 14237); Allotype ♀, Paratype ♂, Egypt, Sinai: St. Catherine Monastery, 13.IV.1987; leg. V. & B. Roth. Other paratypes: Israel: 1♂, En Gedi sulphuric springs, 1936; 1♂, Sinai: Arayif en naqa, 20.XII.1956; leg. Amitai; 1♀, Nahal Mish'mar 186/087 [= Wadi Machnali], 24.I.1958; leg. Shulov; 1♂, Ein Gedi, 9.III.1936; 2♂♂, Elat, 15.IV.1987; leg. V. & B. Roth. All in Coll. HUJ.

DIAGNOSIS: Clypeus with two rows of white setae separated by a brown, bald, narrow belt. Orbital setae of eyes I orange dorsally, white ventrally. Fans of long setae radiating on ♂ pedipalps: orange with white setae retrolaterally on patella and sparse, harder, black bristles. Femora I and II with long, white setae retrolaterally, a bunch of black setae ventrobasally. In ♀, abdomen with long orange scales, darker scales on dark grey spots.

DESCRIPTION. Male: Cephalothorax integument dark brown, light reflecting on thorax, mat, blackish scales making the eye field very dark; a contrasting orange fringe of setae along anterior edge of cephalothorax, above eyes I. Light spots on cephalothorax: a white spot of admixed scales medially along anterior part of eye field, beginning from the touching point of AME and stretching along 2/5th of eye field; in one specimen similar spots also from between ALE and AME; eyes III with a narrow rim of white setae posteriorly and ventrally; ventral margin of carapace with a thin margin of white setae.

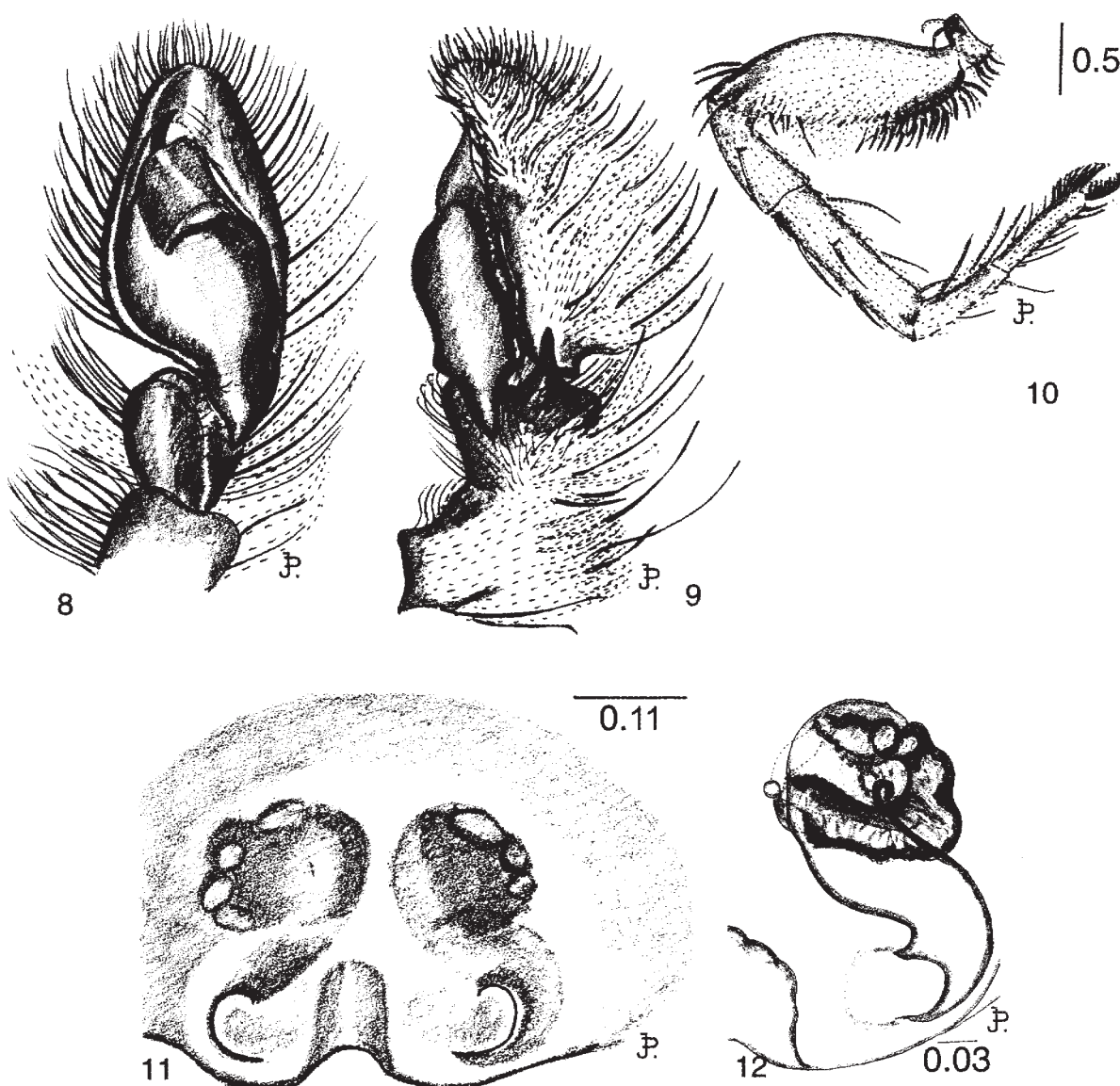
Abdomen: integument dark brown with a white mosaic of adpressed setae of varying density; sides whitish; dorsal spinnerets black, cylindrical and slightly spaced. Ventral aspect: coxae dark brown with very dark brown setae, lighter with whitish setae on prolatero-ventral part of coxa I; sternum dark brown with sparse whitish setae in anterior half, with dark setae in posterior half; coxae in the long-preserved Sinai specimen apparently faded, light.

Frontal aspect: face generally dark, with two "shelf"-lines of striking, whitish setae stretching across clypeus horizontally forwards, separated by a dark, bald belt: first line directly under AME, continuing across face and leaving a space below ALE; second along edge of clypeus, proceeding slightly diagonally downwards. A triangle of dark, much harder, vertical setae originating on clypeus above lower horizontal line and pushing through it, partly overhanging the bases of chelicerae. Eyes I surrounded dorsally and laterally with orange or fawn setae, broader and longer, making a dense "bonnet"; ventral setae white; a few black setae in upper outer



Figs 1–7. *Rafalus christophori* sp.n., ♀, Wadi Mish'mar specimen: general appearance of cephalothorax (1) and abdominal pattern (2), as well as epigyne (3) and its internal structure (4); male specimen (from Elat, 15.IV.87): palpal organ ventrally (5), its tibial apophysis ventrally (6), and palpal femur protuberance (7).

Рис. 1–7. *Rafalus christophori* sp.n., ♀, экземпляр из Wadi Mish'mar: общий вид головогруды (1) и рисунок брюшка (2), эпигина (3) и ее внутренняя структура (4); самец из Elat, 15.IV.87: пальпус вентрально (5), вырост голени пальпы вентрально (6) и выступ бедра пальпы (7).



Figs 8–12. *Rafalus christophori* sp.n. ♂ holotype: palpal organ ventrally (8), laterally (9), leg I retrolaterally (9) (note a bunch of black stiff setae ventrobasally); ♀ from St. Catherine Monastery: epigyne (11) and single spermatheca (12).

Рис. 8–12. *Rafalus christophori* sp.n. голотип ♂: пальпс вентрально (8), латерально (9), нога I ретролатерально (9) (заметьте пучок черных жестких щетинок вентро-базально); ♀ из монастыря Св. Екатерины: эпигина (11) и одиночная сперматека (12).

quarter of rim of ALE. Bristles on eye field less numerous and less dense than in ♀, but more distinct than in *R. stanislawi*. ALE set 1/6th of their diameter above upper rim of AME, diameter of ALE 7/10th of AME, height of clypeus 2/5th of AME diameter.

Pedipalps: covered with long radiating setae, concentrated into three "fans": (a) of white at apical edge of femur, (b) of orange with a few harder, dark brown, and white at retrolateral edge, on patella, (c) intensely orange admixed with a few stouter, long, black bristles, on tibia and cymbium. Chelicerae brown, with thin, soft, sparse, whitish setae anteriorly. This colorful picture is complemented on legs I–II by a sparse fringe of white setae retrolaterally on tarsus, metatarsus, tibia and patella of leg I; there is white fur at the

ventrolateral edge of femora I–II, contrasting with an intensely black "pillow" of short, dark, upright, thick bristles in basal part of ventral surface of femora I–II (these are, however, absent from specimens from Elat). Probably this colorful, contrasting pattern is visible during the display of a spider, and so is an important recognition character.

Legs: prolateral surface of femora I–II light yellow apically; the remaining, black with short white setae more basally; remaining parts of prolateral surface brown; ventral setae on femora I–II as described above. Femora III–IV dark brown, prolaterally with two lighter spots along median line, covered with short, adpressed, whitish setae, without fur of long setae; femur IV lighter brown. Patella and tibia I pale yellow, dorsally with longer setae, mixed colorless, whitish and dark.

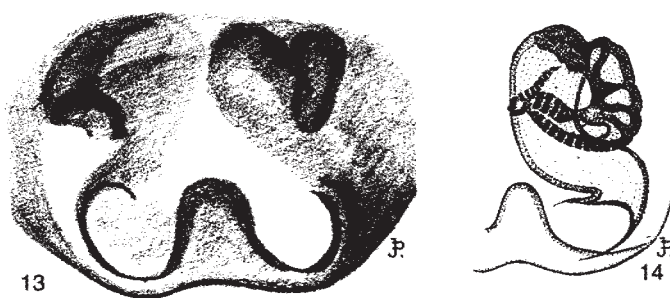
Patella and tibia II darker yellow, with dark pigment-ed spots; two parallel dark lines on tibia dorsally; patella with an elongated, apical, dark triangle and a basal spot consisting of dark grey pigmentation and dark, elongated scales and setae; remnants of a white mane retrolaterally on patella. Patellae and tibiae III–IV still darker, with dark greyish-brown stripes, separated by a dark yellow space, scales dark and whitish, setae single, light and dark, without dense mane. Tarsi III–IV with a peculiar group of dark, hard, spine-like setae ventro-apically just above tarsal tuft of hard setae near claws; these also occur in various *Aelurillus*. Tarsi I–II with apical tarsal tufts but without hard ventral setae.

Palpal organ: bulbus flat, narrow, pointed posteriorly; tibial apophysis elongate and narrow, straight or slightly curved; anterior edge of tibia running straight dorsally, without any other protuberances; an indistinct, low, ventral protuberance on pedipalpal femur (Figs 5–9).

Female: Cephalothorax brown with white and short adpressed setae: a mid thoracic, longitudinal, thin line of white setae extended by an "arrow head" onto eye field, white setae surrounding eyes III; white, longer spots entering the eye field and white, orbital setae above eyes I. Eye field with dark, partly iridescent integument covered with white and admixed, indistinctly orange, long and adpressed scales; numerous short, upright, blackish bristles scattered. Sides with two white lines of setae, horizontal but irregular; a brown supra-marginal line and a white ventral fringe. Great variation can be due to setae lost from live specimens, some samples being almost bald, with remnants of white setae on lower lateral sides and a few at thoracic hind margin. Scales lost from posterior eye field and thorax, while preserved in anterior, sloping part, differing from *Aelurillus conveniens* (O.P.-Cambridge, 1872), where scales are lost from anterior eye field leaving it bald. Abdomen brown, with an indistinct, light, median streak, posteriorly consisting of fused chevrons; covered with adpressed, elongate scales, dominating orange, with a small addition of white and dark scales, darker ones arranged in an indistinct pattern of irregular submarginal spots separated by a lighter, orange, median area, with pairs of indistinct, small, white spots; marginal edges of a brown dorsal surface indented by white expansions extending from white sides.

Frontal aspect: eye field dark, with a row of white setae further on and with dense, upright, short, dark bristles interspersed with adpressed whitish and orange scales, a row of longer, fawn setae above dorsal rim of ALE. Eyes I surrounded with white setae, AME with a row of broadened setae, three setae in a row, setae at lower rim of AME extended laterally by a streak of whitish setae, half upright, directed horizontally and diagonally forward. Clypeus yellow to brown, with a narrow, bald line between two rows of dense, white setae, lower row of setae overhanging the cheliceral bases. A brown, bald, side line under ALE. AME's diameter 150% of ALE's. Chelicerae brown, bulging, surface covered sparsely with white, thin hairs; pedipalps brown, with patella-tibia yellow. Leg I, tibia-patella yellow dorsally, with incomplete, darker annuli. Femur I ventrally: white bristles, thick and upright in basal part of ventral surface.

Pedipalps yellowish-white with sparse whitish setae, dark and stronger setae admixed on tarsus. Legs yellow with indistinct darker annulations; tibia I with three pairs of ventral spines; femora III and IV with a particularly long, dorsal,



Figs 13–14. *Rafalus feliksi* sp.n. (Sinai: WE Tamaovi): epigyne (13) and its internal structure (14).

Рис. 13–14. *Rafalus feliksi* sp.n. (Синай: WE Тамави): эпигина (13) и ее внутренняя структура (14).

basal spine. Ventral aspect: sternum dark; coxae light; abdomen light ventrally. Epigyne and its internal structure as in Figs 11 & 12.

General measurements (mm) (for detailed measurements see biometric studies above). Male: Length of cephalothorax 2.44–2.96; length of abdomen 2.18–2.57; length of 5 segments of leg I 4.63–5.40. Female: length of cephalothorax 3.03–4.65; length of abdomen 3.15; length of 5 segments of leg I 4.65–4.85.

DISTRIBUTION: Egypt, Sinai: St. Catherine Monastery. Israel: Makhtesh Ramon [= Ramon Crater, near Shen Ramon], Elat, En Gedi, En Gedi sulfur springs, Nahal Mish'mar 186/087 [= Wadi Machnali].

NAME: Honors Krzysztof [= Christopher] Prószyński: born in Auschwitz Konzentrationslager (= Auschwitz Concentration Camp) in January 1945; died of hunger six days later, after the death of his mother, Pia Prószyńska, exhausted by childbirth. Pia had been brought by Nazi Germans to the Auschwitz Camp during the pacification of the Warsaw Uprising (August–September 1944), together with the majority of civilian population of Warsaw's Ochota Quarter; Krzysztof was the first cousin of the author.

Rafalus feliksi sp.n.

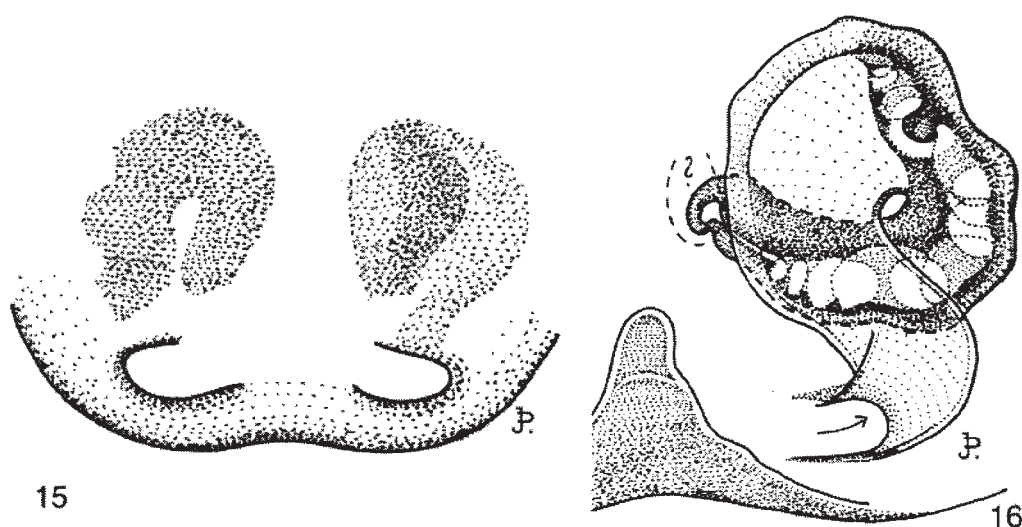
Figs 13 & 14.

Holotype ♀, Egypt, Sinai: Wadi e-Tamaovi (NW Isla'), 24.X.1969; leg. G. Tsabar. Coll. HUJ.

DIAGNOSIS: Clypeus fawn, almost bald, with a few colorless setae stretching forward; eye field black, densely covered with white setae; thorax darker brown, covered densely with uniform, thin, white, adpressed setae; abdomen "sand color" with traces of a median streak; specimen 25% larger than others.

DESCRIPTION. Female: Cephalothorax brown, eye field covered with a mixture of brown and whitish setae; eyes III surrounded with white; setae above eyes I white; with dark, stiff bristles lying horizontally along anterior edge of eye field; some white setae entering medially between AME; thorax and sides brown with white setae concentrated into horizontal streaks. Profile differing from that of other congeners by having the rim of ALE set slightly higher, 3/8 of diameter above AME; gently rounded, low and flat, anterior 72% of thorax sloping very gently.

Abdomen altered during preservation, with visible remnants of brown setae.



Figs 15–16. *Rafalus insignipalpe* (Simon, 1882), cotype from Aden: epigyne (15) and its internal structure (16) (after Prószyński [1987: 37]).

Рис. 15–16. *Rafalus insignipalpe* (Simon, 1882), котип из Адена: эпигина (15) и ее внутренняя структура (16) (по: Prószyński [1987: 37]).

Frontal aspect: eye field covered uniformly with mixed scales, areas behind AME not different from rest; eyes I surrounded with white; clypeus lighter brown, narrower, with fewer setae, but with colorless, long setae stretching forward horizontally. Chelicerae brown; pedipalps yellow with long, whitish setae. Legs yellow with indistinct, darker annulations, femur I whitish ventrally, yellow prolaterally, with hints of two darker brown spots; tibia I with three pairs of ventral spines; femora III and IV with a particularly long, dorsal spine basally. Ventral aspect: sternum dark; coxae light; abdomen light.

Epigyne and its internal structure as in Figs 13 & 14.

General measurements (mm) (for detailed measurements see biometric studies above). Female: Length of cephalothorax 4.11; length of abdomen 3.86; length of 5 segments of leg I 7.57.

DISTRIBUTION: Egypt: Sinai, Wadi e-'Tamaovi (NW Isla').

NAME: In honor of the late Feliks Prószyński, a judge, Reserve Officer of the Polish Army during World War 2, interned by the Soviets in September 1939, executed in April 1940 at the Katyn Forest with 4,500 co-victims; uncle of the author.

Rafalus insignipalpe (Simon, 1882), **comb.n.**

Figs 15 & 16.

Habrocestum insignipalpe Simon, 1882: 214 (♂♀);

"*Habrocestum*" *insignipalpe*: Prószyński, 1987: 37 (♀ only).

Habrocestum insignipalpe: Wesolowska & van Harten, 1994: 28 (N).

Cotype ♀ of "*Habrocestum insignipalpe* Sim., Aden, 1880"; 1 ♂ of "*Habrocestum insignipalpe* ES. Porto Bardia, III. 1927" [= a mismatched ♂ *Aelurillus* sp., small, black, with a white, hairy cymbium]; both in Museo Civico di Storia Naturale in Genova, Genoa, Italy.

REMARKS: Based on the internal structure of the epigyne, this species is congeneric with *R. christophori*, yet its position within the genus remains obscure. The male specimen, which should be in the Muséum National d'Histoire Naturelle in Paris, could not be located in the collection.

Described from Yemen and Aden, the occurrence in Libya is doubtful.

DESCRIPTION. Female (cotype from Aden): A thick-set looking spider with short legs, generally brownish-grey. Cephalothorax brownish, covered with adpressed, whitish setae; sparse, upright, short bristles on eye field just behind eyes I; margins of eye field darkened.

Abdomen brownish-grey with a paler median area along posterior half, covered with colorless scales with a brown median ridge and longer setae; a "hairy" appearance due to upright, large, whitish setae along margins, also with some larger, brown and white bristles at anterior end. Sides of abdomen yellowish-white; spinnerets cylindrical, yellowish-grey.

Frontal aspect: eyes I surrounded densely with white, thick setae; clypeus low, yellowish fawn with white setae; chelicerae fawn, pedipalps yellow with white setae.

Legs I yellow with indistinct darker annulations dorsally, these distinct only on prolateral surfaces: two darker bands on tibia I, one on patella I, two on femur I. Tibia I with three pairs of ventral spines, tarsi I–II with scopulae expanding indistinctly onto ventral surface. Sternum brownish-yellow, coxae yellow, abdomen light grey ventrally.

General measurements (mm) (for detailed measurements see biometric studies above). Female: Length of cephalothorax 3.00; length of abdomen 2.80.

DISTRIBUTION: Yemen: Aden.

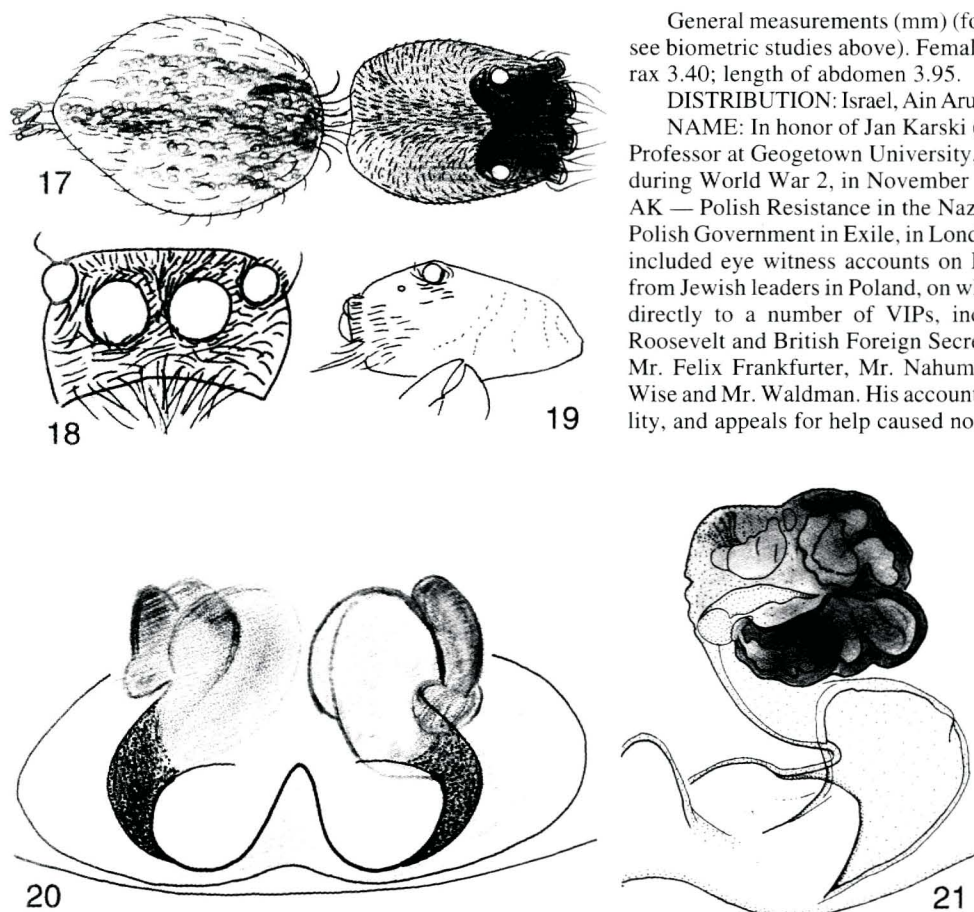
Rafalus karskii **sp.n.**

Figs 17–21.

Holotype ♀ and a paratype ♀, Israel, "Ain Aruz [= En Tamar (183/044)], 13.VIII.1939; leg. A. Shulov", "14953". Coll. HUJ.

DIAGNOSIS: Differing from all congeners by cephalothorax covered with dense, white setae, long and adpressed; abdomen with indistinct yellow spots surrounded with grey.

DESCRIPTION. Female: Cephalothorax with integument of eye field blackish-brown, thorax dorsally and sides brown with brown lines and dots, all covered uniformly with white setae, slightly flattened and adpressed, distinctly longer



Figs 17–21. *Rafalus karskii* sp.n., ♀ holotype: general appearance (17), cephalothorax laterally (18), frontal eyes (19), epigyne (20) and its internal structure (21) (drawn by S. Hęciak).

Рис. 17–21. *Rafalus karskii* sp.n., голотип ♀: общий вид (17), головогрудь сбоку (18), передние глаза (19), эпигина (20) и ее внутренняя структура (21) (рис. S. Hęciak).

than in other species. Sparse brown bristles scattered over eye field. Fovea at level of eyes III, eyes II distinctly closer to eyes III than to eyes I.

Abdomen: integument darker brownish-grey anteriorly, densely covered with white, adpressed setae making a greyish fawn general appearance, with a slightly darker, broad, median streak, laterally lighter grey, sides light fawn; with scattered, longer, upright setae, anteriorly white, brown over remaining surface. Spinnerets whitish-yellow.

Frontal aspect: conspicuously dense, adpressed, white setae: clypeus brown with white setae arranged horizontally and a dense, white beard; eyes I surrounded by white scales. Chelicerae brown, lighter brown basally, covered with dense setae: whitish basally, colorless apically. Ventral aspect: sternum yellow suffused grey with upright, longer, white setae; margin darker; labium longer than in *Phlegra*, brown with white margins; coxae yellow, chelicerae brown; with a single retrolateral tooth; abdomen fawn ventrally.

Epigyne as in Figs 20 & 21.

Legs I yellowish-brown, II–IV yellowish with slightly darker tarsi, metatarsi and tibiae; all legs densely covered with adpressed, white setae and sparse, stronger setae and spines. A brush of setae on tarsi I–II, longer and thicker setae on tarsi III–IV.

General measurements (mm) (for detailed measurements see biometric studies above). Female: Length of cephalothorax 3.40; length of abdomen 3.95.

DISTRIBUTION: Israel, Ain Aruz [= En Tamar (183/044)].

NAME: In honor of Jan Karski (Jan Koziński), lately Professor at Georgetown University, Washington, DC, USA, during World War 2, in November 1942, emissary from the AK — Polish Resistance in the Nazi-occupied Poland to the Polish Government in Exile, in London. His communications included eye witness accounts on Holocaust and messages from Jewish leaders in Poland, on which he was able to speak directly to a number of VIPs, including President F. D. Roosevelt and British Foreign Secretary A. Eden, as well as Mr. Felix Frankfurter, Mr. Nahum Goldman, Mr. Stephen Wise and Mr. Waldman. His accounts were met with incredulity, and appeals for help caused no action.

Rafalus stanislawi sp.n.

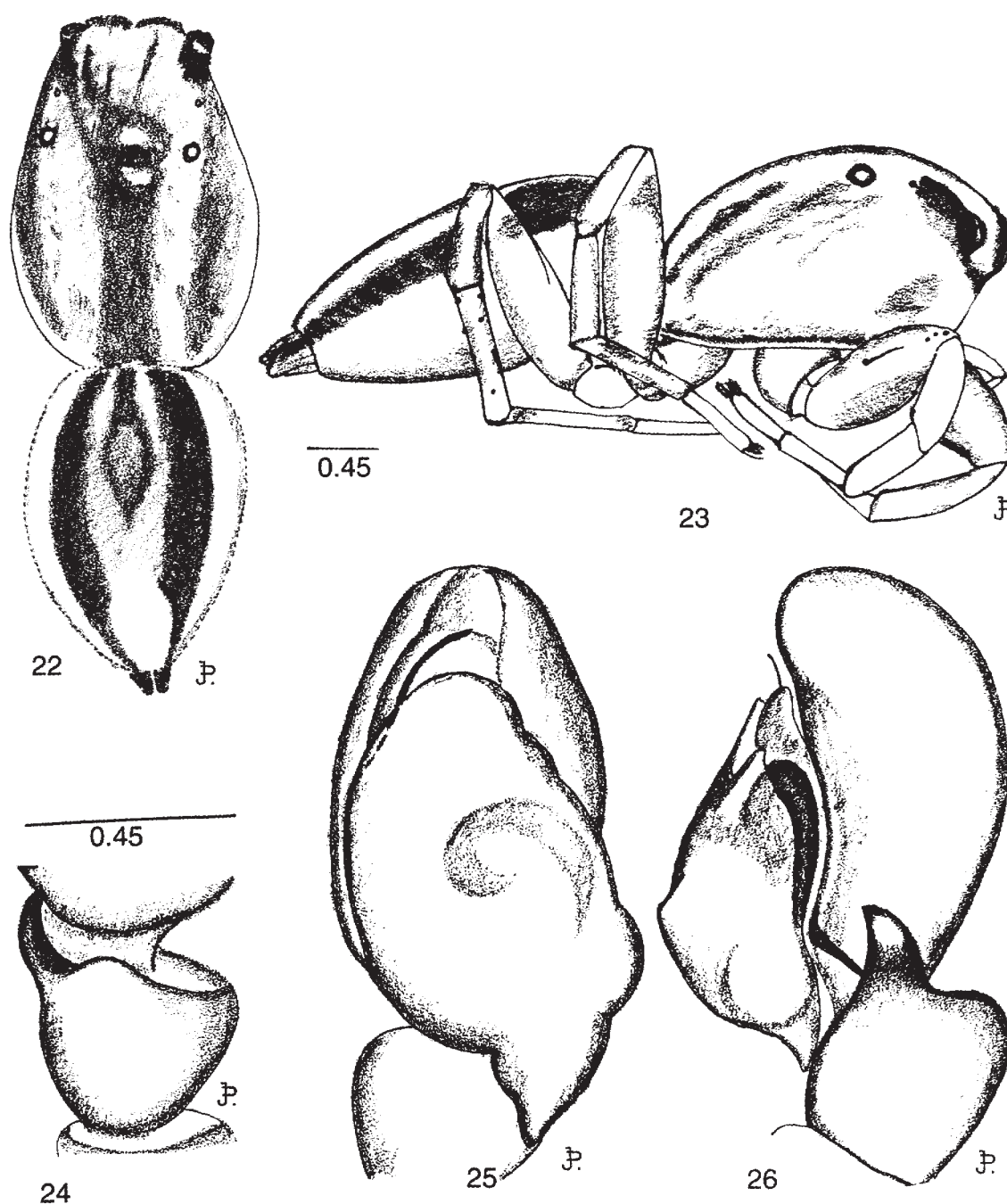
Figs 22–26.

Holotype ♂, Israel: Negev, Be'er Masshabim (sand-pitfall trap), 15.V.1991. Paratypes: same collecting place: 1♂, 27.V.1992, 3♂♂, 12.VI.1991; 1♂, 20.VI.1991. Paratype ♂, Negev, Haluqim Ridge, 20.VI.1991; all leg. Y. Lubin. Coll. SB.

DIAGNOSIS. A distinct, broad, white belt of setae across entire lower face, not split into two, followed ventrally by a belt of similar white setae overhanging the cheliceral bases. Fans of long setae on pedipalps white.

DESCRIPTION. Male: Cephalothorax with integument dark brown, covered densely with adpressed, small setae, apparently easy to lose in live specimens; on eye field minute greyish, on thorax longer white, making two broad streaks along dorsal edges of thorax, and also along ventral margins, separated by dark brown streaks, covered with sparse, indistinct, dark setae; an orange-brownish mat of scales along upper sides of cephalothorax under lateral eyes.

Abdominal pattern as a light median streak about 1/3rd of width of abdomen: posterior half white more distinctly, median part fawn, in anterior part a streak of white setae followed laterally by a brown streak and a white marginal line.



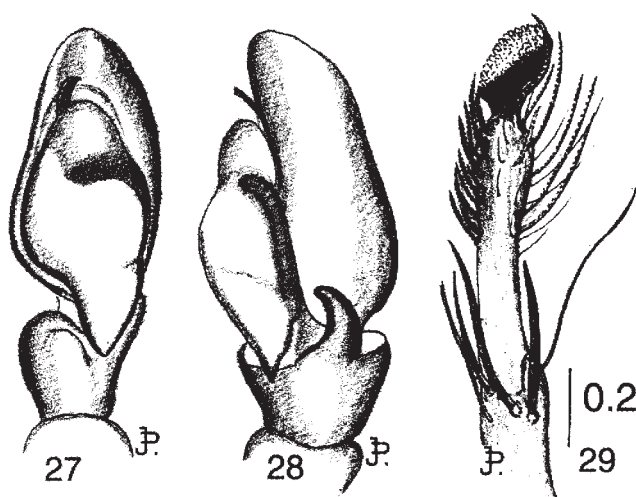
Figs 22–26. *Rafalus stanislawi* sp.n.: general appearance dorsally (22) and laterally (23), palpal tibia dorsally (24), palpal organ ventrally (25) and laterally (26).

Рис. 22–26. *Rafalus stanislawi* sp.n.: общий вид дорсально (22) и латерально (23), голень пальпуса дорсально (24), пальпус вентрально (25) и латерально (26).

Face: entire lower part, from ventral rim of AME to edge of clypeus, covered with dense, adpressed, horizontal, strikingly white setae followed ventrally by a broad (1/3rd of AME's diameter) white belt of white setae directed ventrally and overhanging the cheliceral bases. Upper rims of AME and ALE consisting of greyish-white setae extending also onto eye field where these somewhat smaller; lateral rims of AME

and ventral rims of ALE with brownish setae corresponding in color to an indistinct, darker, transverse belt across face. A "bonnet" of dorsal setae above AME less distinct and shorter than in *R. christophori*.

Pedipalps whitish-yellow with longer, whitish, upright setae: a fan of long white setae dorsally and on both lateral sides of palpal femur, white setae dorsally on patella and tibia,



Figs 27–29. *Rafalus* aff. *stanislawi* sp.n. (specimen from Ein Fesha, 31.III.1935), palpal organ ventrally (27), laterally (note a bent apophysis) (28), tarsus IV (29).

Рис. 27–29. *Rafalus* aff. *stanislawi* sp.n. (экземпляр из Ein Fesha, 31.III.1935), пальпус вентрально (27), латерально (с изогнутым выростом) (28), лапка IV (29).

cymbium with sparse, dark bristles dorsally. Palpal organ: bulbus whitish, single tibial apophysis articulating with a small, bent, plate-like outgrowth of lateral wall of cymbium. Leg I light yellow.

A male from Ein Fesha (31.III.1935) possibly belongs to this species, as it also has a curved tibial apophysis. Unfortunately, this specimen has lost almost all of its setae during the 60 years of preservation, and the colors are faded.

Female yet unknown but, as the collecting localities in the Negev Desert (Be'er Mash'abbim and Haluqim Ridge) are easily accessible and frequented by visitors, there are good chances to find female specimens of this species.

General measurements (mm) (for detailed measurements see biometric studies above). Male: Length of cephalothorax 1.70–1.96; length of abdomen 1.70–1.87; length of 5 segments of leg I 3.02–3.22.

NAME: In the memory of the late Stanislaw Prószyński, in 1939 a student of the Warsaw University of Technology, soldier in defense of besieged Warsaw during September 1939, member of the Polish Resistance, arrested by Nazi Germans, admitted to the Auschwitz Concentration Camp on August 27th, 1941, inmate Number 18573 SchP ["Sicherheit Pole" = Security, Pole], death registered on November 11th of the same year; uncle of the Author.

Uncertain *Rafalus* species 1–3

The following specimens listed below have, during the 30–60 years of preservation, their colors faded and part of the setae lost. Since they were collected as single individuals, the importance of the differences in their genital organs cannot be evaluated; there is no reason to consider them conspecific either. Legs are similar in all of these females, yellow with indistinct darker annulations; tibia I with three pairs of ventral spines; femora III and IV with a particularly long, dorsal spine basally. Ventral aspect: sternum dark; coxae light; abdomen light, similar in all females described. A decision concerning the specific status of these is left until more material becomes available for study.

Rafalus sp. 1

Figs 30 & 31.

MATERIAL: ♀, Egypt, Sinai: Wadi Yah'med, 27.I.1969; leg. S. Riechenstein. Coll. HUJ.

DIAGNOSIS: Eyes I surrounded with white ventrally, setae above ALE white dorsally to AME fawn, darker; clypeus brown with longer, horizontally stretched, white setae; concentrated whitish setae in the center of eye field, similar ones making three horizontal streaks on thoracic sides; abdomen dark brown with a dark median streak delimited by pairs of white spots.

DESCRIPTION. Female: Cephalothorax: blackish with whitish setae concentrated in the middle of eye field, around eyes III and above ALE, there are, however, dark setae above AME; thorax and sides covered with thinner, whitish setae concentrated on sides into three horizontal streaks.

Abdomen dark brown, with a dark median streak delimited by pairs of white spots of adpressed setae, there are no sharp borders, some more white spots marginally; sides light grey.

Frontal aspect: eye field dark, with an admixture of white setae, areas behind AME darker and further on with a row of white setae; eyes I surrounded

ventrally by white and dorsally by light fawn orbital setae; clypeus brown, with longer, white setae stretched horizontally, "subocular" setae thinner and less numerous than in *R. christophori*, whitish setae overhanging the chelicerae. Chelicerae light brown, bulging, with indistinct colorless setae on surface. Pedipalps, yellow with patella, lighter. Legs yellow, indistinctly annulated; femora I whitish ventrally, with two brownish spots, light brown prolaterally; patella-tarsus I light fawn, with indistinct darker spots prolaterally (pigmented and with scales). Ventral aspect: sternum dark, coxae light, abdomen light ventrally. Epigyne and its internal structure as in Figs 30 & 31.

General measurements (mm) (for detailed measurements see biometric studies above). Female: Length of cephalothorax 2.80; length of abdomen 3.00; length of 5 segments of leg I 4.90.

DISTRIBUTION: Egypt: Sinai, Wadi Yah'med.

Rafalus sp. 2

Figs 32 & 33.

Material: ♀, Israel, Nahal Roded near Elat, 6.I.1966; leg. Shulov. Coll. HUJ.

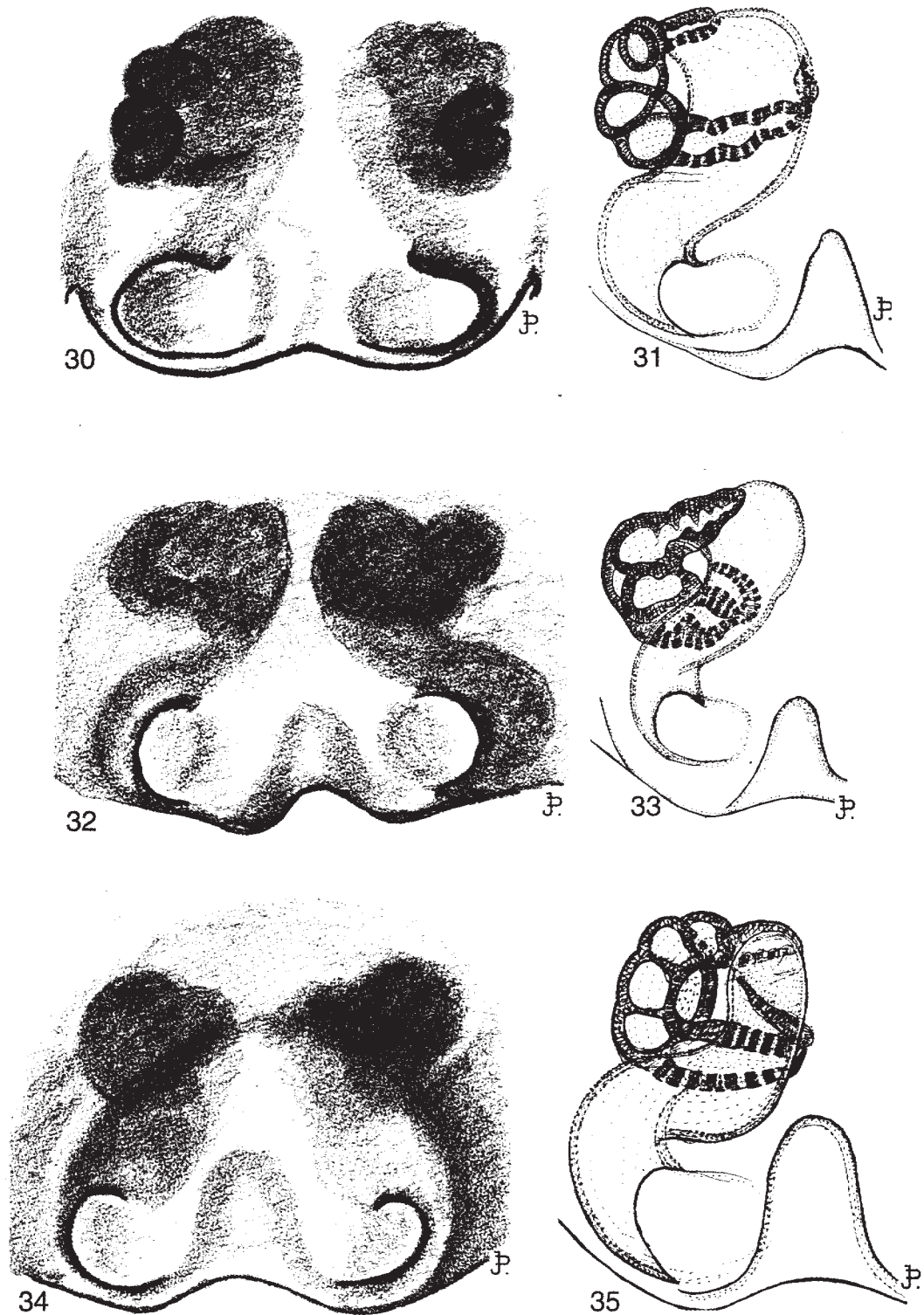
DIAGNOSIS: Posterior slope of thorax beginning immediately behind eyes III.

DESCRIPTION. Female: Cephalothorax with integument darker brown than in related species, covered densely and uniformly with thin, adpressed, white setae; there is no rounded surface behind eyes III, posterior slope of thorax beginning immediately behind eye field, more steep.

Abdomen light brown with "sand color" tinge, median streak barely visible and not contrasting.

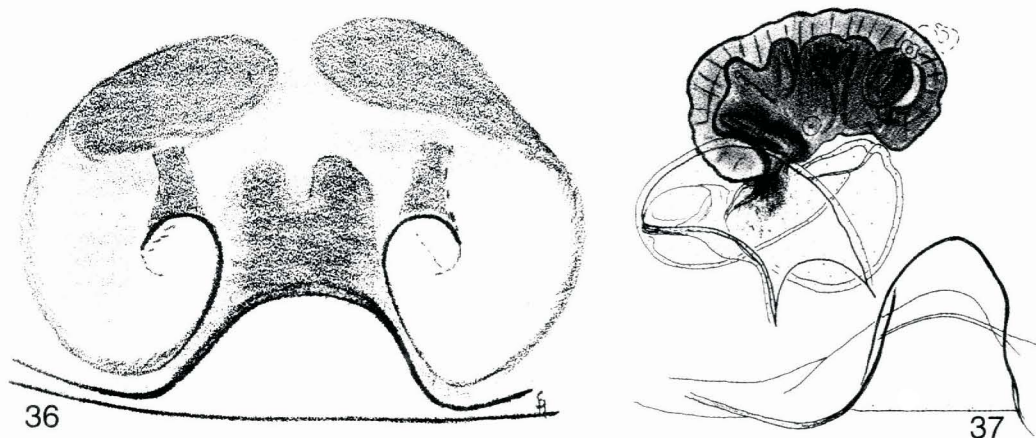
Frontal aspect: eye field dark; eyes I surrounded with white; clypeus fawn, almost bald, with a few setae stretching forwards horizontally. Chelicerae bulging, chestnut brown, darker than clypeus. Pedipalps yellow: tibia and patella I yellow, with traces of brown annuli.

Legs yellow, with indistinct darker annulations; tibia I with three pairs of ventral spines; femora III and IV with a



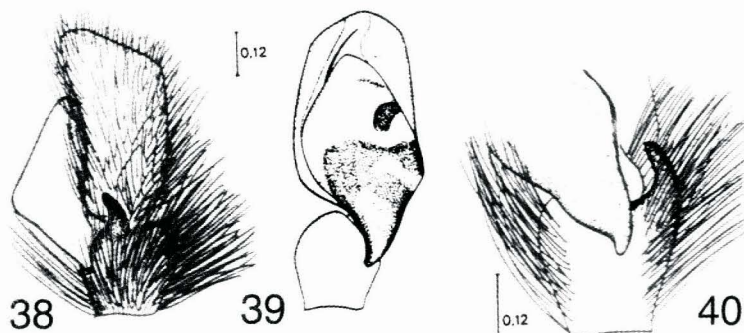
Figs. 30–35. Variation in epigyne and its internal structure in females of three *Rafalus* spp. of uncertain status. *Rafalus* sp. 1 (from Sinai: Wadi Yah'med): epigyne (30) and its internal structure (31); *Rafalus* sp. 2 (from Nahal Roded near Elat): epigyne (32) and its internal structure (33); *Rafalus* sp. 3 (from Elat, 3.V.1951): epigyne (34) and its internal structure (35).

Рис. 30–35. Изменчивость эпигины и ее внутренней структуры трех *Rafalus* sp. неопределенного статуса. *Rafalus* sp. 1 (с Синай: Wadi Yah'med): эпигина (30) и ее внутренняя структура (31); *Rafalus* sp. 2 (из Nahal Roded около Elat): эпигина (32) и ее внутренняя структура (33); *Rafalus* sp. 3 (из Elat, 3.V.1951): эпигина (34) и ее внутренняя структура (35).



Figs 36–37. Relevant Central Asiatic species: *Rafalus variegatus* (Kroneberg, 1875), holotype ♀ from Uzbekistan: epigyne (36) and its internal structure (37) (drawn by S. Hęciak).

Рис. 36–37. Среднеазиатские виды: *Rafalus variegatus* (Kroneberg, 1875), голотип ♀ из Узбекистана: эпигина (36) и ее внутренняя структура (37) (рис. S. Hęciak).



Figs 38–40. Relevant Asiatic species: *Rafalus wittmeri* (Prószyński, 1978): palpal organ laterally (38), ventrally (39) and tibial apophysis ventrolaterally (40) (after Prószyński [1978a: 9, figs 1–3], modified).

Рис. 38–40. Азиатские виды: *Rafalus wittmeri* (Prószyński, 1978): палепус латерально (38), вентрально (39), вырост голени вентро-латерально (40) (по: Prószyński [1978a: 9, figs 1–3], изменено).

particularly long, dorsal spine basally. Ventral aspect: sternum dark; coxae light; abdomen light ventrally.

Epigyne and its internal structure as in Figs 32 & 33.

General measurements (mm) (for detailed measurements see biometric studies above). Female: Length of cephalothorax 3.27; length of abdomen 3.49; length of 5 segments of leg I 5.58.

DISTRIBUTION: Israel, Nahal Roded near Elat.

Rafalus sp. 3

Figs 34 & 35.

MATERIAL: ♀, Israel, Elat, 3.V.1951. Coll. HUIJ.

DIAGNOSIS: Distinguished by its particular epigyne.

DESCRIPTION. Female: Cephalothorax light brown with a mixture of whitish and dark setae; eye field darker; eyes III surrounded with white setae; orbital setae over eyes I white; thorax covered with thin, adpressed, whitish setae on brown integument, white setae denser on lower sides.

Abdomen light brown, covered with a mixture of brown and whitish setae; median serrated streak whitish, consisting

of fused chevrons, covering about 1/3rd of width of abdomen.

Frontal aspect: eye field covered uniformly with mixed scales, white much denser, areas behind AME slightly less white; face like in *R. christophori* but with white setae under eyes I and along clypeus, dense and longer, some overhanging the chelicerae; chelicerae yellow with denser, white setae; pedipalps yellow with white setae. Femora I whitish ventrally, with hints of two greyish spots; patella and tibia I yellow with indistinct, darker annuli.

Epigyne and its internal structure as in Figs 34 & 35.

General measurements (mm) (for detailed measurements see biometric studies above). Female: Length of cephalothorax 3.12; length of abdomen 2.79; length of 5 segments of leg I 5.58.

DISTRIBUTION: Israel: Elat.

Reclassified African and Asiatic species

Rafalus lymphus Próchniewicz & Hęciak, 1994, **comb.n.**

Aelurillus lymphus Próchniewicz & Hęciak, 1994: 34–35, figs 1a–f.

REMARKS: According to the original drawings [Próchniewicz & Hęciak, 1994], this species, described from Kenya, ought to be reclassified into *Rafalus*. This has already been suggested to me by these authors. So here I simply formalize the issue.

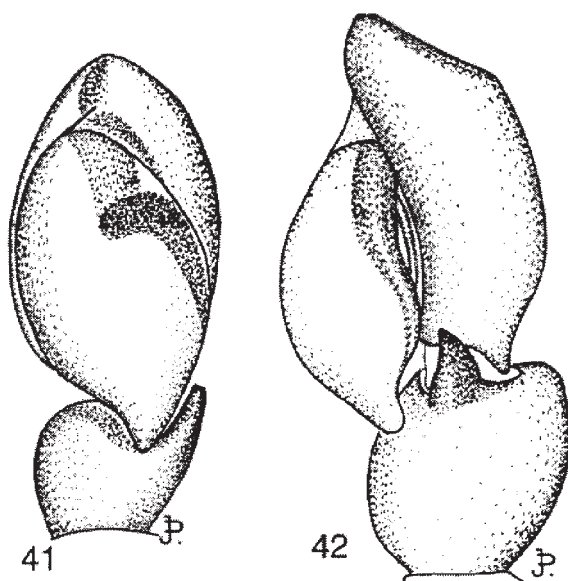
Rafalus variegatus (Kroneberg, 1875)

Figs 36 & 37.

Aeluropus variegatus Kroneberg, 1875: 51, T. 5, F. 39 (D ♂♀).

Aelurillus variegatus: Prószyński, 1976: map 8;

Rafalus variegatus: Logunov & Rakov, 1998: 134–136, figs 55–64, map 1.



Figs 41–42. *Rafalus nigritibis* (Caporiacco, 1941), holotype ♂: palpal organ of the type specimen from Foci del Sagan, Missione Biologica Sagan-Omo.

Рис. 41–42. *Rafalus nigritibis* (Caporiacco, 1941), holotype ♂: пальпа типового экземпляра из Foci del Sagan, Missione Biologica Sagan-Omo.

REMARKS: Logunov & Rakov [1998] have recently provided a wealth of distributional data concerning this species in Kazakhstan, Kyrgyzstan, Tadjikistan, Turkmenistan, and Uzbekistan, all mapped. The transfer is reconfirmed here.

Rafalus wittmeri (Prószyński, 1978), **comb.n.**
Figs 38–40.

Aelurillus wittmeri Prószyński, 1978: 9–10, figs 1–3.

REMARKS: The species has been described from Bhutan and is reclassified now because of the characters clearly visible in the original drawing of the palpal organ [Prószyński, 1978]. A redescription of the type and a study of more specimens are certainly necessary.

Rafalus nigritibis (Caporiacco, 1941), **comb.n.**
Figs 41–42.

Saitis nigritibis Caporiacco, 1941: 145, fig. 63 (D ♂).

Aelurillus nigritibis: Prószyński, 1987: 1 (♂ only, transfer from *Saitis*).

MATERIAL: Holotype ♂ of “*Saitis nigritibis* Di Cap. Foci del Sagan. Missione Biologica Sagan-Omo, leg. Zavattari, 19.VI.1939”, in the Museo Civico di Storia Naturale di Firenze, Florence, Italy.

DIAGNOSIS: Palpal organ resembling that of *Rafalus*, with a single tibial apophysis; femur III distinctly longer than femur IV.

DESCRIPTION. Male: A small spider with cephalothorax and abdomen brown, with a contrasting pattern of white

and blackish-brown setae. Posterior part of median streak of abdomen covered with remnants of white setae, its anterior part currently bald. Space between median abdominal streak and sides covered with blackish-brown, adpressed, long setae. White setae covering the pedipalps, legs, lower clypeus, sides of cephalothorax, and abdomen. Blackish brown setae surrounding eyes I, being unusually long above eyes, also covering the eye field and ventral surfaces of tibia and metatarsus I.

Palpal organ resembles in general appearance *Aelurillinae*, but has proportionately larger ventral surface of bulbus, tibial apophysis single, triangular.

Only a single pedipalp preserved, chelicerae damaged.

Body proportions (in percentage of length of cephalothorax, measurements in mm lost) as follows: LE 39%, HC 50%, WE I 57%, WE III 59%, DWE 1–3 = –2%, WC III 68%, LA 78%.

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