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A Review of the Ground Spider Genus *Synaphosus* (Araneae, Gnaphosidae)

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ABSTRACT

The 17 known species of the ground spider genus *Synaphosus* are reviewed and assigned to three species groups. The genus is native to the Old World, occurring from France south to the Ivory Coast and Kenya, and east to Kazakhstan and Pakistan, but its type species, *S. syntheticus* (Chamberlin), has apparently been introduced into the United States and Mexico. *Drassodes nanus* (O. P.-Cambridge), *Zelotes gracillimus* (O. P.-Cambridge), *Zelotes intricatus* Denis, and *Zelotes minimus* Caporiacco are transferred to *Synaphosus*. Twelve new species are described: *palearcticus*

(Armenia, Azerbaijan, Kazakhstan, Kirghizstan, Turkey, Turkmenistan, Uzbekistan), *sauvage* (France, Italy, Switzerland), *taukum* (Kazakhstan), *evertsi* (Ivory Coast), *karakumensis* (Turkmenistan), *soyunovi* (Turkmenistan), *yatenga* (Burkina Faso), *turanicus* (Kazakhstan, Kirghizstan, Tadjikistan, Turkmenistan, Uzbekistan), *neali* (Iran, Pakistan), *shirin* (Iran), *khashm* (Saudi Arabia), and *kakamega* (Kenya). The males of *S. minimus* and *S. intricatus* are described for the first time.

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INTRODUCTION

The spider genus *Synaphosus* was established by Platnick and Shadab (1980). Its type species, *S. syntheticus* (Chamberlin), then known from southern California and Baja California Norte east to southern Georgia, had earlier been misplaced in the genera *Nodocion* and *Zelotes*. Platnick and Shadab (1980) also assigned a second species, *S. paludis* (Chamberlin and Gertsch), found in the southeastern United States, to the genus. Subsequent studies of gnaphosids from other parts of the world, noted in Platnick (1989), soon indicated that *S. syntheticus* is neither native to North America nor congeneric with *S. paludis*.

In this paper, we review the Old World species that do seem to be closely related to *S. syntheticus*. The results indicate that *Synaphosus* is a valid genus, perhaps most closely related to *Cryptodrassus* Miller (described from Czechoslovakia). The type species of *Synaphosus* appears to be native to Libya, Egypt, and the Middle East, and related species occur widely in the Old World.

The format of the descriptions and standard morphological terms and abbreviations follow those of Platnick and Shadab (1975, 1980) and Sierwald (1989). All measurements are in millimeters. Where sufficient material has been available, we present scanning electron micrographs, as well as drawings, of the male palpal bulb and female epigynum.

We are deeply indebted to the Lincoln Ellsworth Fund of the American Museum of Natural History and the United States-Israel Binational Science Foundation for the financial assistance that has enabled our collaborative efforts in St. Petersburg, Jerusalem, and New York. Material received from the pitfall trapping of Dr. Yael Lubin in Israel, as well as her support of our joint efforts, are gratefully acknowledged. Helpful comments on a draft of the manuscript were provided by Theo Blick (Hummeltal, Germany), Charles Dondale (Centre for Land and Biological Resources Research, Ottawa), Ambros Hänggi (Naturhistorisches Museum, Basel), and John Murphy (Hampton, England). We thank Mohammad U. Shadab, Peling Fong Melville, and Louis Sorkin of the American Museum

of Natural History for assistance with illustrations, scanning electron micrographs, and maps, and the many collectors and curators, listed below, who provided relevant specimens.

COLLECTIONS EXAMINED

AMNH	American Museum of Natural History, New York
BMNH	Natural History Museum, London, P. Hillyard
CRB	R. Bosmans, Gent, Belgium
CTB	T. Blick, Hummeltal, Germany
DBAC	Dipartimento di Biologia Animale, Università di Catania, P. Alicata, F. Di Franco
ELH	H. K. El-Hennawy, Cairo, Egypt
HDO	Hope Entomological Collections, Oxford University, I. Lansbury
HUJ	Hebrew University, Jerusalem
JAM	J. A. Murphy, Hampton, England
MZF	Museo Zoologico de "La Specola," Firenze, S. Mascherini, L. Bartolozzi
MHNG	Muséum d'Histoire Naturelle, Geneva, B. Hauser
MRAC	Musée Royal de l'Afrique Centrale, R. Jocqué
NMB	Naturhistorisches Museum, Basel, A. Hänggi, M. Brancucci
NMC	National Museum (Natural History), Prague, A. Kůrka
USNM	National Museum of Natural History, Smithsonian Institution, J. Coddington
UZM	Zoological Museum, Uppsala University, Sweden, L. Wallin
ZISP	Zoological Institute, Academy of Sciences, St. Petersburg, Russia

SYNAPHOSUS PLATNICK AND SHADAB

Synaphosus Platnick and Shadab, 1980: 21 (type species by original designation *Nodocion syntheticus* Chamberlin).

DIAGNOSIS: Specimens of *Synaphosus* can be distinguished from other gnaphosids by the combined presence of a preening brush (but not a preening comb; see Roth, 1985 for illustrations) on metatarsi III, elongated superior claws on the fourth tarsi (figs. 1, 2), a long, circular embolus, distally supported by a conductor base expanded into a horizontally enlarged, translucent flange (figs. 26, 63; flange least developed in *S. soyunovi* and *S.*

yatenga), a flat, sharply tipped retrolateral tibial apophysis (figs. 14, 55, except in *S. evertsi*, fig. 50), anterior atrial epigynal pockets (figs. 15, 56), and long, highly twisted spermathecal ducts (figs. 16, 57).

DESCRIPTION: Total length 1.8–4.7. Carapace oval in dorsal view, slightly invaginated posteriorly, narrowed at level of palpi, widest behind coxae II, usually pale brown (or dark brown, *gracillimus* group) with black setae; cephalic area flattened, thoracic groove short, longitudinal. From above, anterior eye row recurved, posterior row straight or slightly procurved; from front, both rows procurved. AME circular, dark; PME irregularly rectangular, light; other eyes oval, light; PME largest, AME smallest; AME separated by roughly their diameter, almost touching ALE; PME separated by their radius or more, by roughly their radius from PLE; lateral eyes of each side separated by roughly their radius; MOQ roughly square, slightly wider in back than in front. Clypeal height equal to or slightly greater than AME diameter. Chelicerae usually with two or three tiny promarginal teeth and one or no retromarginal denticles. Mouthparts and sternum dirty white to light brown; endites convergent, obliquely depressed, with weak distal scopula; labium slightly elongate; sternum broad anteriorly, with long setae at margins, rebordered, with tiny extensions to and between coxae. Leg formula 4123. Typical leg spination pattern (only surfaces bearing spines listed): femora: I, II d1-1-0, p0-0-1; III d1-1-1, p0-1-1, r0-1-1; IV d1-1-1, p0-1-1, r0-0-1; patella III r0-1-0; tibiae: II v1r-1r-2; III d1-0-0, p1-1-1, v2-2-2, r0-1-1; IV d1-0-0, p2-1-1, v2-2-2, r1-1-1; metatarsi: I v2-2-0; II v2-0-0; III p1-2-2, v2-2-1p, r1-1-2; IV p1-2-2, v2-2-1p, r1-2-2. Legs usually light gray, orange, or light brown; femora, patellae, and tibiae I, II dark brown in *gracillimus* group. Tarsi very lightly scopulate, with two dentate claws and small claw tufts; trochanters not notched. Metatarsi III with distal preening brush; tarsi IV with elongated superior claws. Distal segments of all legs with one or two rows of long trichobothria; trichobothrial bases bearing 2–5 flat ridges (fig. 3), tarsal organ elongate, with oval opening and elevated distal part (fig. 4). Abdomen usually dirty white to light brown (or dark brown, *gracillimus* group) dorsally, cov-

ered by thick, plumose setae bearing 4–7 pairs of appendages originating from ventral surface of setae (figs. 5, 6); dorsum of some species with chevron pattern posteriorly; venter light; males with anterior scutum. Palp with embolus long, circular, lying in groove of conductor, with various forms of processes at base (figs. 17, 18, 26, 27, 63, 64), armed with teeth in proximal portion (figs. 19, 28, 65); base of conductor expanded into enlarged, translucent flange (figs. 17, 26, 63); median apophysis folded; retrolateral tibial apophysis flat, sharpened at tip or bifurcate (figs. 14, 47, 55) or rarely lacking (fig. 50), patella with elongated retrolateral apophysis in *gracillimus* group only (figs. 55, 60). Epigynum with no, one, or two atrial hoods and two pockets with copulatory openings (figs. 15, 51, 56, 89); spermathecae with long, strongly twisted anterior ducts (figs. 16, 57).

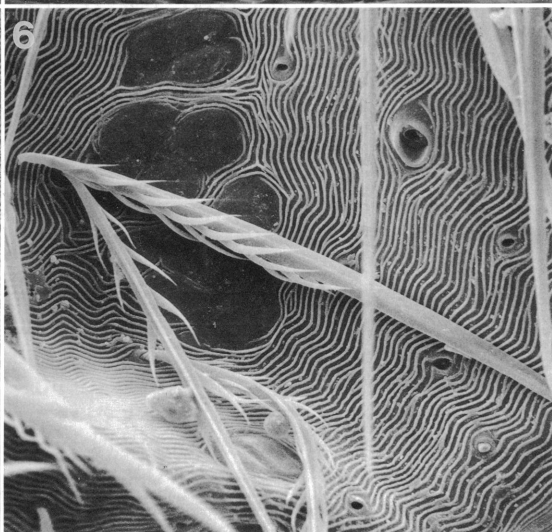
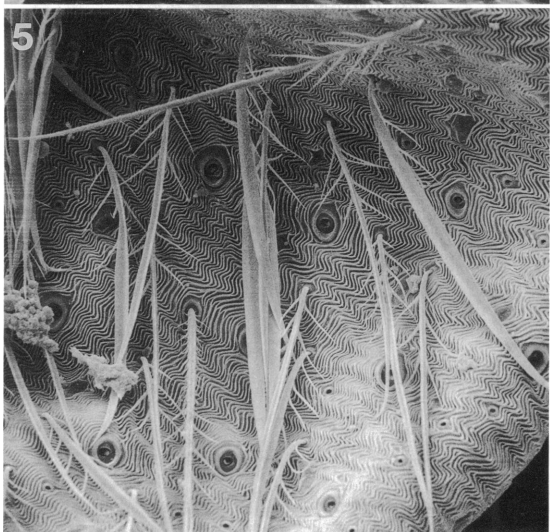
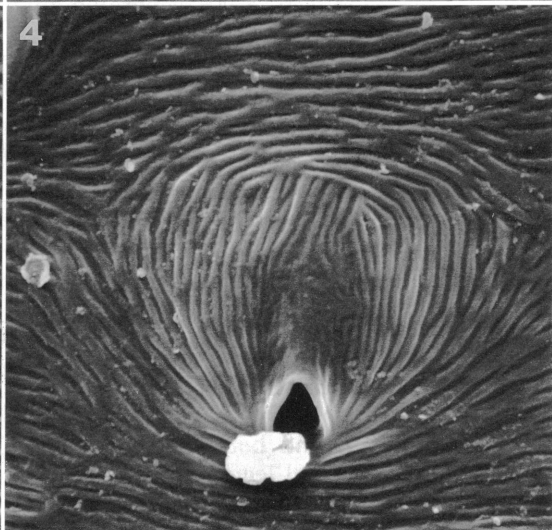
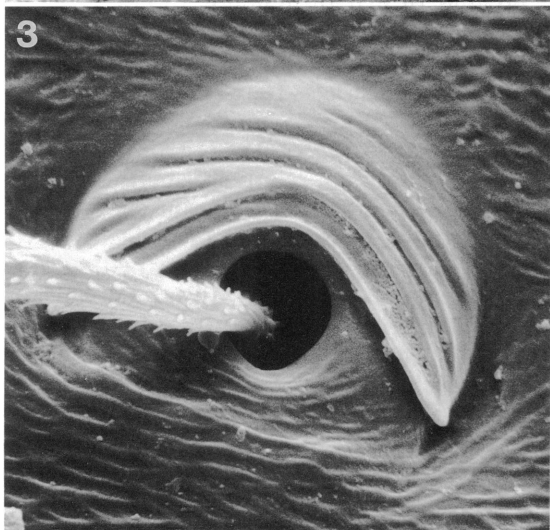
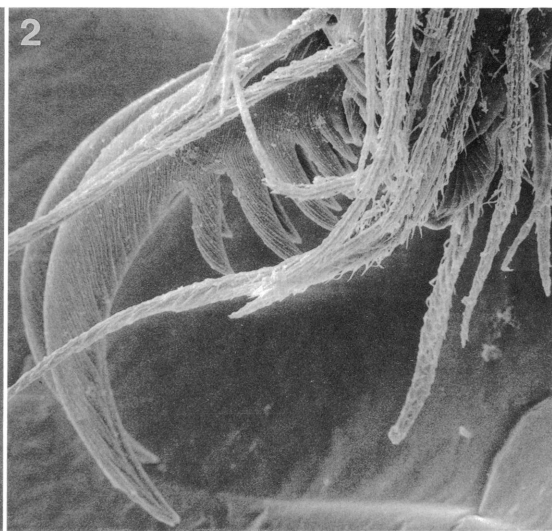
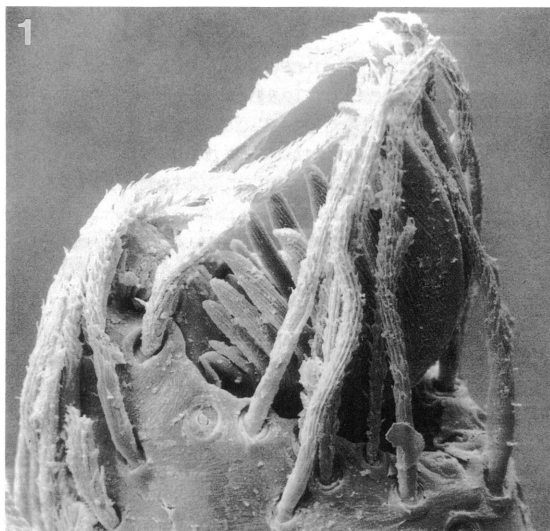
RELATIONSHIPS: *Synaphosus* shares with *Cryptodrassus* Miller (1943) a number of features, including a relatively small body size and notably elongated superior claws on the fourth tarsi. Examination of the genitalia of a pair of the type (and only described) species, *Cryptodrassus pulchellus* Miller (on loan from NMC), indicates that the two genera are distinct, however. Males of *C. pulchellus* lack the translucent flange on the male palp (figs. 7–9), and females lack the highly twisted epigynal ducts (figs. 10, 11), that are found in *Synaphosus*. *Cryptodrassus* probably has a wide range, as we have seen a female from Kenya that appears to be closely related to *C. pulchellus*.

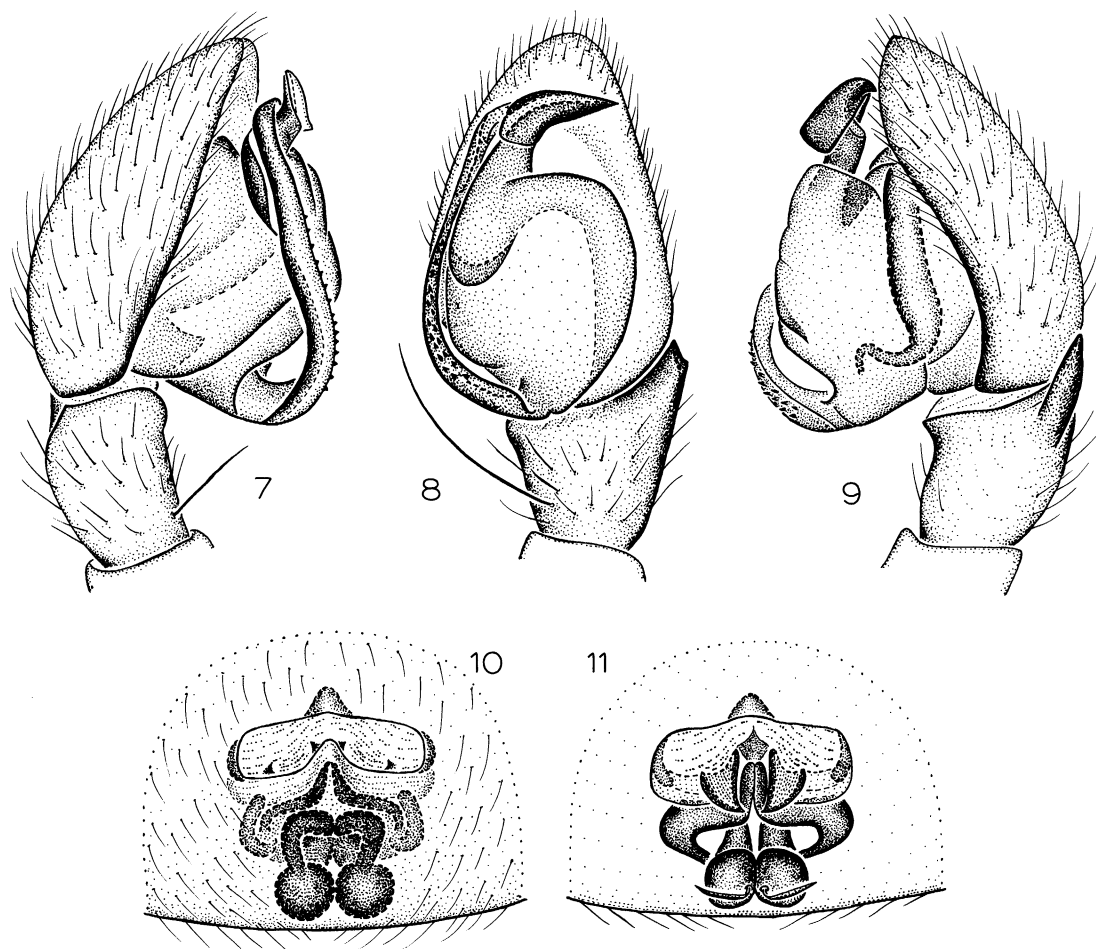
MISPLACED SPECIES: Study of the newly discovered relatives of *S. syntheticus* indicates that the second American species assigned to *Synaphosus* by Platnick and Shadab (1980), *S. paludis*, is not a member of the genus. It is likely that *S. paludis*, like *S. syntheticus*, has been introduced into the New World, as males with very similar palpi occur in Kenya; accurate placement of the species must await studies of its Old World relatives.

SPECIES GROUPS: Three species groups (the *syntheticus*, *gracillimus*, and *kakamega* groups) are recognized below.

THE *SYNTHETICUS* GROUP

Members of this species group are easily recognized by the presence of a small, dor-





Figs. 7–11. *Cryptodrassus pulchellus* Miller. 7. Left male palp, prolateral view. 8. Same, ventral view. 9. Same, retrolateral view. 10. Epigynum, ventral view. 11. Same, dorsal view.

sally shifted retrolateral apophysis (as in figs. 14, 23) or a retrolateral depression with a small pocket (as in fig. 50) on the male palpal tibia (and the absence of a retrolateral apophysis on the male palpal patella), and by the extreme anterior position of atrial pockets (with the copulatory openings) and the more posterior position of the atrial hoods (when present, as in figs. 15, 33; hoods sometimes lacking, as in fig. 51), and the asymmetrically

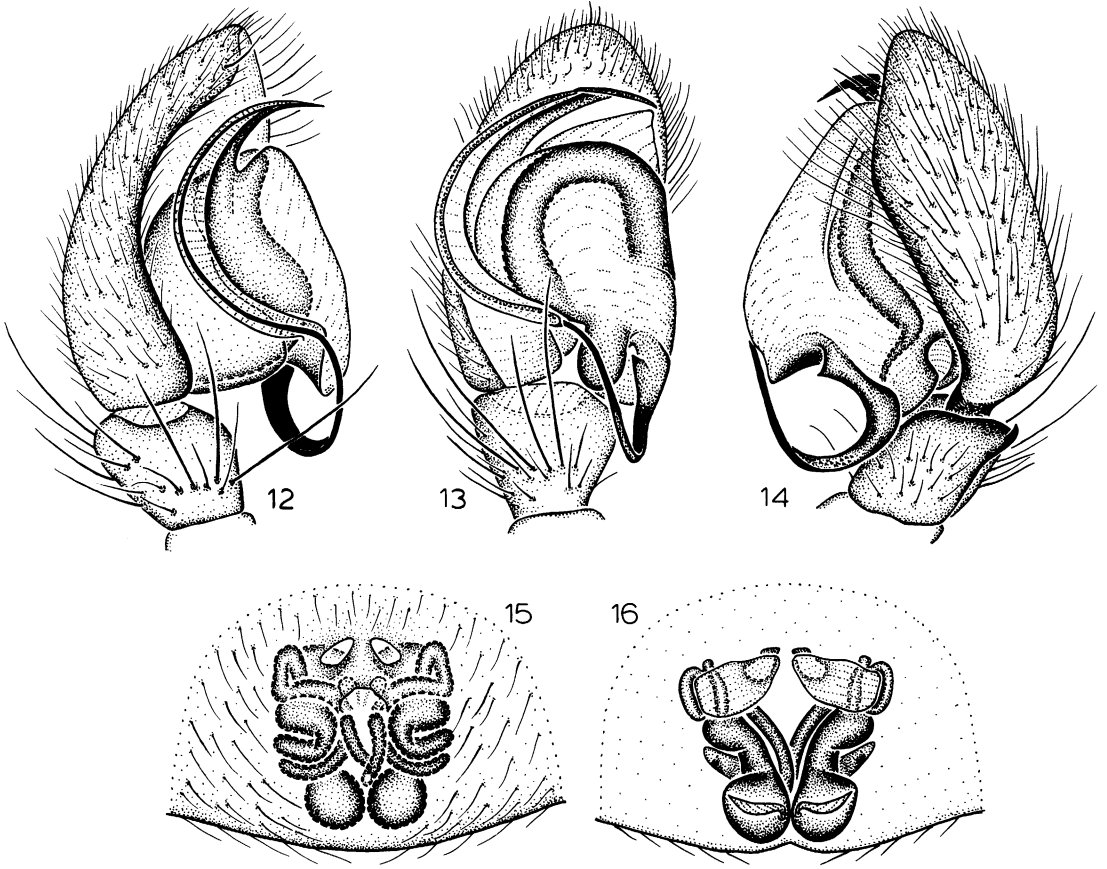
arranged spermathecal ducts (as in figs. 16, 34, 52) of females.

Synaphosus syntheticus
(Chamberlin)

Figures 1, 2, 12–20; Map 1

Nodocion syntheticus Chamberlin, 1924: 614, figs. 50, 51 (female holotype and male allotype from Isla Rasa, Baja California Norte, Mexico, in California Academy of Sciences, examined by Platnick and Shadab, 1980).

Figs. 1–6. 1, 2. *Synaphosus syntheticus* (Chamberlin). 3–5. *S. palearcticus*, new species. 6. *S. turanicus*, new species. 1. Claws of leg I, lateral view. 2. Claws of leg IV, lateral view. 3. Trichobothrial base, dorsal view. 4. Tarsal organ, dorsal view. 5, 6. Abdominal setae, dorsal view.



Figs. 12–16. *Synaphosus syntheticus* Chamberlin. 12. Left male palp, prolateral view. 13. Same, ventral view. 14. Same, retrolateral view. 15. Epigynum, ventral view. 16. Same, dorsal view.

Synaphosus syntheticus: Platnick and Shadab, 1980: 23, figs. 40–43.

DIAGNOSIS: Males resemble those of *S. palearcticus* and *S. sauvage* in having a long, triangular conductor tip but can be recognized by the very small process at the base of the embolus (figs. 12–14, 17, 18); females have elaborately twisted spermathecae and laterally directed epigynal pockets (figs. 15, 16, 20).

MALE: Described by Platnick and Shadab (1980).

FEMALE: Described by Platnick and Shadab (1980).

NEW RECORDS: **Egypt:** *Cairo:* Garden of 6th October, Helwan, Mar. 1, 1985 (H. K. El-Hennawy, ELH), 1♀; Zenhum, Apr. 25, 1983 (H. K. El-Hennawy, ELH), 1♂. **Israel:**

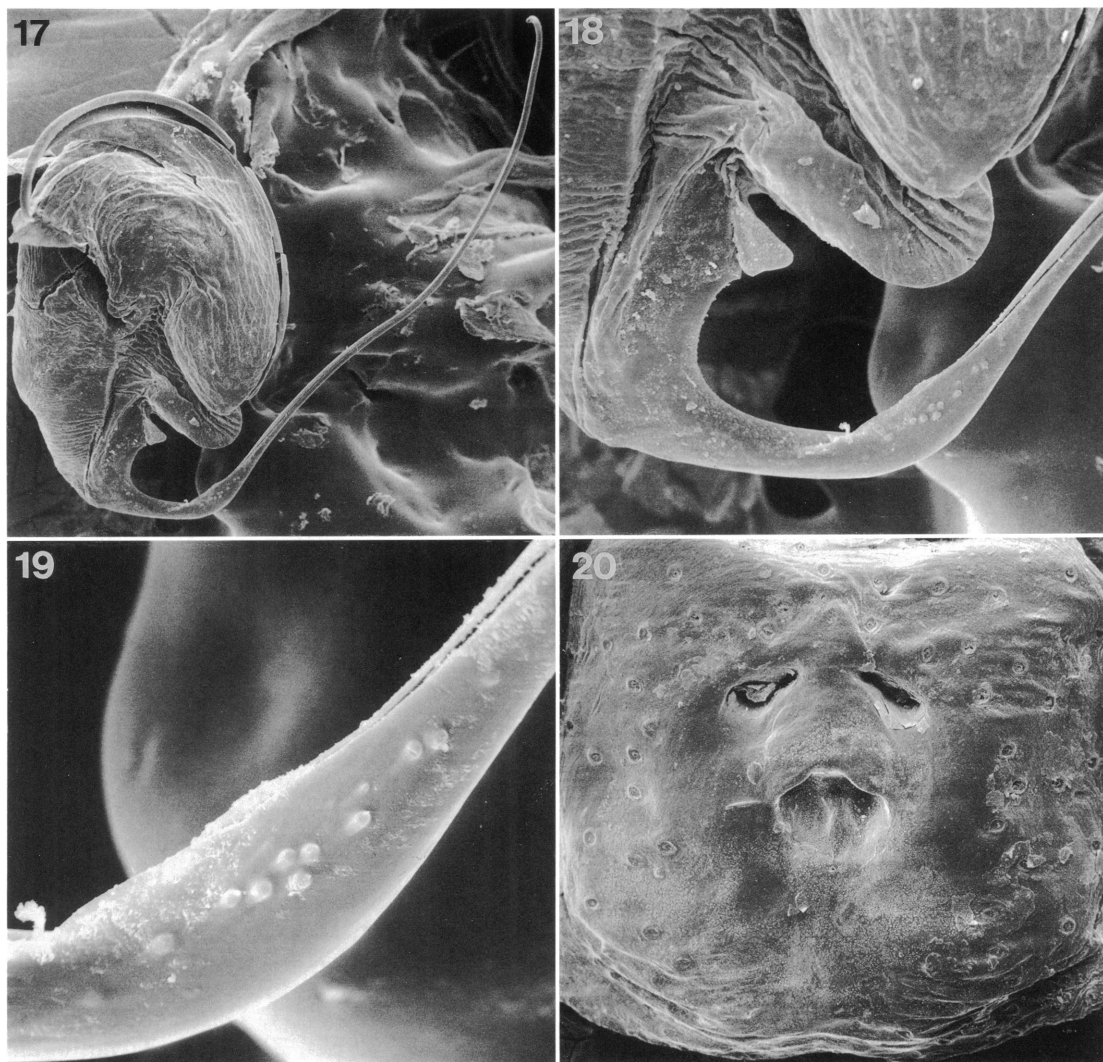
Elat, Red Sea coast, Apr. 16, 1987 (V. D. Roth, HJ), 1♀; En Harod, Valley of Jezreel, Sept. 25, 1939 (A. Shulov, HJ), 2♀. **Libya:** Oum El Ma, June 17, 1978, salt lake (J. Mertens, CRB), 1♂. **Saudi Arabia:** Dirab Pigeon, Dec. 2, 1979 (W. Büttiker, NMB), 1♂, 1♀.

DISTRIBUTION: Apparently native to the southeastern Mediterranean and Middle East (map 1) and introduced into the southern United States and Mexico (Platnick and Shadab, 1980: map 6).

***Synaphosus palearcticus*,
new species**

Figures 3–5, 21–29; Map 1

TYPES: Male holotype and female allotype from Shengeldy spring, 40 km NE Ulanbel,



Figs. 17–20. *Synaphosus syntheticus* Chamberlin. 17. Bulb of right male palp, ventral view. 18. Embolar base, ventral view. 19. Proximal portion of embolus, ventral view. 20. Epigynum, ventral view.

Betpak-Dala desert, Dzhambul, Kazakhstan (June 4, 1990; A. A. Zyuzin, A. A. Fedorov), deposited in ZISP.

ETYMOLOGY: The specific name refers to the distribution of the species.

DIAGNOSIS: This species seems closest to *S. sauvage* but can be separated by the smaller process at the base of the embolus (figs. 21–23) and the posteriorly wider epigynum (figs. 24, 25, 29).

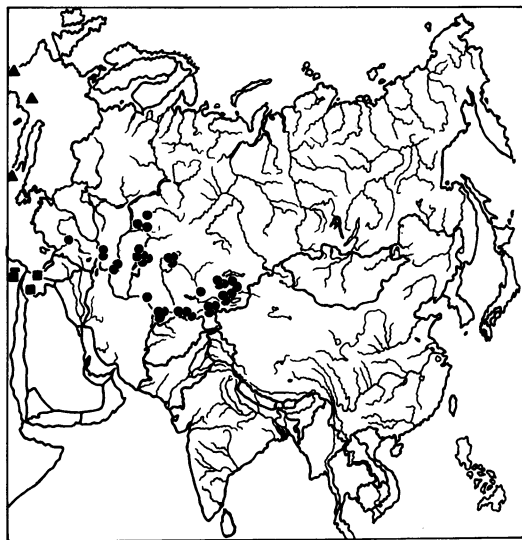
MALE: Total length 3.10. Carapace 1.25 long, 0.95 wide. Femur II 0.68 long. Eye sizes and interdistances: AME 0.07, ALE 0.08,

PME 0.08, PLE 0.07; AME-AME 0.04, AME-ALE 0.00, PME-PME 0.03, PME-PLE 0.03, ALE-PLE 0.03; MOQ length 0.18, front width 0.15, back width 0.17. Palp with long, narrow, twisted embolus bearing large process at base; retrolateral tibial apophysis flat, hooked at tip (figs. 21–23, 26–28). Leg spination: tibiae: I, II v1-1-2; III p2-2-0, v1-2-2; IV d1-1-0; metatarsus II v2-2-0.

FEMALE: Total length 4.15. Carapace 1.43 long, 1.05 wide. Femur II 0.75 long. Eye sizes and interdistances: AME 0.06, ALE 0.07, PME 0.07, PLE 0.07; AME-AME 0.03, AME-

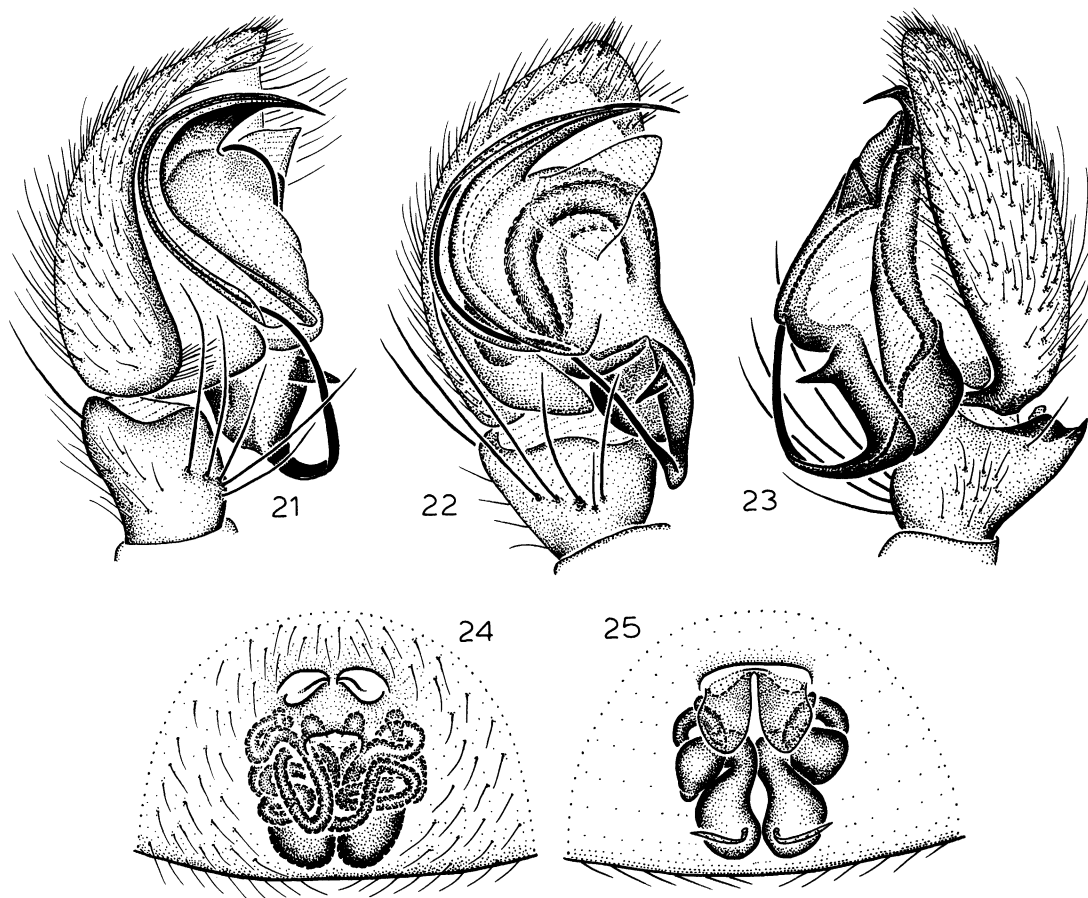
ALE 0.01, PME-PME 0.03, PME-PLE 0.04, ALE-PLE 0.02; MOQ length 0.17, front width 0.17, back width 0.18. Epigynal atrium with two anterior pockets and two more posteriorly situated hoods (figs. 24, 29); copulatory ducts longitudinal, short, spermathecae strongly twisted (fig. 25). Leg spination: tibiae: II v0-1-0; IV r2-1-1; metatarsi: I v2-1-0; II v2-2-0.

OTHER MATERIAL EXAMINED: **Armenia:** *Echmiadzin*: Dzhrarat, Mar. 18, 1988 (V. A. Zakhariyan, ZISP), 1♂; Oktemberyan, Apr. 27, 1975 (A. Prisnyi, ZISP), 2♀. **Azerbaijan:** *Baku*: nr. Baku, June 8, 1977 (P. M. Dunin, ZISP), 1♀. *Lerik*: Divagach, July 11, 1983 (S. Dashdamirov, ZISP), 1♀. **Kazakhstan:** *Alma-Ata*: 43 km E Bakanas, Saryesik-Atyrau desert, Aug. 18, 1989 (S. I. Ibraev, A. A. Zyuzin, ZISP), 2♀; Kapchagai, May 10, 1986 (A. A. Zyuzin, ZISP), 2♂; Taukum desert, May 6, 1988 (M. Zarko, ZISP), 1♀. *Atyrau*: Aibas, Makhambet area, Aug. 2–11, 1976 (A. V. Ponomarev, ZISP), 2♂; 20 km NE Ganyushkino, May 24, 1977 (A. V. Ponomarev, ZISP), 1♀; Kuibyshevo, May 21, 1985 (S. Deryugin, ZISP), 1♂; Kulsary, June 4, 1989 (A. A. Raikhanov, S. I. Ibraev, ZISP), 2♂; Zhuzguntyube, Dengiz area, May 19, 1977 (A. V. Ponomarev, ZISP), 2♂. *Dzhambul*: 21 km N Akkol, May 15, 1991 (S. I. Ibraev, A. A. Zyuzin, ZISP), 1♂; 124 km N Akkol, Muynkum desert, May 16–17, 1991 (S. I. Ibraev, A. A. Zyuzin, ZISP), 1♂; Georgievka, May 22, 1984 (S. V. Ovchinnikov, ZISP), 1♂, 1♀; Shengeldy spring, 40 km NE Ulanbel, Betpak-Dala desert, June 4, 1990 (A. A. Zyuzin, A. A. Fedorov, ZISP), 1♂; 76 km NE Ulanbel, Betpak-Dala desert, June 6, 1990 (A. A. Zyuzin, A. A. Fedorov, ZISP), 1♀; 79 km NE Ulanbel, Betpak-Dala desert, May 18–19, 1991 (S. I. Ibraev, A. A. Zyuzin, ZISP), 1♀. *Kzyl-Orda*: Barsakelmes Island, Aral Sea, May 10–Aug. 8, 1981–1983 (T. V. Pavlenko, ZISP), 2♂, 2♀. *Mangistau*: 48 km E Akkuduk, Ustyurt Reservation, Eraliev area, Apr. 27–May 2, 1990 (S. I. Ibraev, ZISP), 1♀; Kadyberdy, Ustyurt Reservation, Ustyurt plateau, May 29–30, 1989 (A. A. Raikhanov, S. I. Ibraev, ZISP), 1♀; Koldybai, Ustyurt Reservation, Ustyurt plateau, May 17, 1989 (A. A. Raikhanov, S. I. Ibraev, ZISP), 1♂; Novyi Uzen, Ustyurt Reservation, Ustyurt plateau, May 12, 1989 (A. A. Zyuzin, ZISP, AMNH, USNM), 6♂,



Map 1. Distribution of *Synaphosus syntheticus* (squares), *S. palearcticus* (circles), and *S. sauae* (triangles).

7♀. **South Kazakhstan**: nr. Arys, May 30, 1983 (V. Linskii, ZISP), 1♀. **West Kazakhstan**: 10 km SW Kalmykovo, June 23, 1977, semi-desert (A. V. Ponomarev, ZISP), 1♂. **Kirghizstan**: *Dzhalal-Abad*: Arslanbob, Ferghan Mt. range, June 1, 1981, elev. 1200 m (S. L. Zonstein, ZISP), 2♀. *Frunze*: Baityk, Kirghiz Mt. range, Apr. 27, 1988 (S. V. Ovchinnikov, ZISP), 1♂. *Osh*: Ak-Buura gorge, June 25, 1985, desert, elev. 1500 m (A. A. Zyuzin, ZISP), 1♀; Mirza-Aki, Uzgen area, July 9, 1975 (S. N. Rybin, ZISP), 2♀; Tuyamuyun, Aravan, Aug. 4, 1973 (S. N. Rybin, ZISP), 1♂. **Turkey**: *Kayseri*: Kultepe, 32.7 km SE Kayseri, June 17, 1961, under rocks (R. Walsh, AMNH), 1♀. **Turkmenistan**: *Ashkhabad*: Karanki gorge, Central Kopet-Dag, Apr. 8–15, 1980 (G. T. Kuznetsov, ZISP), 1♂. *Chardzhou*: Kabakly, Amudarya Reservation, Oct. 1, 1987 (F. M. Zeleev, ZISP), 1♀; Khodzhaful, Kugitangtau, May 10, 1984, elev. 400 m (S. L. Zonstein, ZISP), 1♀. *Mary*: Akartcheshme, Badkhyz Reservation, Apr. 14, 1985, elev. 750 m (S. L. Zonstein, ZISP), 1♂; Iolotan, May 31, 1929 (ZISP), 2♂; Morgunovka, Badkhyz Reservation, Apr. 1978 (V. Fet, ZISP), 1♀. **Uzbekistan**: *Kashkadarya*: Varganza, June 1, 1978 (D. Shcherbakov, ZISP), 1♂. *Surkhandarya*: Koktyube Mt. pass,



Figs. 21–25. *Synaphosus palarcticus*, new species. 21. Left male palp, prolateral view. 22. Same, ventral view. 23. Same, retrolateral view. 24. Epigynum, ventral view. 25. Same, dorsal view.

Babatag Mt. range, Apr. 16, 1990, elev. 1400 m (S. L. Zonstein, ZISP), 1♂.

DISTRIBUTION: Arid regions of the central Palearctic (map 1).

***Synaphosus sauvage*,
new species**

Figures 30–34; Map 1

TYPES: Male holotype and female allotype taken on dunes near Pointe Espagnole, Côte Sauvage, Charente-Maritime, France (May 20, 1993; J. and F. Murphy, D. Jones), deposited in AMNH.

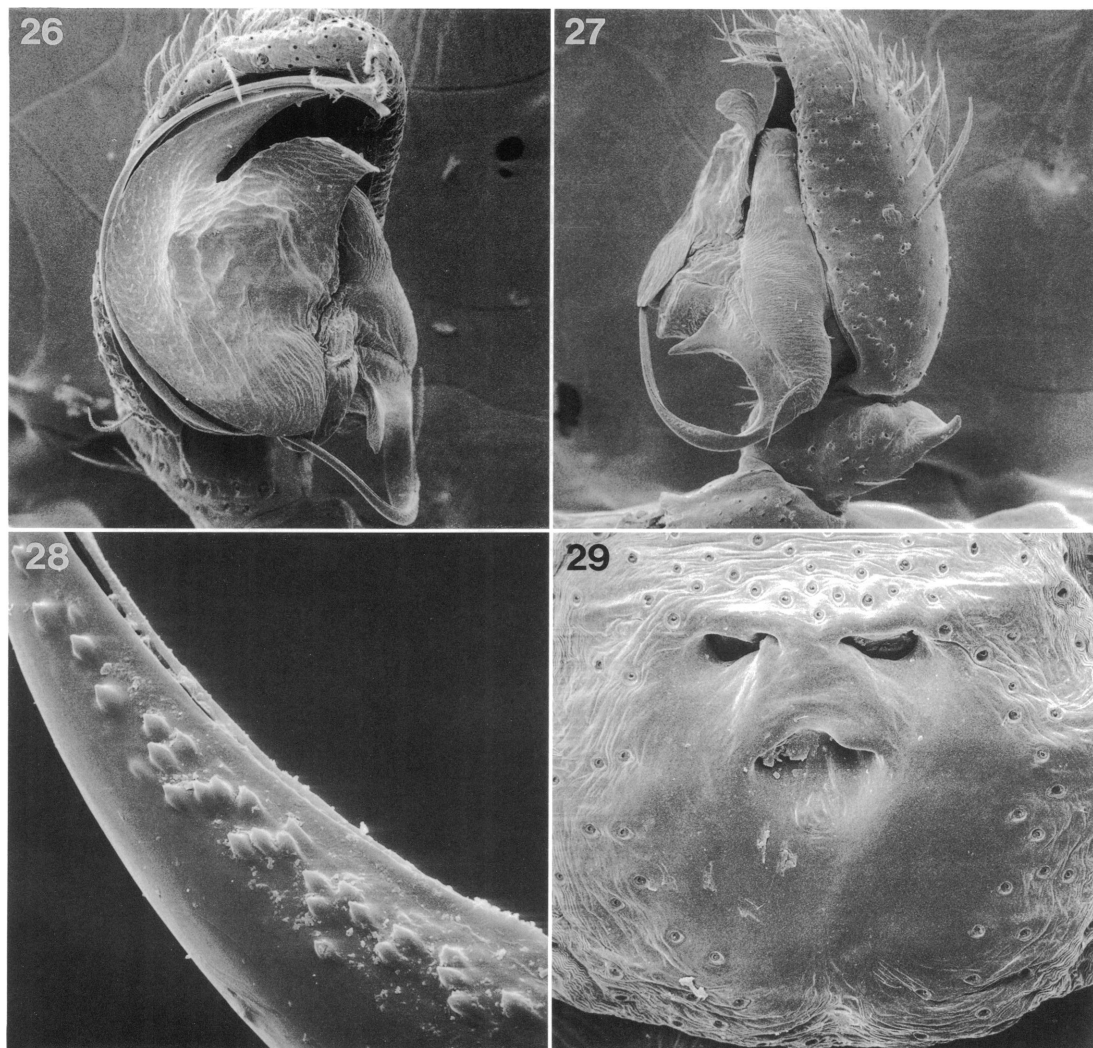
ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: This species seems closest to *S. palarcticus* but can be separated by the

larger process at the base of the embolus (figs. 30–32) and the posteriorly narrower epigynum of females (figs. 33, 34).

MALE: Total length 2.76. Carapace 1.11 long, 0.83 wide. Femur II 0.62 long. Eye sizes and interdistances: AME 0.07, ALE 0.07, PME 0.07, PLE 0.06; AME-AME 0.05, AME-ALE 0.01, PME-PME 0.02, PME-PLE 0.03, ALE-PLE 0.04; MOQ length 0.15, front width 0.12, back width 0.14. Palp with long, narrow, strongly twisted embolus bearing small process at base; retrolateral tibial apophysis flat (figs. 30–32). Leg spination: femora: I d1-0-0; IV d1-1-0; tibiae: I v1p-1p-2; III d1-1-1, p1-1-1, v1-2-2; IV d1-1-0; metatarsus II v2-2-0.

FEMALE: Total length 3.70. Carapace 1.17 long, 0.85 wide. Femur II 0.58 long. Eye sizes

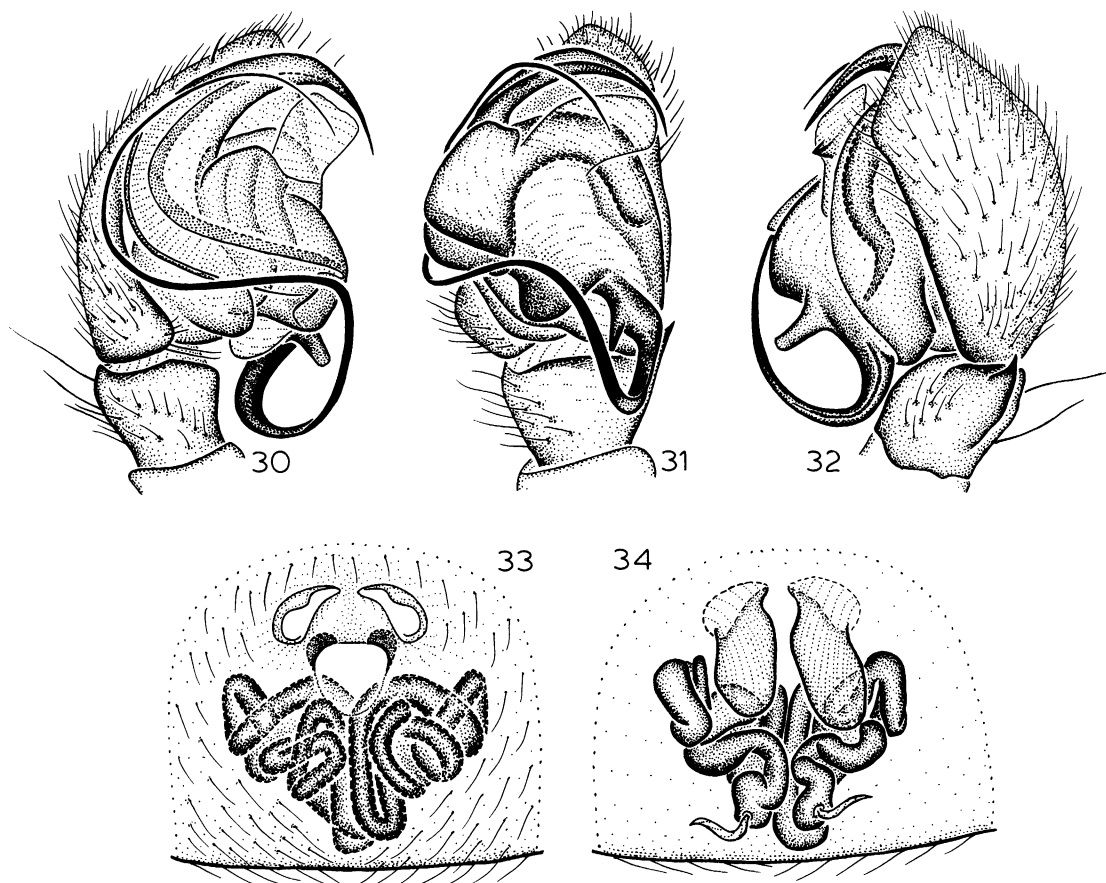


Figs. 26–29. *Synaphosus palearcticus*, new species. 26. Left male palp, ventral view. 27. Same, retrolateral view. 28. Proximal portion of embolus, ventral view. 29. Epigynum, ventral view.

and interdistances: AME 0.06, ALE 0.07, PME 0.07, PLE 0.05; AME-AME 0.03, AME-ALE 0.01, PME-PME 0.04, PME-PLE 0.03, ALE-PLE 0.03; MOQ length 0.15, front width 0.14, back width 0.15. Epigynal atrium with two triangular anterior pockets and two more posteriorly situated hoods (fig. 33); copulatory ducts long, directed longitudinally, spermathecae strongly twisted (fig. 34). Leg spination: femora: I, II p0-0-0; III d0-1-1, p0-0-1, r0-0-1; IV d0-1-1, p0-0-0; patella III r0-0-0; tibiae: I, II v0-0-0; III v0-2-2, r0-1-0; IV p1-0-0, v1-2-2; metatarsi: I v2-1-0; II v2-2-

0; III p2-2-0, v2-0-1p, r1-2-0; IV p1-2-2, v2-1p-2.

OTHER MATERIAL EXAMINED: **France:** *Charente-Maritime:* Pointe Espagnole, Côte Sauvage, June 3, 1992, in dunes (J. & F. Murphy, JAM, AMNH), 5♀. **Italy:** *Siracusa:* Cava Grande di Avola, May 27–June 30, 1990 (A. Adorno, DBAC), 1♂. **Switzerland:** *Valais:* Châteauneuf, Crête de Maladeyres, May 20–June 2, 1979, elev. 550 m, dry vegetation on rocks (R. Delarze, NMB), 1♂; Leuk, Coteau de Berhji-Platten, June 23–July 10, 1979, elev. 800 m, dry vegetation on rocks (R. Delarze,



Figs. 30–34. *Synaphosus savage*, new species. 30. Left male palp, prolateral view. 31. Same, ventral view. 32. Same, retrolateral view. 33. Epigynum, ventral view. 34. Same, dorsal view.

MHNG), 1♂; N Saillon, Rhone valley, Alps, S slope, May 14–June 4, 1991, elev. 500–600 m, pitfall traps in vineyards (CTB, NMB, AMNH), 3♂.

DISTRIBUTION: Known only from France, Switzerland, and Italy (map 1).

Synaphosus nanus
(O.P.-Cambridge),
new combination

Figures 38, 39; Map 2

Drassus nanus O. P.-Cambridge, 1872: 237, pl. 15, fig. 15 (three female syntypes from Jericho and Jerusalem, Israel, in HDO, examined).

Drassodes nanus: Roewer, 1955: 390.

DIAGNOSIS: Females resemble those of *S. savage* in having prominent, longitudinally arranged medial epigynal ducts, but can be

distinguished by the wide anterior epigynal margin combining two atrial pockets and two hoods (figs. 38, 39).

MALE: Unknown.

FEMALE: Described by O. P.-Cambridge (1872).

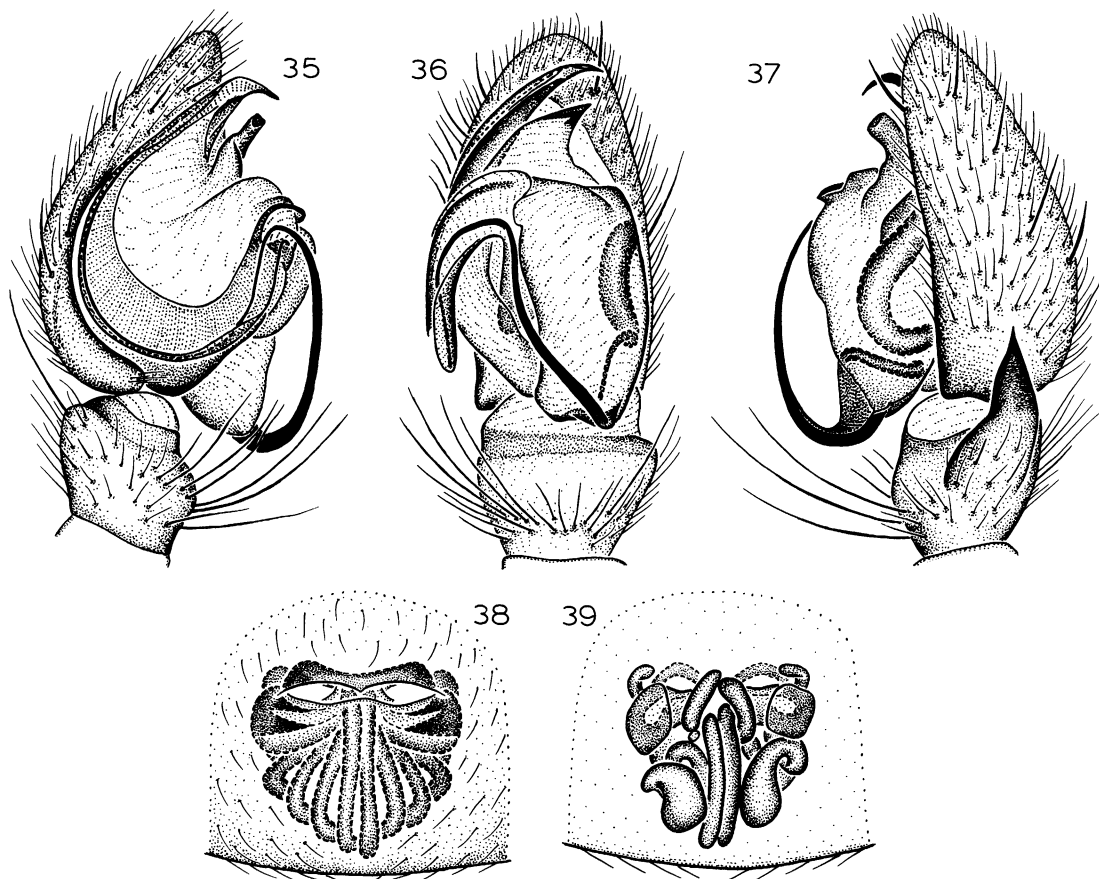
MATERIAL EXAMINED: Only the syntypes, collected under rocks.

DISTRIBUTION: Known only from Israel (map 2).

Synaphosus taukum,
new species

Figures 43, 44; Map 2

TYPE: Female holotype from Taukum desert, Alma-Ata, Kazakhstan (May 8, 1988; C. K. Tarabaev, M. Zarko), deposited in ZISP.



Figs. 35–39. 35–37. *Synaphosus karakumensis*, new species. 38, 39. *S. nanus* (O. P.-Cambridge). 35. Left male palp, prolateral view. 36. Same, ventral view. 37. Same, retrolateral view. 38. Epigynum, ventral view. 39. Same, dorsal view.

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Females resemble those of *S. palearcticus* and *S. sauvage* but can be separated by the wide hood situated between the atrial pockets of the epigynum (figs. 43, 44).

MALE: Unknown.

FEMALE: Total length 4.55. Carapace 2.00 long, 1.30 wide. Femur II 0.95 long. Eye sizes and interdistances: AME 0.08, ALE 0.10, PME 0.10, PLE 0.08; AME-AME 0.06, AME-ALE 0.01, PME-PME 0.04, PME-PLE 0.04, ALE-PLE 0.04; MOQ length 0.22, front width 0.21, back width 0.22. Epigynal atrium with wide, anteriorly bifurcate hood, situated between atrial pockets (fig. 43); copulatory ducts short, wide, closely spaced posteriorly, spermathecae with simply twisted ducts (fig. 44).

Leg spination: tibiae: II v0-0-0; III p2-2-0; IV d1-1-0, r2-2-0; metatarsi: I v2-0-0; IV r2-2-2.

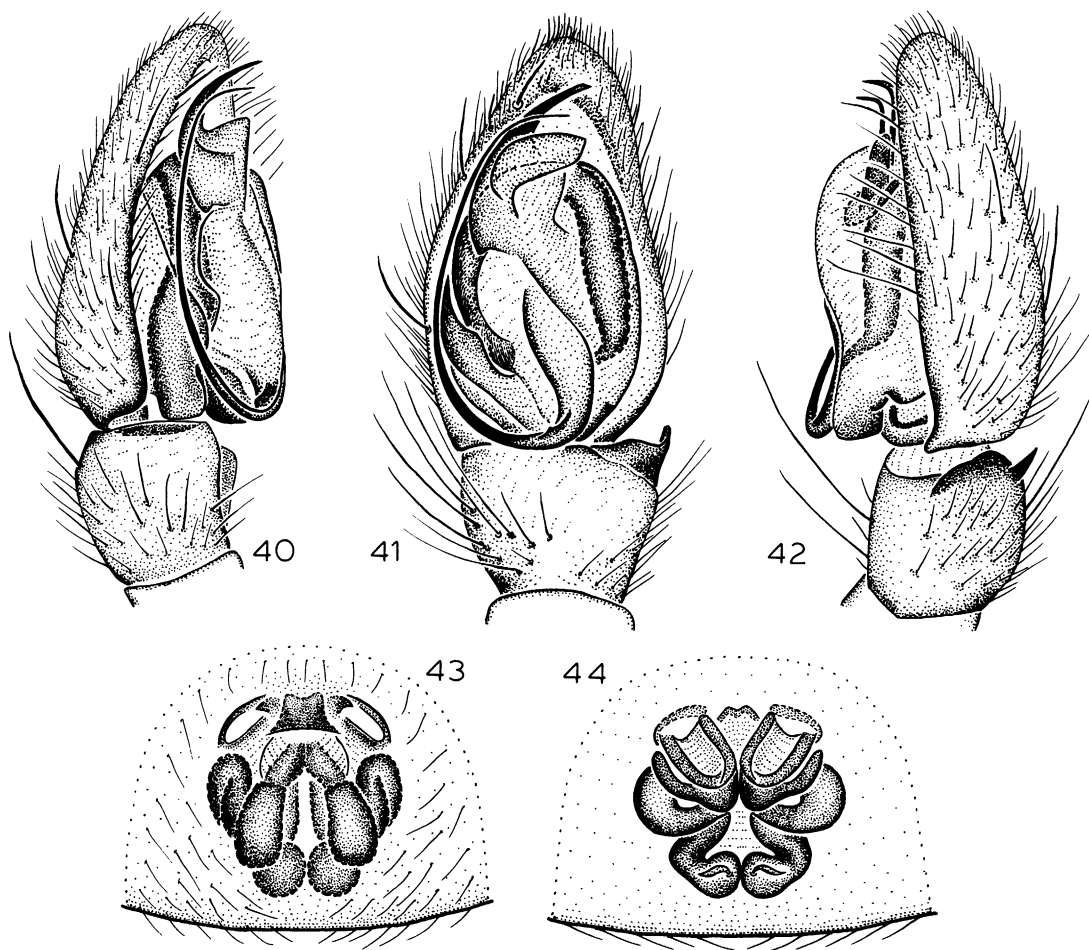
OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Known only from the Alma-Ata region of Kazakhstan (map 2).

***Synaphosus evertsi*,
new species**

Figures 48–52; Map 4

TYPES: Male holotype from ranch de la Marahoué, Mankono, 08°27'N, 06°52'W, Ivory Coast (Jan. 31, 1980; J. Everts), and female allotype from riverine forest on Bandama River, N Korhogo, 09°27'N, 05°38'W, Ivory Coast (Apr. 14, 1980; J. Everts), deposited in MRAC.



Figs. 40–44. 40–42. *Synaphosus soyunovi*, new species. 43, 44. *S. taukum*, new species. 40. Left male palp, prolateral view. 41. Same, ventral view. 42. Same, retrolateral view. 43. Epigynum, ventral view. 44. Same, dorsal view.

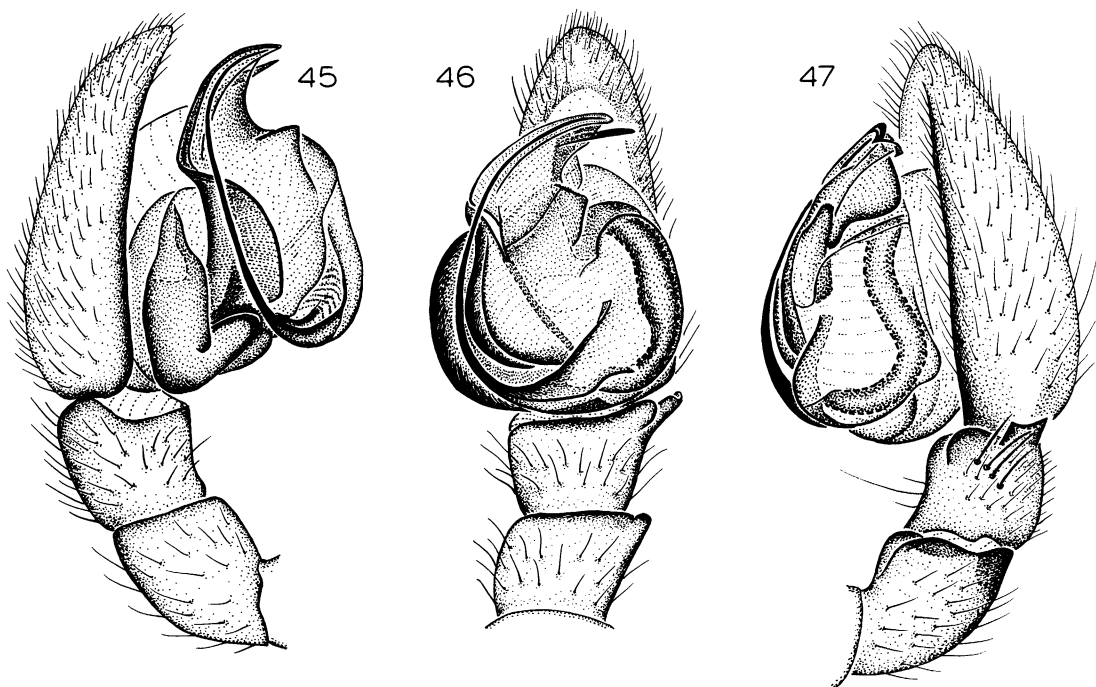
ETYMOLOGY: The specific name is a patronym in honor of the collector of the holotype.

DIAGNOSIS: This species can easily be recognized by the absence of a retrolateral tibial apophysis (figs. 48–50) on the male palp and the (probably correlated) absence of atrial epigynal hoods, as well as the long, narrow copulatory ducts (figs. 51, 52) of females.

MALE: Total length 3.70. Carapace 1.55 long, 1.22 wide. Femur II 1.04 long. Eye sizes and interdistances: AME 0.06, ALE 0.09, PME 0.09, PLE 0.08; AME-AME 0.05, AME-ALE 0.01, PME-PME 0.04, PME-PLE 0.04, ALE-PLE 0.04; MOQ length 0.21, front width

0.15, back width 0.19. Palp with long, narrow, twisted embolus, long, sharply pointed, distal part of conductor; tibia with retrolateral depression and small pocket directed posteriorly (figs. 48–50). Leg spination: femora: I p0-0-0; III d1-1-0, p0-0-1, r0-0-1; IV d1-1-0, p0-0-0; tibiae: II v0-0-0; IV d0-0-0, p1-1-1; metatarsi: I v0-0-0; II v2-2-0; III p0-2-2, v2-0-0, r0-1-2; IV p0-2-2.

FEMALE: Total length 2.96. Carapace 1.17 long, 0.97 wide. Femur II 0.72 long. Eye sizes and interdistances: AME 0.05, ALE 0.08, PME 0.07, PLE 0.07; AME-AME 0.03, AME-ALE 0.01, PME-PME 0.03, PME-PLE 0.02, ALE-PLE 0.03; MOQ length 0.20, front width



Figs. 45–47. *Synaphosus yatenga*, new species. 45. Left male palp, prolateral view. 46. Same, ventral view. 47. Same, retrolateral view.

0.13, back width 0.17. Epigynal atrium represented by two anterior pockets and two deep copulatory openings, directed posteriorly (fig. 51); copulatory ducts long, narrow, longitudinal, closely spaced, spermathecal ducts simply twisted (fig. 52). Leg spination: femora: I, II p0-0-0; IV d1-1-0, p0-0-0; tibia II v0-0-0; metatarsi: I v0-0-0; II v2-1r-0 (legs III and tibiae and metatarsi of legs IV missing).

OTHER MATERIAL EXAMINED: None.

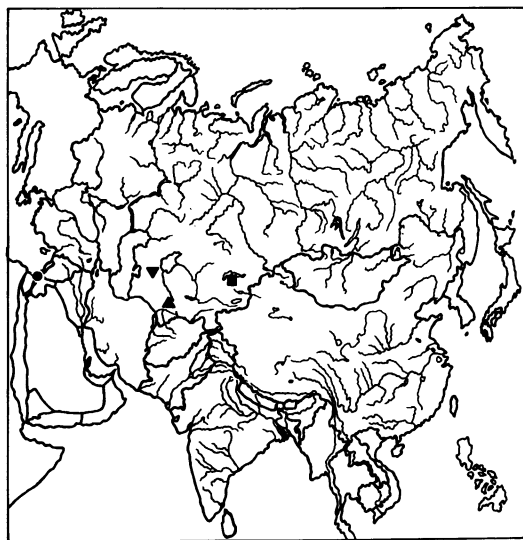
DISTRIBUTION: Known only from the Ivory Coast (map 4).

***Synaphosus karakumensis*,**
new species

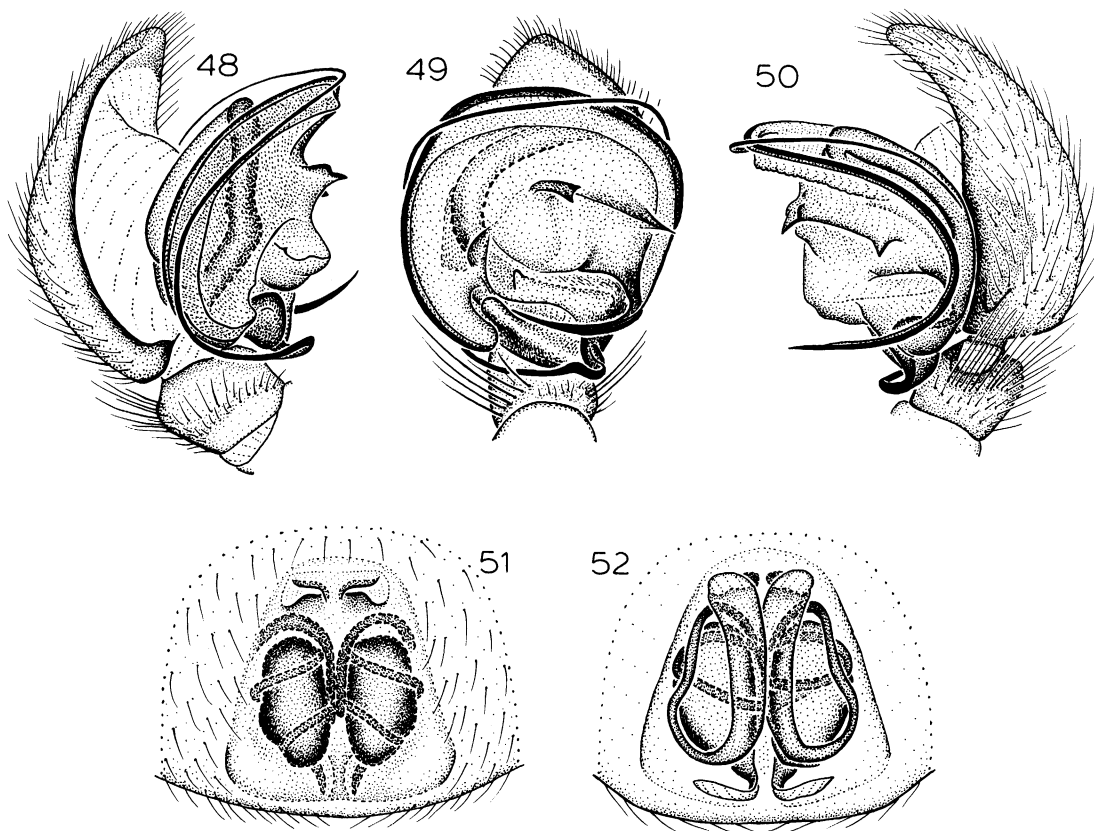
Figures 35–37; Map 2

TYPE: Male holotype from Repetek, Kara Kum desert, Chardzhou, Turkmenistan (Feb. 28, 1982; V. A. Krivokhatskii), deposited in ZISP.

ETYMOLOGY: The specific name refers to the type locality.



Map 2. Distribution of *Synaphosus nanus* (circle), *S. taukum* (square), *S. karakumensis* (triangle), and *S. soyunovi* (inverted triangle).



Figs. 48–52. *Synaphosus evertsi*, new species. 48. Left male palp, prolateral view. 49. Same, ventral view. 50. Same, retrolateral view. 51. Epigynum, ventral view. 52. Same, dorsal view.

DIAGNOSIS: Males can easily be recognized by the extremely long, recurved embolus (figs. 35–37).

MALE: Total length 4.68. Carapace 1.85 long, 1.30 wide. Femur II 1.17 long. Eye sizes and interdistances: AME 0.09, ALE 0.08, PME 0.06, PLE 0.06; AME-AME 0.06, AME-ALE 0.01, PME-PME 0.05, PME-PLE 0.06, ALE-PLE 0.05; MOQ length 0.23, front width 0.23, back width 0.22. Palp with long embolus, strongly twisted in ventral portion, without basal process; conductor small, membranous; retrolateral tibial apophysis triangular, extended at tip (figs. 35–37). Leg spination: femur IV d1-1-0; patella IV r0-1-0; tibiae: I p0-1-1, v2-2-2, r0-1-1; II p1-2-1, v1-2-2, r1-0-1; III v1-2-2; IV p1-0-1, r2-1-1; metatarsi: I p1-1-1, r0-1-1; II p1-2-2, v2-2-0, r0-1-1.

FEMALE: Unknown.

OTHER MATERIAL EXAMINED: One male taken with the holotype (ZISP).

DISTRIBUTION: Known only from the Kara Kum desert, Turkmenistan (map 2).

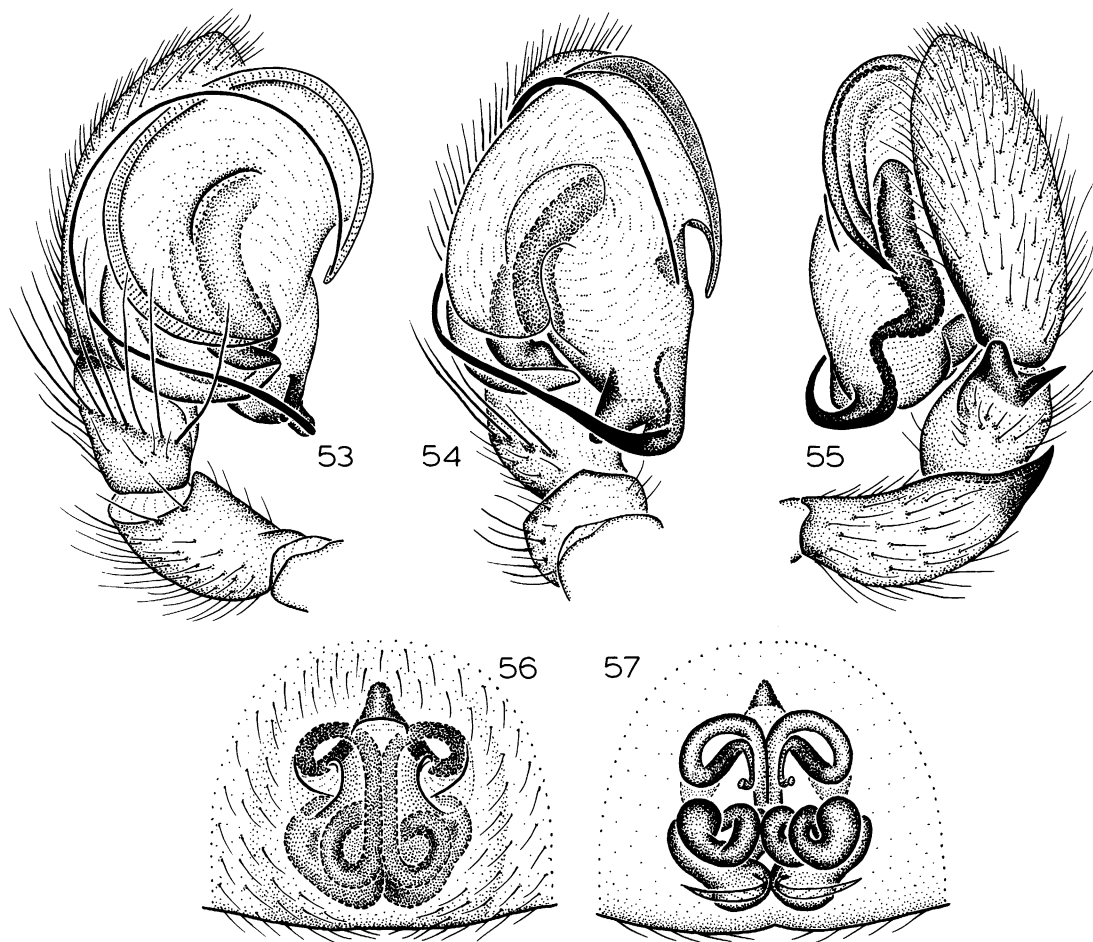
***Synaphosus soyunovi*,
new species**

Figures 40–42; Map 2

TYPE: Male holotype from Sarykamysh, Tashauz, Turkmenistan (Oct. 1, 1984; O. Soyunov), deposited in ZISP.

ETYMOLOGY: The specific name is a patronym in honor of the collector of the holotype.

DIAGNOSIS: Males seem closest to those of *S. yatenga* but can be separated by the apical position of the conductor, the small translucent flange on the conductor, and the ex-



Figs. 53–57. *Synaphosus gracillimus* (O. P.-Cambridge). 53. Left male palp, prolateral view. 54. Same, ventral view. 55. Same, retrolateral view. 56. Epigynum, ventral view. 57. Same, dorsal view.

tended tip of the retrolateral tibial apophysis (figs. 40–42).

MALE: Total length 4.35. Carapace 1.68 long, 1.20 wide. Femur II 0.98 long. Eye sizes and interdistances: AME 0.10, ALE 0.08, PME 0.10, PLE 0.07; AME-AME 0.04, AME-ALE 0.01, PME-PME 0.03, PME-PLE 0.01, ALE-PLE 0.04; MOQ length 0.22, front width 0.21, back width 0.24. Palp with short embolus and small, translucent flange on base of conductor; retrolateral tibial apophysis extended at tip (figs. 40–42). Leg spination: patellae: III p0-1-0; IV r0-1-0; tibiae: I v2-2-2, II v1-2-2; III p2-1-1; IV r2-2-0; metatarsus II v2-2-0.

FEMALE: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Known only from the Tas-hauz region of Turkmenistan (map 2).

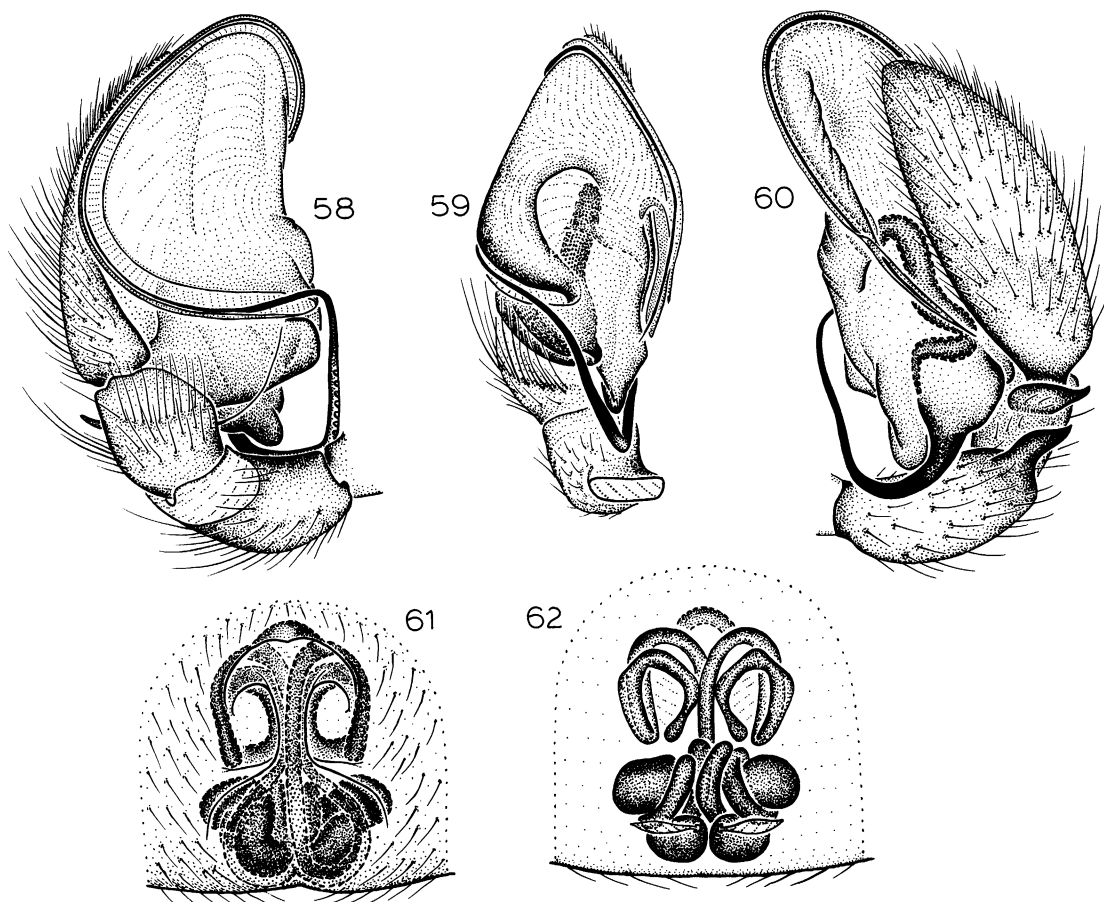
***Synaphosus yatenga*, new species**

Figures 45–47; Map 4

TYPE: Male holotype from Ouahigouya, Nord Yatenga, Burkina Faso (July–Oct. 1992; M. N. de Visscher and G. Balanço), deposited in MRAC.

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Males seem closest to those of *S. soyunovi* but can be separated by the shorter embolus, the lateral position of the conductor, and the flat, bifurcate retrolateral tibial apophysis (figs. 45–47).



Figs. 58–62. *Synaphosus turanicus*, new species. 58. Left male palp, prolateral view. 59. Same, ventral view. 60. Same, retrolateral view. 61. Epigynum, ventral view. 62. Same, dorsal view.

MALE: Total length 2.81. Carapace 1.31 long, 0.92 wide. Femur II 0.81 long. Eye sizes and interdistances: AME 0.06, ALE 0.07, PME 0.81, PLE 0.05; AME-AME 0.05, AME-ALE 0.01, PME-PME 0.04, PME-PLE 0.02, ALE-PLE 0.02; MOQ length 0.15, front width 0.14, back width 0.18. Palp with short, laterally situated conductor supporting apical part of embolus; retrolateral tibial apophysis flat, bifurcate; small thickenings present on distal parts of tibia and patella retrolaterally (figs. 45–47). Leg spination: femur IV r0-1-1; patella IV r0-1-0; tibiae: I p1-1-0; II p1-1-1, v1r-2-2; III p2-1-1; IV d1-1-0, r2-2-0; metatarsi: I p1-0-1, v2-2-0; II p1-1-1, v2-2-0.

FEMALE: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Known only from Burkina Faso (map 4).

THE *GRACILLIMUS* GROUP

Members of this species group are easily recognized by the presence of a retrolateral apophysis on the male palpal patella as well as tibia (as in figs. 55, 60), and by the anterior position of a single atrial hood (as in figs. 56, 61) or the lack of a hood (as in figs. 70, 80), the more posterior position of the atrial pockets with copulatory openings (as in figs. 56, 70, 80), and the more symmetrically arranged spermathecal ducts of females (as in figs. 57, 62, 81).

Synphosus gracillimus
(O.P.-Cambridge),
new combination
Figures 53–57; Map 3

Melanophora gracillima O. P.-Cambridge, 1872: 247, pl. 16, fig. 28 (four male and three female syntypes from the Plains of the Jordan river, Israel, in HDO, examined).

Prosthesima gracillima: Simon, 1878: 99.

Zelotes gracillimus: Reimoser, 1919: 168.

DIAGNOSIS: This species seems closest to *S. turanicus* (males share a bipartite retrolateral tibial apophysis) but can be distinguished by the shorter embolus (figs. 53–55) of males and the much shorter anterior epigynal margin (figs. 56, 57) of females.

MALE: Described by O. P.-Cambridge (1872).

FEMALE: Described by O. P.-Cambridge (1872).

MATERIAL EXAMINED: **Israel:** Plains of Jordan River, Apr. 1865 (O. P.-Cambridge, HDO), 4♂, 3♀ (syntypes); Hatira Ridge, near Sede Boqer, May 8, 1991 (Y. Lubin, HUJ), 2♂; Haluqim Ridge, near Sede Boqer, May 8, 1991 (Y. Lubin, HUJ), 1♀; additional material from Nahal Sekher, Nahal Zin, Miz'pe Ramon, Be'er Menuha, and from En Higiya in the Sinai (HUJ).

DISTRIBUTION: Known only from Israel and the Sinai (map 3).

NATURAL HISTORY: Mature males have been taken, primarily in pitfall traps, from March through May, mature females from April through June, always in arid areas.

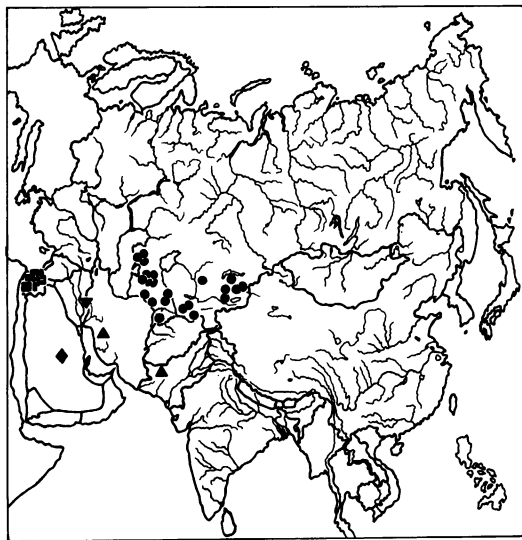
Synphosus turanicus,
new species

Figures 6, 58–66; Map 3

TYPES: Male holotype and female allotype from Baskorgan, Ustyurt Reservation, Ustyurt plateau, Mangistau, Kazakhstan (May 28, 1989; A. A. Raikhanov, S. I. Ibraev), deposited in ZISP.

ETYMOLOGY: The specific name refers to the historical name of the region including the type locality.

DIAGNOSIS: This species seems closest to *S. gracillimus*, but can be distinguished by the longer embolus (figs. 58–60, 63–65) of males and the very long anterior epigynal margin (figs. 61, 62, 66) of females.

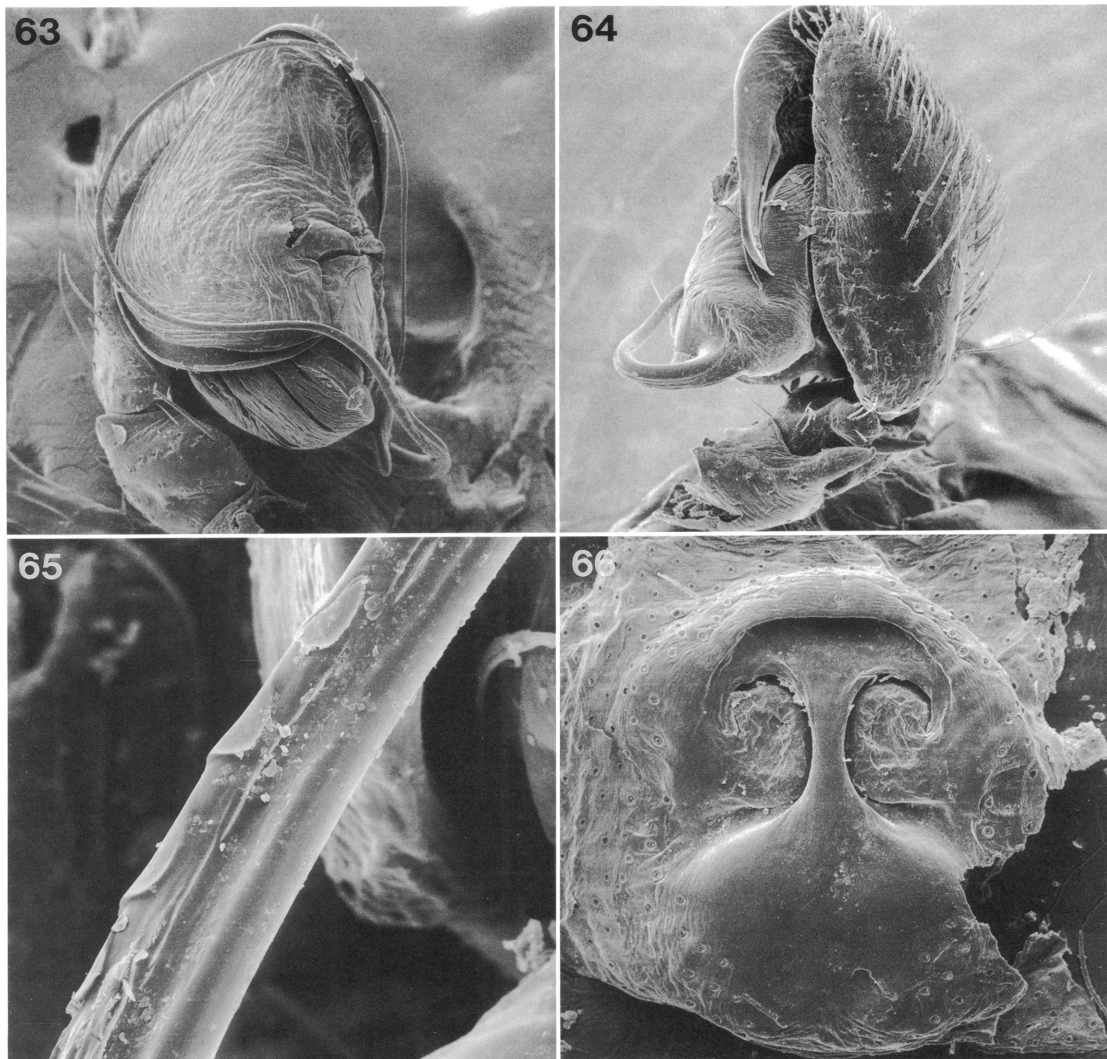


Map 3. Distribution of *Synphosus gracillimus* (squares), *S. turanicus* (circles), *S. neali* (triangles), *S. shirin* (inverted triangle), and *S. khashm* (diamond).

MALE: Total length 3.65. Carapace 1.28 long, 0.95 wide. Femur II 0.75 long. Eye sizes and interdistances: AME 0.06, ALE 0.07, PME 0.09, PLE 0.07; AME-AME 0.04, AME-ALE 0.01, PME-PME 0.03, PME-PLE 0.03, ALE-PLE 0.04; MOQ length 0.20, front width 0.17, back width 0.18. Palp with long, circular embolus; large translucent conductor flange occupying most of bulb; retrolateral tibial apophysis small, patella with flat retrolateral apophysis (figs. 58–60, 63–65). Leg spination: femur IV p0-1-1; tibia III v1-2-2; metatarsi: I v2-2-0; III p0-2-2, r0-1-2.

FEMALE: Total length 3.25. Carapace 1.20 long, 0.93 wide. Femur II 0.70 long. Eye sizes and interdistances: AME 0.06, ALE 0.07, PME 0.08, PLE 0.07; AME-AME 0.04, AME-ALE 0.01, PME-PME 0.03, PME-PLE 0.03, ALE-PLE 0.02; MOQ length 0.20, front width 0.15, back width 0.17. Epigynal atrium deep, with medial keel, anteriorly with one small hood (figs. 61, 66); spermathecae simple, with untwisted median ducts (fig. 62). Leg spination: femur IV p0-0-1; tibiae: I v0-0-0; II v1-1-2; III p2-1-1, v1-2-2; IV r2-1-1; metatarsi: II v2-2-0; III p0-2-2.

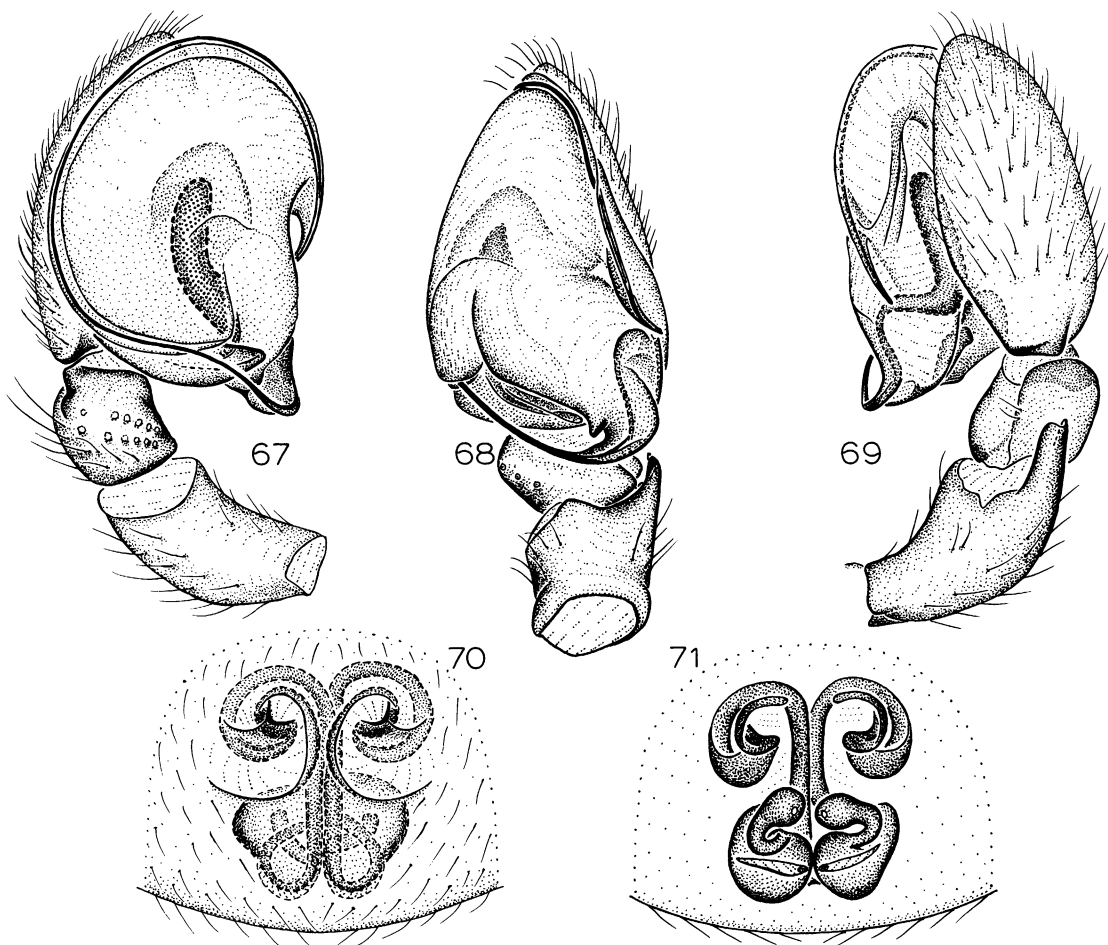
OTHER MATERIAL EXAMINED: **Kazakhstan:** *Alma-Ata:* Kapchagai, May 10–18, 1986 (A.



Figs. 63–66. *Synaphosus turanicus*, new species. **63.** Left male palp, ventral view. **64.** Same, retro-lateral view. **65.** Proximal portion of embolus, ventral view. **66.** Epigynum, ventral view.

A. Zyuzin, ZISP), 5♂, 3♀; Taukum desert, May 6, 1988 (M. Zarko, ZISP), 1♂. *Dzhambul*: 16.7 km NW Kenen, Kindiktas Mt., Krasnogorka area, June 14–15, 1990 (A. A. Zyuzin, A. A. Fedorov, ZISP), 1♀. *Mangistau*: Baskorgan, Ustyurt Reservation, Ustyurt plateau, May 25–28, 1989 (A. A. Raikhanov, S. I. Ibraev, ZISP), 2♂, 3♀; Novyi Uzen, Ustyurt Reservation, Ustyurt plateau, May 12, 1989 (A. A. Zyuzin, ZISP), 1♂. *South Kazakhstan*: 2 km S Aksumbe, Karatau Mt. range, June 16, 1989 (A. A. Zyuzin, ZISP), 1♀. **Kirghizstan**: *Frunze*:

Chon-Aryk, Bozbultek Mt., N slope Kirghiz Mt. range, May. 29, 1983, elev. 1200 m (S. V. Ovchinnikov, ZISP), 1♂, 1♀. **Tadjikistan**: *Kurgan-Tyube*: Garavuti, Dzhilikul area, Apr. 23, 1986, mountains (A. A. Zyuzin, S. L. Zonstein, ZISP, AMNH, USNM), 8♂, 7♀. **Turkmenistan**: *Ashkhabad*: Berzengi, May 31–June 6, 1980 (G. T. Kuznetsov, ZISP), 2♂; Solyukli, Central Kopet-Dag, May 16–23, 1980 (G. T. Kuznetsov, ZISP), 1♂. *Char-dzhou*: Kabakly, Amudarya Reservation, May 3–13, 1987 (F. M. Zeleev, ZISP), 1♂, 1♀; Re-



Figs. 67–71. *Synaphosus minimus* (Caporiacco). 67. Left male palp, prolateral view. 68. Same, ventral view. 69. Same, retrolateral view. 70. Epigynum, ventral view. 71. Same, dorsal view.

petek, May 11–14, 1979 (V. Krivokhatskii, ZISP), 1♂. *Mary*: Kyzyl-Dzhar, Badkhyz Reservation, Apr. 12–22, 1978 (V. Krivokhatskii, ZISP), 2♂. *Tashauz*: Chirishly, May 9, 1985, desert (O. Soyunov, ZISP), 1♂, 1♀; Kaplankyr Reservation, May 5–7, 1983–1984 (O. Soyunov, ZISP), 2♂; Apr. 29–May 17, 1984–1986 (L. Mitroshina, ZISP), 4♂. **Uzbekistan**: *Bukhara*: nr. Bukhara, Kysylkum Desert, May 1980 (R. E. Zlotin, ZISP), 1♀. *Kashkadarya*: Varganza, May 13, 1978 (D. Shcherbakov, ZISP), 1♂. *Samarkand*: Dzham, Sovetabad area, Apr. 30, 1986 (A. A. Zyuzin, ZISP), 1♀.

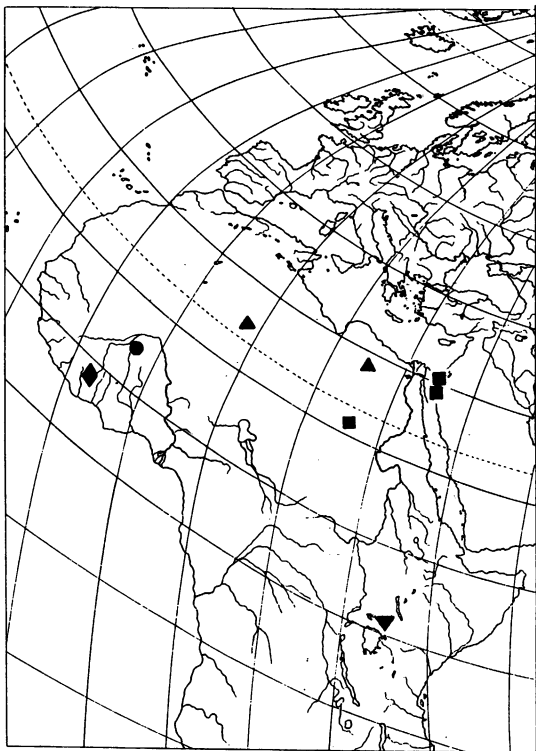
DISTRIBUTION: Widespread in Middle Asia (map 3).

Synaphosus minimus
(Caporiacco),
new combination
Figures 67–71; Map 4

Zelotes minimus Caporiacco, 1936: 114, fig. 11 (female holotype from Ain Zueia, el-Auenat, Libya, in MZF, examined).

DIAGNOSIS: This species resembles *S. neali* (males share a ledge-like retrolateral tibial apophysis and a bifid retrolateral patellar apophysis) but can be distinguished by the shorter process on the embolar base (figs. 67–69) of males and the shorter anterior spermathecal ducts (figs. 70, 71) of females.

MALE: Total length 3.03. Carapace 1.26



Map 4. Distribution of *Synaphosus minimus* (squares), *S. yatenga* (circle), *S. intricatus* (triangles), *S. evertsi* (diamond), and *S. kakamega* (inverted triangle).

long, 0.97 wide. Femur II 0.83 long. Eye sizes and interdistances: AME 0.07, ALE 0.09, PME 0.10, PLE 0.08; AME-AME 0.04, AME-ALE 0.01, PME-PME 0.02, PME-PLE 0.02, ALE-PLE 0.03; MOQ length 0.22, front width 0.17, back width 0.19. Palp with long, narrow, twisted embolus bearing small process at base; retrolateral tibial apophysis flat, narrowed dorsally; retrolateral patellar apophysis bifid, groovelike at tip (figs. 67–69). Leg spination: femora: III d1-1-0, p0-0-1, r0-0-1; IV d1-1-0, p0-0-1; tibiae: I v2-2-2; III v1-2-2; IV p1-1-1, v1-2-2, r2-2-0; metatarsi: II v2-2-0; III p2-2-0, v2-2-1r, r1-2-0.

FEMALE: Described by Caporiacco (1936).

MATERIAL EXAMINED: **Egypt: Sinai:** Dabab, Red Sea coast, Apr. 16, 1987 (V. D. Roth, HUI), 1♂; Wadi Yah'med, Jan. 28, 1968 (S. Reichenstein, HUI), 1♀. **Libya:** Ain Zueia, el-Auenat (= Ein Zuweia), Apr. 1933 (MZF), 1♀ (holotype).

DISTRIBUTION: Known only from Libya and the Sinai (map 4).

Synaphosus intricatus (Denis),
new combination

Figures 72–76; Map 4

Zelotes intricatus Denis, 1947: 61, pl. 4, fig. 4 (female holotype from Khamissa, Siwa Oasis, Egypt, in BMNH, examined).

DIAGNOSIS: This species resembles *S. minimus* and *S. neali* but can be distinguished by the two small retrolateral tibial apophyses and the long, medially curved retrolateral patellar apophysis (figs. 72–74) of males and the position of the anterior pockets of the atrium and the highly twisted posterior spermathecal ducts (figs. 75, 76) of females. Males and females have not been taken together, but are tentatively paired here because of their respective similarities to those of *S. minimus*.

MALE: Total length 3.33. Carapace 1.37 long, 0.97 wide. Femur II 0.77 long. Eye sizes and interdistances: AME 0.07, ALE 0.09, PME 0.09, PLE 0.07; AME-AME 0.04, AME-ALE 0.01, PME-PME 0.04, PME-PLE 0.03, ALE-PLE 0.04; MOQ length 0.22, front width 0.20, back width 0.20. Palp with long, circular embolus without distinctive process at base; tibia with two small, widely spaced retrolateral apophyses; retrolateral patellar apophysis narrow, long (longer than tibia), slightly curved medially (figs. 72–74). Leg spination: femora: III d1-1-0, p0-1-1, r0-1-1; IV d1-1-0, p0-0-1; tibiae: I v2-2-2; II p0-1-1; III v1-2-2; IV r2-2-0; metatarsi: II v2-2-0; III p2-2-0, v2-2-1r, r1-2-0.

FEMALE: Described by Denis (1947).

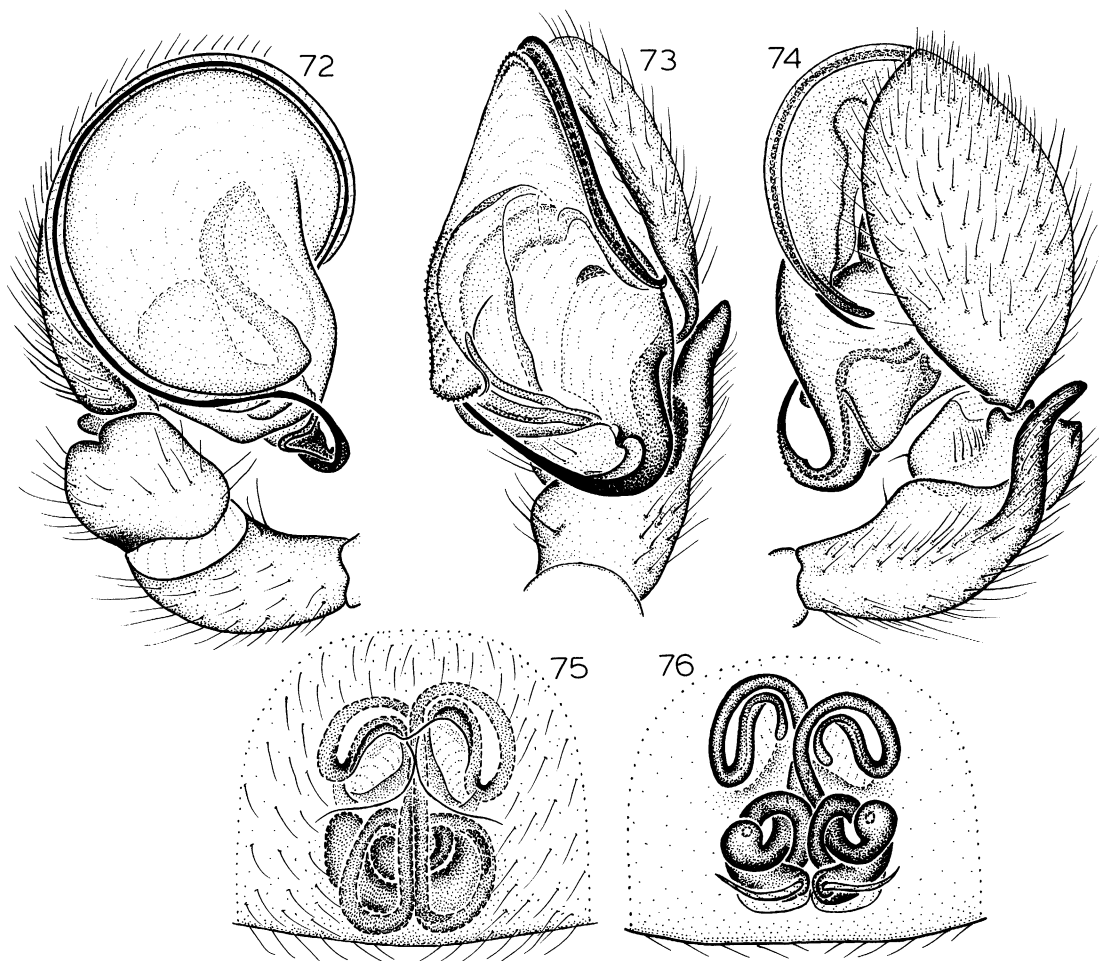
MATERIAL EXAMINED: **Algeria:** Iherir (R. Bosmans, CRB), 1♂. **Egypt:** Khamissa, Siwa Oasis, May 6, 1935, marsh (Omer-Cooper Expedition, BMNH), 1♀ (holotype).

DISTRIBUTION: Known only from Algeria and Egypt (map 4), although Denis (1955) recorded a specimen (not seen by us) from Niger.

Synaphosus neali, new species

Figures 77–81; Map 3

TYPES: Male holotype and female allotype from 18 km SE Kharan, Kalat, Baluchistan, Pakistan (Feb. 13–16, 1965; J. Neal), deposited in USNM.



Figs. 72–76. *Synaphosus intricatus* (Denis). 72. Left male palp, prolateral view. 73. Same, ventral view. 74. Same, retrolateral view. 75. Epigynum, ventral view. 76. Same, dorsal view.

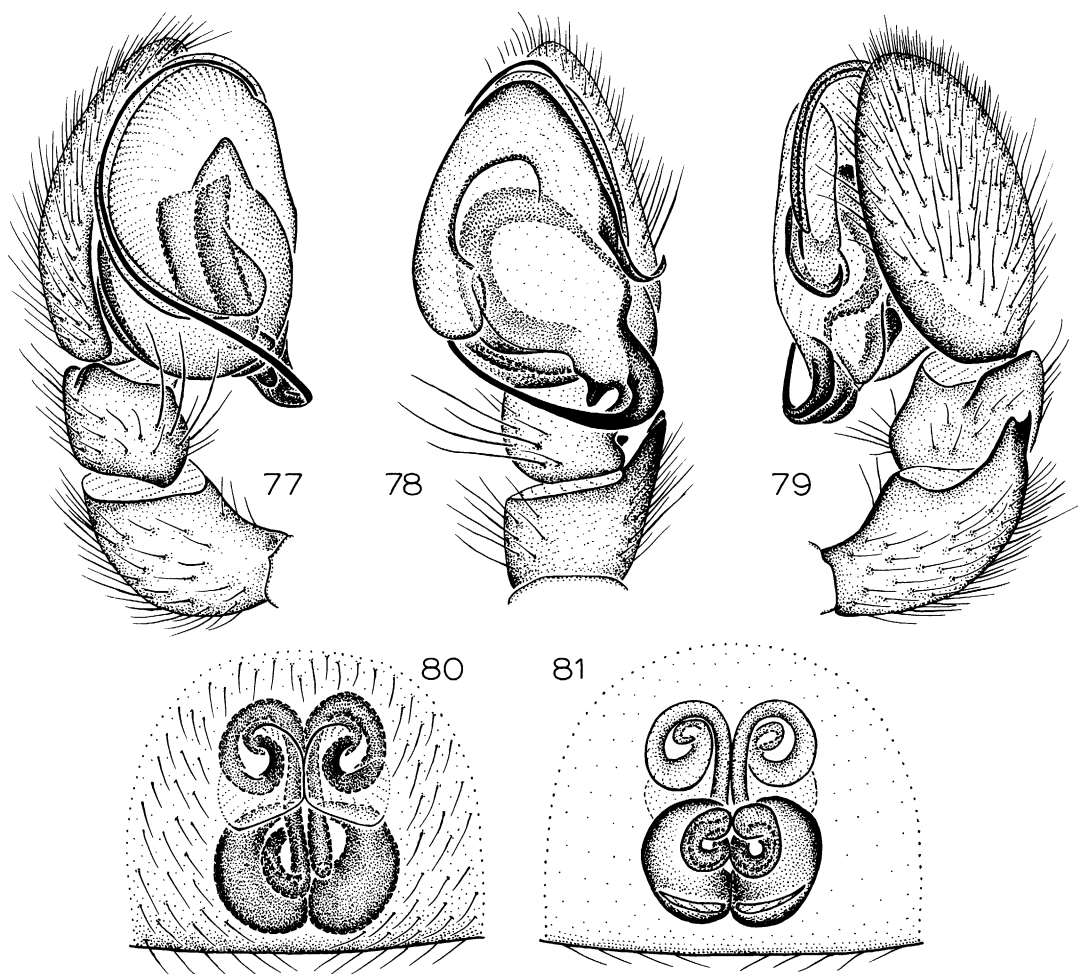
ETYMOLOGY: The specific name is a patronym in honor of the collector of the holotype.

DIAGNOSIS: This species resembles *S. minimus*, but can be distinguished by the longer process on the base of the embolus (figs. 77–79) of males and the longer anterior spermathecal ducts (figs. 80, 81) of females.

MALE: Total length 3.80. Carapace 1.46 long, 1.04 wide. Femur II 0.85 long. Eye sizes and interdistances: AME 0.06, ALE 0.09, PME 0.09, PLE 0.06; AME-AME 0.05, AME-ALE 0.01, PME-PME 0.04, PME-PLE 0.04, ALE-PLE 0.04; MOQ length 0.22, front width 0.18, back width 0.21. Palp with long, circular embolus, large translucent conductor

flange occupying most of bulb; retrolateral tibial apophysis ledgelike, small, patella with flat, distally bifid retrolateral apophysis (figs. 77–79). Leg spination: femora: III d1-1-0; IV d1-1-0, p0-0-1; tibiae: I p1-1-0, v2-2-2; II p1-1-0; IV r1-1-2; metatarsi: II p0-0-1, v2-2-0; III p0-2-2, v2-1p-0.

FEMALE: Total length 3.85. Carapace 1.48 long, 1.04 wide. Femur II 0.86 long. Eye sizes and interdistances: AME 0.06, ALE 0.08, PME 0.09, PLE 0.08; AME-AME 0.06, AME-ALE 0.01, PME-PME 0.03, PME-PLE 0.04, ALE-PLE 0.04; MOQ length 0.21, front width 0.18, back width 0.23. Epigynal atrium deep, with narrow medial keel (fig. 80); spermathecae simple, median ducts not twisted (fig.



Figs. 77–81. *Synaphosus neali*, new species. 77. Left male palp, prolateral view. 78. Same, ventral view. 79. Same, retrolateral view. 80. Epigynum, ventral view. 81. Same, dorsal view.

81). Leg spination: femora: III d1-1-0; IV d1-1-0, p0-0-1; tibiae: I v1p-0-0; II p0-1-0, v1r-1r-1p; IV r2-1-1; metatarsi: I v2-1p-0; II v2-2-0; III v2-1-1r, r0-1-2.

OTHER MATERIAL EXAMINED: **Iran:** *Fars:* 13 km SE Shiraz, July 2, 1965 (J. Neal, USNM), 1♀.

DISTRIBUTION: Known only from Iran and Pakistan (map 3).

***Synaphosus shirin*, new species**

Figures 82, 83; Map 3

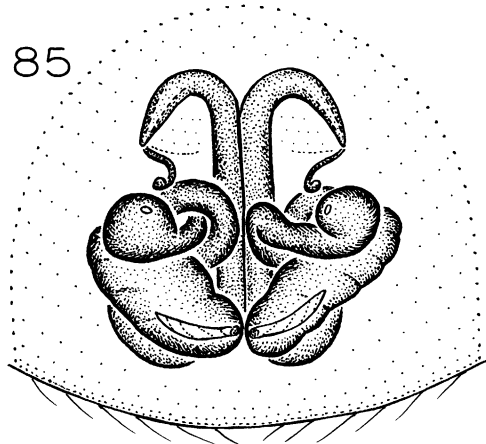
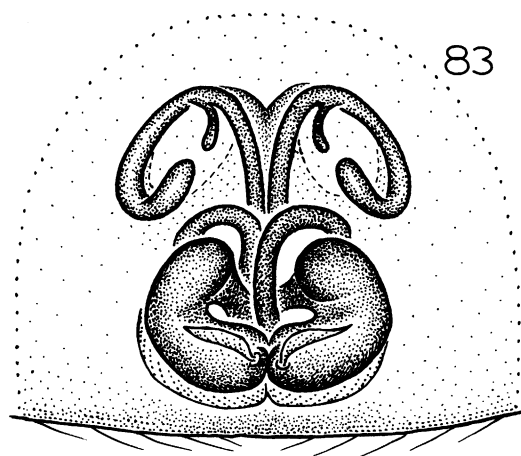
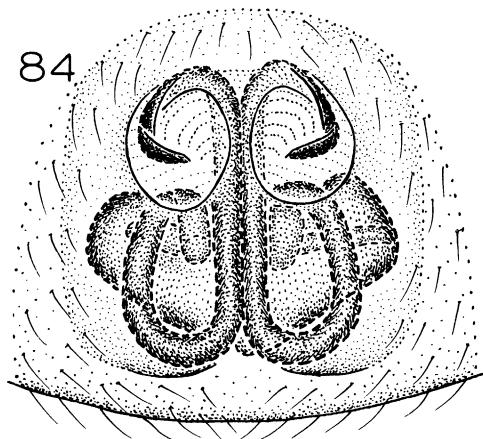
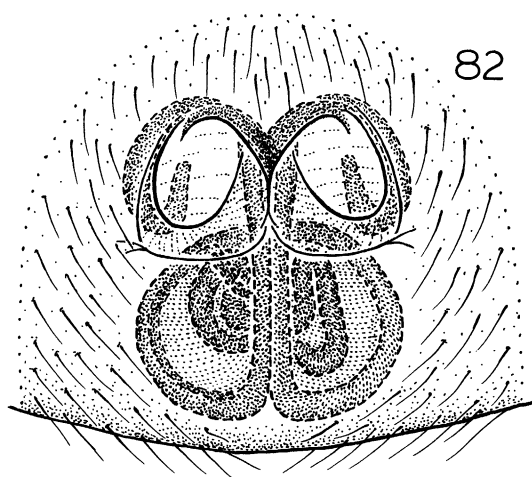
TYPE: Female holotype from 8 km E Qasr-e-Shirin, Kermanshahan, Iran (Apr. 15, 1964; J. Neal), deposited in USNM.

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: This species seems closest to *S. minimus* and *S. neali* but can be distinguished by the two very closely spaced anterior pockets of the epigynal atrium and the very long, twisted ducts of the spermathecae (figs. 82, 83).

MALE: Unknown.

FEMALE: Total length 3.70. Carapace 1.44 long, 1.08 wide. Femur II 0.81 long. Eye sizes and interdistances: AME 0.05, ALE 0.07, PME 0.09, PLE 0.09; AME-AME 0.06, AME-ALE 0.01, PME-PME 0.03, PME-PLE 0.03, ALE-PLE 0.05; MOQ length 0.20, front width



Figs. 82–85. 82, 83. *Synaphosus shirin*, new species. 84, 85. *S. khashm*, new species. 82, 84. Epigynum, ventral view. 83, 85. Same, dorsal view.

0.16, back width 0.23. Epigynal atrium with two very closely spaced pockets (fig. 82); spermathecal ducts without elaborate twists (fig. 83). Leg spination: femora: III d1-1-0; IV d1-1-0, p0-0-1; tibiae: III p2-2-0; IV p1-1-1, r2-2-0; metatarsi: II v2-2-0; III v2-2-1r, r0-1-2.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Known only from Iran (map 3).

***Synaphosus khashm*, new species**

Figures 84, 85; Map 3

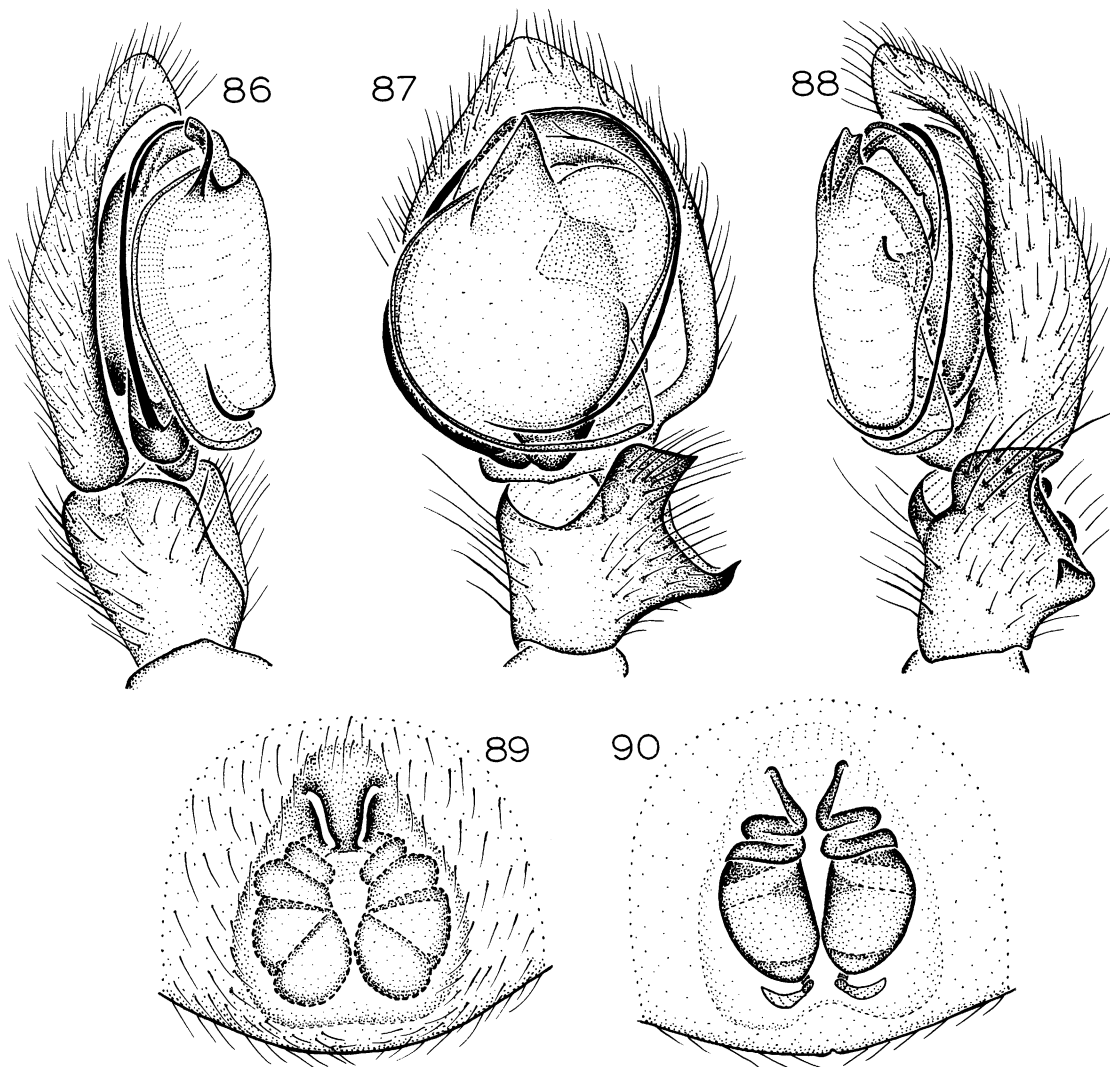
TYPE: Female holotype from Khashm Khafs, Ar Riyad, Saudi Arabia (March 13, 1981: W. Büttiker), deposited in NMB.

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Females resemble those of *S. minimus* and *S. intricatus* but can be distinguished by the laterally spaced pockets of the epigynal atrium and the short anterior spermathecal ducts and simple spermathecae, without elaborate twists (figs. 84, 85).

MALE: Unknown.

FEMALE: Total length 4.44. Carapace 3.18 long, 2.15 wide. Femur II 0.81 long. Eye sizes and interdistances: AME 0.06, ALE 0.09, PME 0.09, PLE 0.07; AME-AME 0.05, AME-ALE 0.01, PME-PME 0.03, PME-PLE 0.05, ALE-PLE 0.05; MOQ length 0.21, front width



Figs. 86–90. *Synaphosus kakamega*, new species. 86. Left male palp, prolateral view. 87. Same, ventral view. 88. Same, retrolateral view. 89. Epigynum, ventral view. 90. Same, dorsal view.

0.16, back width 0.19. Epigynal atrium with laterally spaced pockets (fig. 84); anterior spermathecal ducts short, spermathecae simple, ducts without elaborate twists (fig. 85). Leg spination: femur IV d1-1-0, p0-0-0; tibiae: II v0-0-1p; III p2-1-1, v1-2-2; IV d0-0-0, p1-1-1, r2-1-1; metatarsi: I v2-0-0; II v2-2-0; III p0-2-2, v2-1p-1r, r0-1-2.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Known only from Saudi Arabia (map 3).

THE KAKAMEGA GROUP

The single species assigned to this group is easily recognized by the presence of two retrolateral apophyses on the male palpal tibia and the absence of retrolateral apophysis on the male palpal patella (figs. 87, 88), and by the two narrow, longitudinal atrial pockets (with posteriorly directed copulatory openings) of the female epigynum (figs. 89, 90).

Synaphosus kakamega,

new species

Figures 86–90; Map 4

TYPES: Male holotype and female allotype from an elevation of 1600 m in the Kakamega Forest, Kisieni area, Kenya (Jan. 19–21, 1969; Å. Holm), deposited in UZM.

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Males can easily be recognized by the two retrolateral apophyses on the tibia (figs. 86–88), females by the two narrow, longitudinal atrial epigynal pockets (figs. 89, 90).

MALE: Total length 3.30. Carapace 1.22 long, 0.90 wide. Femur II 0.76 long. Eye sizes and interdistances: AME 0.05, ALE 0.07, PME 0.06, PLE 0.05; AME-AME 0.03, AME-ALE 0.01, PME-PME 0.03, PME-PLE 0.03, ALE-PLE 0.02; MOQ length 0.15, front width 0.11, back width 0.13. Palp with long, circular embolus, only apical part of embolus lying in groove of conductor; two retrolateral tibial apophyses, apical one small, shifted dorsally, other one large, shifted laterally (figs. 86–88). Leg spination: femora: I, II d1-0-0;

III d1-1-0, p0-0-1, r0-0-1; IV d1-1-0, p0-0-0; tibiae: II v0-0-0; III d0-0-0; IV d0-0-0, p1-1-0, v1-2-2; metatarsi: I v0-0-0; III p0-2-2, v0-1-0, r0-1-2; IV p0-2-2, v2-2-0.

FEMALE: Total length 3.33. Carapace 1.22 long, 0.95 wide. Femur II 0.70 long. Eye sizes and interdistances: AME 0.05, ALE 0.07, PME 0.08, PLE 0.06; AME-AME 0.03, AME-ALE 0.01, PME-PME 0.03, PME-PLE 0.03, ALE-PLE 0.04; MOQ length 0.17, front width 0.13, back width 0.15. Epigynal atrium represented by two narrow longitudinal pockets with posteriorly directed copulatory openings (fig. 89); spermathecal ducts wide, closely spaced posteriorly, narrow, twisted anteriorly (fig. 90). Leg spination: femora: I, II p0-0-0; III d1-1-0, p0-0-1, r0-0-1; IV d1-1-0, p0-0-0, r0-0-0; tibiae: II v0-0-0; III d0-0-0, p0-1-1, v0-2-2; IV d0-0-0, p1-1-0, v1p-2-2; metatarsi: I v0-0-0; II v0-0-2; III v2-1-1r, r0-1-2; IV p0-1-2, v1p-1p-0, r1-1-1.

OTHER MATERIAL EXAMINED: One female taken with the types (AMNH).

DISTRIBUTION: Known only from Kenya (map 4).

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