ZHELTUKHINA, V. I. (1984): [The species composition and habitat distribution of spiders of the Central-Forest State Reserve]. — In: [The fauna and ecology of arachnids]: 101-111; Perm (Perm State Univ.) [in Russian].

ZONSTEIN, S. L. (1984): [To the fauna and ecology of spiders (Aranei) of the lower strata of the walnut-fruit forests of southern Kirghizia]. — Ent. Issled. v. Kirghizii, 17: 144-151; Frunze [in Russian].

Author: KIRILL Y. ESKOV, c/o National Committee of Soviet Biologists, Leninsky prospekt 33, Moscow V-71, USSR.

With author's compliments

Senckenbergiana biol. | 67 (1986) | (4/6) | 279-296 | Frankfurt am Main, 31. 7. 1987

The spider genus *Robertus* O. PICKARD-CAMBRIDGE in the USSR, with an analysis of its distribution[1])

(Arachnida: Araneae: Theridiidae).

By

KIRILL Y. ESKOV,
Moscow.

With 18 figures and 1 map.

Abstract: The USSR fauna of *Robertus* O. PICKARD-CAMBRIDGE 1879 comprises 13 species (of which one is reported herein only from literature), including *golovatchi* n. sp. and *mediterraneus* n. sp. from the Caucasus, *kastoni* n. sp. and *sibiricus* n. sp. from E-Siberia, and *ussuricus* n. sp. from the Far East. Besides, *arganoi* BRIGNOLI 1980 from Sardinia, Italy, becomes a junior synonym of *Enoplognatha testacea* SIMON 1884; *cottarellii* BRIGNOLI 1980 from Italy and *potanini* SCHENKEL 1963 from the Tien-Shang Mts., Central Asia, have been shown to belong in genera different from *Robertus*. Thus the latter now comprises worldwide 38 valid species, distributed between four major faunal centers: Atlantic and Pacific coasts of North America, Europe with both W-Siberia and Central Asia, and E-Siberia with the Far East.

Robertus O. PICKARD-CAMBRIDGE 1879 is a large theridiid genus, with its members known as inhabiting forest litter, moss, crevices under stones, etc., and habitually similar to Erigoninae which occur in the same biotopes. Generally, the genus is Holarctic in the distribution, with 20 species in Europe (cf. WUNDERLICH 1973, BRIGNOLI 1980) and 16 in North America (cf. KASTON 1946, CHAMBERLIN & IVIE 1947). The only endemic Asian species is *potanini* SCHENKEL 1963 from the Tien-Shang of China.

Eight *Robertus* have hitherto been registered in the USSR fauna, with only three of them, namely *lividus* (BLACKWALL 1836), *arundineti* (O. PICKARD-CAMBRIDGE 1871), and *neglectus* (O. PICKARD-CAMBRIDGE 1871), occurring also in the Asian part of the USSR.

The present paper is a revision of *Robertus* of the USSR fauna, chiefly based on newly collected materials from various parts of the country, in particular from Siberia, the Far East and the Caucasus. Besides, I have been able to restudy both FEDTSCHENKO's and SYTSHEVSKAJA's collections from Turkestan and Kamchatka, respectively, kept at the Zoological Museum of the Moscow State University

[1]) Contribution to the fauna of the Caucasus, conducted by S. I. GOLOVATCH and J. MARTENS 1981, No. 8. — No. 7: Spixiana, 9 (3): 239-243, 1987 (for 1986). — Sponsored by Soviet Academy of Sciences (S. I. G., J. M.) and German Research Society (J. M.).

(ZMMU) (cf. KRONEBERG 1875, SYTSHEVSKAJA 1935). All in all, no less than 12 species of *Robertus* have emerged, of which five have turned out to be new to science.

The material treated below is deposited in the collections of the ZMMU (all holotypes) and partly in the Senckenberg-Museum, Frankfurt a. M. (SMF) (some para- and non-types). All measurements in the text and figures are given in mm.

Before going further, I wish to express my deep gratitude to the following persons whose materials served as basis for the present paper: Mrs. T. R. ANDREEVA (Moscow), Mr. V. V. BELOV (Moscow), Dr. S. I. GOLOVATCH (Moscow), Mr. Y. M. MARUSIK (Magadan), Mr. A. B. RYVKIN (Moscow) Mr. S. A. SERBENIUK (Moscow), Mr. A. V. TANASEVITCH (Moscow), Dr. A. L. TIKHOMIROVA (Moscow), Mrs. E. M. VESELOVA (Moscow), Dr. V. V. ZHERIKHIN (Moscow), and Mr. S. L. ZONSTEIN (Frunze). Besides, I am particularly indebted to Mr. K. G. MIKHAJLOV, Keeper of Arachnida at the ZMMU, who not only allowed to check his own identified and unidentified materials of *Robertus*, but also provided facilities for a restudy of the ancient FEDTSCHENKO and SYTSHEVSKAJA collections.

Robertus arundineti (O. PICKARD-CAMBRIDGE 1871).

1871 *Neriene arundineti* O. PICKARD-CAMBRIDGE, Trans. Linn. Soc. Lond., **27**: 441.

1967 *Robertus arundineti* MILLER, Prirod. Prace Ust. cesk. Akad. Brno, (NS) **1** (7): 284, pl. 10-11.

Material: 2♂ (ZMMU), USSR, Murmansk area, Kandalaksha State Reserve, bog, 27. VII. 1980, leg. Y. B. BYZOVA, det. K. G. MIKHAJLOV. — 1♂ (ZMMU), Moscow area, Zvenigorod Biol. Station of Moscow State University, wet meadow, 19. VI. 1981, leg. & det. K. G. MIKHAJLOV. — 1♂ (ZMMU), Ryazan area, Oka State Reserve, dry meadow, 14. VI. 1981, leg. K. ESKOV. — 1♂ (ZMMU), Caucasus, Armenia, Dilizhan State Reserve, Agartsyn (Pambak Mt. Ridge), 1250-1300 m, *Fagus* forest, 17. VI. 1983, leg. S. I. GOLOVATCH. — 1♂ (ZMMU), Armenia, Megri Distr., SSE of Lichk, Megri River Valley, 1530 m, *Quercus* forest, in litter, rotten wood and under stones, 25. VI. 1983, leg. S. I. GOLOVATCH. — 1♀ (ZMMU), Georgia, Chokhatauri Distr., near Bakhmaro ca. 40 km SSE of Nabeglavi, 1550-1700 m, *Abies-Picea-Fagus* forest, 8. VI. 1981, leg. S. I. GOLOVATCH & J. MARTENS. — 1♀ (ZMMU), Georgia, Borzhomi State Reserve, Baniskhevi Valley, 800-900 m, *Picea-Fagus-Carpinus* forest, litter & under stones, 12. & 16. V. 1983, leg. S. I. GOLOVATCH. — 1♀ (ZMMU), Azerbaidjan, Lenkoran Distr., Apo, ca. 8 km SW of Alexeevka, *Quercus, Acer, Carpinus, Parrotia* forest, 250-70 m, 16. X. 1983, leg. S. I. GOLOVATCH. — 1♀ (ZMMU), Azerbaidjan, Nakhichevan ASSR, S of Bichenek Pass, Shakhbuz, oak forest, 1900 m, litter, 22. IV. 1983, leg. S. I. GOLOVATCH. — 3♀ (ZMMU), Azerbaidjan, Mountainous Karabakh Autonomous Region, Dashalty near Shusha, 1100-1300 m, *Quercus, Carpinus* etc. forest, litter, 1. V. 1983, leg. S. I. GOLOVATCH. — 2♀ (ZMMU), Dagestan ASSR, Upper Gunib, 1700 m, *Betula-Pinus* forest, litter, 8. & 9. VI. 1982, leg. S. I. GOLOVATCH. — 3♀ (ZMMU), N-Osetian ASSR, 10 km NW of Mozdok, *Acacia* hedge along field, litter, 28. V. 1982, leg. S. I. GOLOVATCH. — 2♀ (ZMMU), Kazakhstan, Uralsk area, Djanybek, forest hedge along field, 29. VIII. & 16. IX. 1982, leg. & det. K. G. MIKHAJLOV. — 1♀ (ZMMU), Uzbekistan, Surkhan-Darya area, Aktash (Kuhitang-Tau Mt. Ridge), 450 m, *Scirpus* thicket near spring, 10. V. 1985, leg. A. V. TANASEVITCH. — 1♀ (SMF 34096), Uzbekistan, Tashkent area, Sidjak, Kainar-Sai Kanyon (Ugam Mt. Ridge), 1600 m, *Juglans* forest, 22.-25. IV. 1983, leg. A. V. TANASEVITCH. — 1♂ (ZMMU), Kirghizia, Osh area, Sary-Chelek State Reserve (Chatkal Mt. Ridge), 1800 m, *Juglans* forest, 29. IV. 1983, leg. A. V. TANASEVITCH & S. L. ZONSTEIN. — 1♂ (SMF 34097), Kirghizia, Frunze, V.-VI. 1979, leg. S. L. ZONSTEIN. — 1♂ 9♀ (ZMMU), Kazakhstan, Alma-Ata area, Alma-Ata State Reserve (Trans-Ili Mt. Ridge), 1650 m, 30. VIII. 1983, leg. Y. M. MARUSIK.

Distribution: Widespread in the USSR European part, reaching in the east the S- and N-Urals (AZHEGANOVA 1951, PAKHORUKOV 1979). Within the USSR Asian part, besides the above localities, it has been recorded from Azerbaidjan (DUNIN 1984), Tadjikistan (SPASSKY & LUPPOVA 1945), Kirghizia (ZONSTEIN 1984) and E-Kazakhstan (SAVELIEVA 1979). Outside the USSR this species occurs throughout Europe, including Iceland (WUNDERLICH 1973).

Robertus frivaldszkyi (CHYZER 1894).

1894 *Pedanostethus Rivaldszkyi* CHYZER, in CHYZER & KULCZYŃSKI, Araneae Hungariae, **2**, pars prior: Theridiidae, Budapest,: 47.

1976 *Robertus frivaldszkyi* WUNDERLICH, Senckenbergiana biol., **57** (1/3): 107, 111.

Material: 1♂ (ZMMU), USSR, Moldavia, Bachoy, apple orchard, 18. VIII. 1981, leg. V. MATSUK.

Distribution: In the USSR, this species has hitherto been recorded only in Moldavia (ADASHKEVITCH 1974), outside the USSR in SE-Europe (WUNDERLICH 1973).

Robertus golovatchi n. sp.

Figs. 1-2.

Holotype: ♂ (ZMMU), USSR, Caucasus, Georgia, Chokhatauri Distr., Bakhmaro Pass, ca. 40 km SE of Nabeglavi (Meskheti Mt. Ridge), 1550-1700 m, *Abies-Picea-Fagus* forest, 8. VI. 1981, leg. S. I. GOLOVATCH & J. MARTENS.

Diagnosis: By its palpal structure, *golovatchi* n. sp. seems particularly closely related to *lividus* (BLACKWALL 1836) and *truncorum* (L. KOCH 1872), but is well distinguishable from both of them by the smaller size, process of the median apophysis very long and directed forward, and armature of the cheliceral groove (in both *lividus* and *truncorum* the largest tooth is the middle one).

Description: ♂: Total length 2·36, carapace 1·25 long and 0·88 wide. Carapace, legs and chelicerae orange-brown, abdomen pale grey. Anterior margin of cheliceral groove with three teeth, the proximal of them being the largest and set off from contiguous both distal ones. Palpal median apophysis with two lobe-like processes, one of them reaching to distal end of cymbium; mesal margin of latter with a row of long setae (Figs. 1-2). — ♀: Unknown.

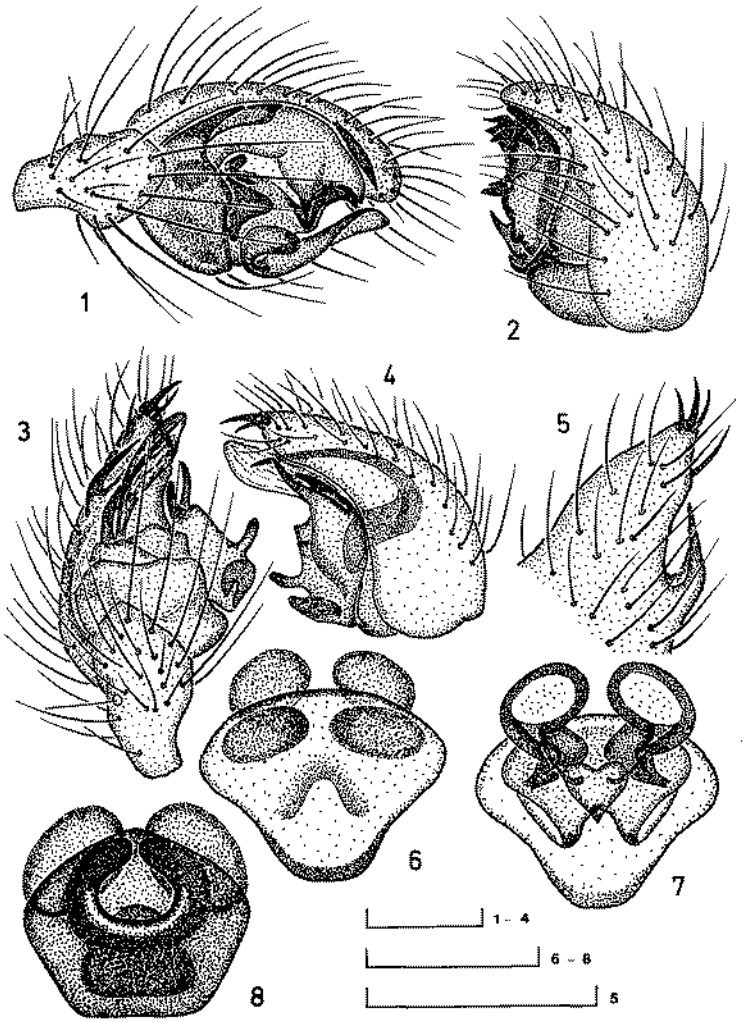
Distribution: The Caucasus Minor: forest belt of the Meskheti Mt. Ridge.

Robertus insignis O. PICKARD-CAMBRIDGE 1907.

1907 *Robertus insignis* O. PICKARD-CAMBRIDGE, Proc. Dorset nat. Hist. Antiq. Field Club, **28**: 127, 138.

1976 *Robertus insignis* WUNDERLICH, Senckenbergiana biol., **57** (1/3): 107, 111.

Distribution: In the USSR, this species has hitherto been recorded only in Estonia (VILBASTE 1980), outside the USSR in Middle Europe (WUNDERLICH 1973).



Figs. 1-8. *Robertus golovatchi* n. sp., ♂ holotype (1-2), *Robertus kastoni* n. sp., ♂♀ paratypes (3-7) and *Robertus ussuricus* n. sp., ♀ holotype (8). — 1-2) male palp (ectal & mesal views, respectively); 3-4) male palp (ectal & mesal views, respectively); 5) apex of male palp; 6-7) epigyne & vulva, respectively; 8) epigyne. — Scale = 0·2 mm.

Robertus kastoni n. sp.

Figs. 3-7.

Holotype: ♂ (ZMMU), USSR, Siberia, Krasnoyarsk area, Evenk Autonomous Region, Taymura River, delta of Chambe River, forestless *Sphagnum* bog with *Betula nana*, 22. VIII. 1982, leg. K. Eskov.

Paratypes: 1♂ 7♀ (ZMMU), 1♂ 2♀ (SMF 34098), same data as holotype. — 5♂ 26♀ (ZMMU), same locality, boggy forest of depressed *Larix dahurica* with *Andromeda palustre*, *Vaccinium uliginosum* and *Betula nana*, 19.-20. VIII. 1982, leg. K. Eskov. — 3♂ 8♀ (ZMMU), Taymura River, delta of Neptenne River, forestless *Sphagnum* bog with *Betula nana*, 2. VIII. 1982, leg. K. Eskov. — 1♂ 13♀ (ZMMU), Khabarovsk Prov., Dzhugdzhur Mt. Range, Amka River Valley, delta of Khetana Stream (Ulya River Basin), *Sphagnum* tussock in valley forest of *Larix dahurica*, *Betula platyphylla*, *Rosa* bush, Gramineae, 19. VIII. 1985, leg. V. V. Zherikhin. — 3♂ 2♀ (ZMMU), environs of Magadan, 10 km N of Palatka, in *Sphagnum*, 3. VII. 1985, leg. Y. M. Marusik. — 1♂ 3♀ (ZMMU), Siberia, Magadan area, upper flow of Kolyma River, Sibit-Tyellakh (Bolshoy Annachag Mt. Ridge), 500 m, *Alnus fruticosa* bushes with *Hylacomium* and *Pleurozium* along spring, 24. VIII. 1983, leg. K. Eskov & Y. M. Marusik. — 1♀ (ZMMU), same locality, *Sphagnum* bog in moraine depression, 25. VIII. 1984, leg. K. Eskov & Y. M. Marusik. — 2♂ 6♀ (ZMMU), same locality, boggy sparse forest of depressed *Larix dahurica*, 3.-24. VIII. 1984, leg. B. P. Chevrizov. — 2♂ 5♀ (ZMMU), 1♂ 1♀ (SMF 34099), Magadan area, Kolyma River 10 km upstream of Vetrennyi, *Alnus fruticosa* bushes with *Sphagnum*, *Hylacomium* and *Pleurozium*, 5. VIII. 1984, leg. K. Eskov.

Diagnosis: The presence of a group of strong setae on the apex of cymbium makes *kastoni* n. sp. particularly closely related to N-American *frontata* (Banks 1892), *banksi* (Kaston 1946), *laticeps* (Keyserling 1884), *longipalpis* (Kaston 1946) and *riparius* (Keyserling 1886) (see Kaston 1946). However, from all of them *kastoni* n. sp. differs in the shape of the outgrowths of the median apophysis, arrangement of the apical cymbial setae and absence of an outlined fovea on the epigynal plate.

Description: ♂: Total length 2·25-2·53, carapace 1·00-1·10 long and 0·75-0·80 wide. Carapace, chelicerae and legs brownish-yellow, abdomen pale grey to whitish. Anterior margin of cheliceral groove with three contiguous teeth, the middle one being the largest. Palp with the median apophysis provided with two outgrowths, one of which is directed forward and the other curved backward (Figs. 3-4). Apical part of cymbium with four strong setae, of which three are situated apically (middle one being the largest) and fourth of them located at ectal margin (Fig. 5).

♀: Total length 2·00-2·52, carapace 1·00-1·05 long and 0·75-0·80 wide. Coloration and armature of chelicerae as in ♂. Palpal claw with five minute teeth. Epigynal plate somewhat wider than long and considerably tapering caudad; its surface deprived of both projections and depressions (Fig. 6). Vulva with small oval receptacula, terminal parts of which almost converge (Fig. 7).

Distribution: Siberia: Middle Siberian Plateau, Dzhugdzhur Mt. Range, Okhotsk Sea Coast near Magadan and upper flow of Kolyma River.

Robertus lividus (Blackwall 1936).

Fig. 13.

1836 *Neriene livida* Blackwall, London Phil. Mag. J. Sci., (3) 8: 486.
1967 *Robertus lividus* Miller, Prirod. Prace Ust. cesk. Akad. Brno, (NS) 1 (7): 283, pl. 10-11.

Material: 1♂ (ZMMU), USSR, Murmansk area, Kandalaksha State Reserve, *Betula* forest, 24. VIII. 1978, leg. Y. B. Byzova, det. K. G. Mikhajlov. — 30♂♀ (ZMMU), Moscow area, Tishkovo, Ucha River, *Picea* forest, V.-IX. 1981, leg. A. A. Zakharov. — 1♂

(ZMMU), Moscow area, Zvenigorod Biol. Station of the Moscow State University, *Betula* forest, 27. IX. 1981, leg. & det. K. G. Mikhajlov. — 1♀ (ZMMU), Kostroma area, Kologriv, forest of *Picea abies* with *Vaccinium myrtilus*, 16. VII. 1983, leg. P. K. Yeremin, det. K. G. Mikhajlov. — 1♀ (ZMMU), Ryazan area, Oka State Reserve, *Pinus* forest with *Pleurozium*, 26. VI. 1981, leg. K. Eskov. — 1♂ (ZMMU), Siberia, environs of Krasnoyarsk, Sorokino, *Betula* forest, 23. VIII. 1984, leg. A. B. Ryvkin. — 1♂ 5♀ (ZMMU), 1♂ 2♀ (SMF 34100), Krasnoyarsk area, Yenisei River, Mirnoye (62°20'N), valley forest of *Picea sibirica* with *Hylacomium*, VI.-VIII. 1977, leg. K. Eskov. — 1♂ (ZMMU), Magadan area, Okhotsk Sea Coast, River Kava Valley, ca. 72 km upstream, 13. VI.-1. VII. 1983, leg. A. Mestcheryakov. — 3♀, Siberia, Kamchatka Peninsula, Kamchatka River, Kluchi, Kharchinski Mt. Ridge, 5. IX. 1930. — 3♀, Kamchatka River, Kozyrevsk 29. VII. 1930. — 1♂ 2♀ Kamchatka River, Nerpichye Lake, 27. IX. 1930, all leg. & det. V. A. Sytshevskaja, ZMMU Ta 2397-Ta 2401).

Distribution: Widespread in the USSR European part. In the USSR Asian part, it has hitherto been recorded in the Tyumen area, lower flow of Ob River (Kulczyński 1916), middle flow of Yenisei River (Holm 1973) and Kamchatka (Kulczyński 1926, Sytshevskaja 1935). The discovery of this species in Turkestan (Urgut) by Kroneberg (1875) is erroneous: the specimen identified by Kroneberg as *Erigone livida* Blackwall (ZMMU Ta 1108, examined) actually belongs to *Enoplognatha testacea* Simon 1884. Dunin's (1984) record of *lividus* in the Apsheron Peninsula, Azerbaidjan, Caucasus, needs verification (see remarks on *mediterraneus* n. sp.). Outside the USSR, *lividus* is widespread throughout Europe (Wunderlich 1973) and also occurs in Alaska (Kaston 1946).

Zoogeographical remarks: The above boreal Palaearctic species displays an interesting disjunction of its range in E-Siberia. East of the Yenisei River, it disappears to reappear only in the N-Okhotsk Sea Coast and Beringia (Kamchatka and Alaska). In the southern regions of the Palaearctic, it seems vicariating with the closely related species *mediterraneus* n. sp.

Robertus lyrifer Holm 1939.

1939 *Robertus lyrifer* Holm, Ark. Zool., 31A, (8): 2, 13, 31.
1976 *Robertus lyrifer* Wunderlich, Senckenberg. biol., **57** (1/3): 108.

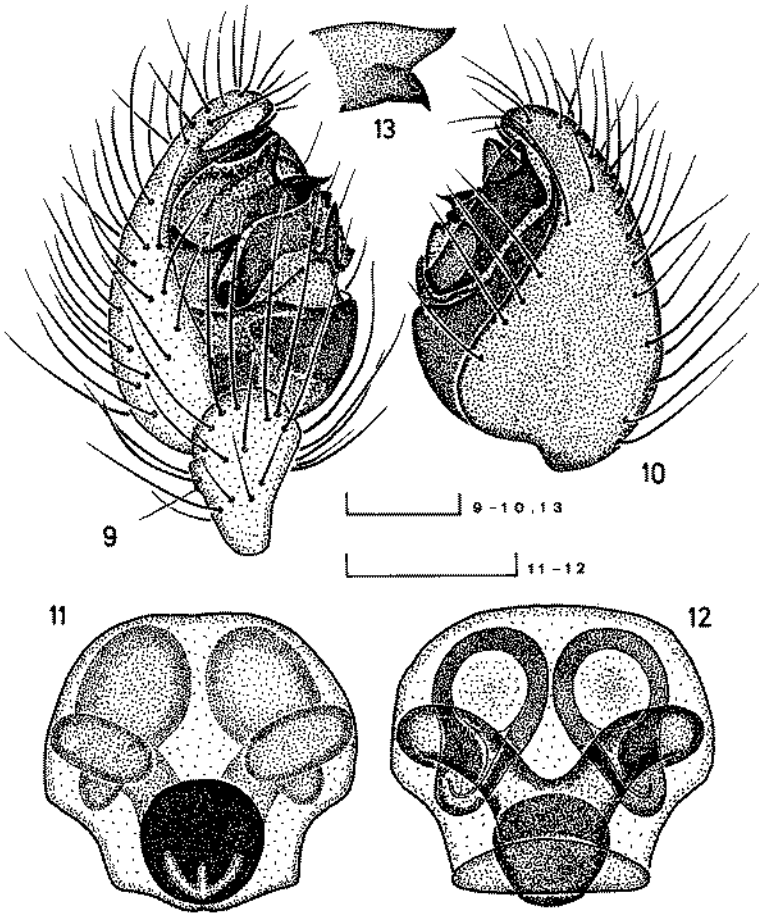
Material: 1♂ (ZMMU), USSR, Siberia, Tyumen area, Yamal Autonomous Region, Stchuchya River, Stchyuchye, *Sphagnum* bog, VIII. 1980, leg. A. L. Tikhomirova & E. M. Veselova. — 2♀ (ZMMU), same locality, moss tundra with *Vaccinium uliginosum* and *Betula nana*, VIII. 1979, leg. T. R. Andreeva. — 1♂ 35♀ (ZMMU), Siberia, Krasoyarsk area, Taimyr Autonomous Region, Putorana Plateau, Ayan Lake, Kapchug River, *Sphagnum* spp. — *Aulacomnium turgidum* bog with *Carex* spp., *Eriophorum* sp., *Andromeda palustre* and *Betula nana*, 11.-21. VI. 1983, leg. K. Eskov. — 2♂ 4♀ (ZMMU), Ayan Lake, Gulyami River, *Sphagnum-Aulacomnium turgidum* bog with *Carex* spp. and *Eriophorum* sp., 9. VIII. 1983, leg. K. Eskov. — 1♂ 2♀ (SMF 34101), Ayan Lake, Amnundakta River, boggy sparse forest of depressed *Larix dahurica* with *Betula nana*, 11. VIII. 1983, leg. K. Eskov. — 11♀ (ZMMU), Siberia, Magadan area, upper flow of Kolyma River, Sibit-Tyellakh (Bolshoy Annachag Mt. Ridge), 500 m, *Sphagnum* bog with *Vaccinium uliginosum* and *Betula nana*, 18. VIII. 1984, leg. K. Eskov. — 1♂ (ZMMU), same locality, sparse forest of depressed *Larix dahurica*, 10.-20. VIII. 1984, leg. I. B. Grishkan.

Distribution: In the USSR it has hitherto been recorded only in the European part: in Estonia (Vilbaste 1980) and the Perm area, N-Urals (Pakhorukov 1979). Outside the USSR known from Fennoscandia and the alpine belt of the Alps (Wunderlich 1973).

Robertus mediterraneus n. sp.

Figs. 9-12.

1980 *Robertus lividus*, — Brignoli, Fragm. ent., **15** (2): 260, 261, fig. 1. [non Blackwall 1836].



Figs. 9-13. *Robertus mediterraneus* n. sp., ♂♀ paratypes (9-12) and *Robertus lividus* (Blackwall 1836), ♂, specimen from the Moscow area (13). — 9-10) male palp (ectal & mesal views, respectively); 11-12) epigyne & vulva, respectively; 13) apex of the median apophysis' inner branch. — Scale = 0·2 mm.

Holotype: ♀ (ZMMU), USSR, Caucasus Major, Krasnodar area, Sochi Distr., Krasnaya Polyana (Main Caucasus Mt. Ridge), 700 m, disturbed forest of *Fagus*, 17. V. 1985, leg. S. I. Golovatch.

Paratypes: 1♀ (ZMMU), 1♀ (SMF 34102), same data as holotype. — 11♂ (ZMMU), 1♂ (SMF 34103), Caucasus Major, North Osetian ASSR, 10 km S of Alagir, Zintsar (Pestchaniy Mt. Ridge), 1000 m, *Quercus* forest, pitfall traps, 11. VI.-9. VII. 1985, leg. K. G. Mikhajlov.

Diagnosis: The new species seems particularly closely related to *lividus* (Blackwall 1836) and, to a lesser extent, to *truncorum* (L. Koch 1872). From *lividus* it is distinguishable by the shape of the bifid apex of the median apophysis' inner branch (Figs. 9, 13) and the rounded sclerotized plate at the posterior part of the epigyne. It differs from *truncorum* by the entrance ducts embowing the receptacula from outer sides and by the bifurcate inner branch of the median apophysis. Besides, *mediterraneus* n. sp. is distinguished from the above two species by the presence of three teeth on the palpal claw of ♀ (five and four in *lividus* and *truncorum*, respectively; see Wunderlich 1976).

Description: ♂: Total length 3·30-3·60, carapace 1·65-1·70 long and 1·15-1·20 wide. Carapace, legs and chelicerae brownish-yellow, abdomen pale grey. Anterior margin of cheliceral groove with three teeth, of which the middle one is largest; both proximal teeth contiguous, distal tooth set somewhat apart. Palp: broad inner branch of median apophysis bifurcate, mesal border of cymbium with a row of long setae (Figs. 9-10).

♀: Total length 3·45-3·95, carpace 1·58-1·65 long and 1·13-1·18 wide. Coloration and armament of cheliceral groove as in ♂. Palpal claw with three distinct teeth. Posterior part of epigyne with a dark, well-sclerotized rounded plate (Fig. 11). Vulva: lower parts of receptacula well elongated to make the latter pyriform; long entrance ducts embow receptacula from outer sides (Fig. 12).

Taxonomical remarks: It seems quite possible that some specimens from S-Europe hitherto referred to *lividus* might prove to be actually belonging to *mediterraneus* n. sp. At least the vulva of a specimen of *"Robertus lividus"* from Italy depicted by Brignoli (1980) undoubtedly belongs to the new species in question.

Distribution: Caucasus Major (deciduous forest belt), Italy and probably some other parts of the Mediterranean.

Robertus neglectus (O. Pickard-Cambridge 1871).

1871 *Neriene neglecta* O. Pickard-Cambridge, Trans Linn. Soc. Lond., **27**: 443.
1967 *Robertus neglectus* Miller, Prirod. Prace Ust. cesk. Akad. Brno, (NS) **1** (7): 283, 284, pl. 10-11.

Material: 2♂ (ZMMU), USSR, Moscow area, Tishkovo, *Picea* forest, 20.-30. V. 1978, leg. K. Eskov. — 2♂ 2♀ (ZMMU), Siberia, Krasnoyarsk area, Yenisei River, Mirnoye (62°20'N), water meadow with Umbelliferae and *Carex* spp., 15.-20. VIII. 1979, leg. K. Eskov.

Distribution: In the USSR European part, this species was recorded in Estonia (Vilbaste 1980), Latvia (Sternbergs 1983) and Byelorussia (Pereleshina 1930). In the USSR Asian part, it has hitherto been recorded only in E-Kazakhstan (Savelieva 1979). Outside the USSR known throughout Europe (Wunderlich 1973).

Robertus scoticus Jackson 1914.

1914 *Robertus scoticus* Jackson, Proc. r. Phys. Soc. Edinburgh, **19**: 108, 111, 120.
1967 *Robertus scoticus* Miller, Prirod. Prace Ust. cesk. Akad. Brno, (NS) **1** (7): 283, pl. 10-11.

Material: 6♀ (ZMMU), USSR, Murmansk area, Kandalaksha State Reserve, *Picea* forest, 9.-20. VII. 1980, leg. Y. B. Byzova, det. K. G. Mikhajlov. — 1♀ (SMF 34104), same locality, *Betula* forest, 25. VII. 1978, leg. Y. B. Byzova. — 2♀ (ZMMU), Moscow area, Tishkovo, *Picea* forest, 20.-30. V. 1978, leg. K. Eskov. — 1♂ (ZMMU), Kostroma area, Kologriv, forest of *Picea abies* with *Oxalis ocetosella*, 26. VII. 1983, leg. P. K. Yeremin, det. K. G. Mikhajlov.

Distribution: In the USSR, this species was recorded in Estonia (Vilbaste 1980), Latvia (Sternbergs 1983), Kalinin area (Zheltukhina 1984) and Perm area, N-Urals (Pakhorukov 1979). Outside the USSR known throughout Europe (Wunderlich 1973).

Robertus sibiricus n. sp.

Figs. 14-17.

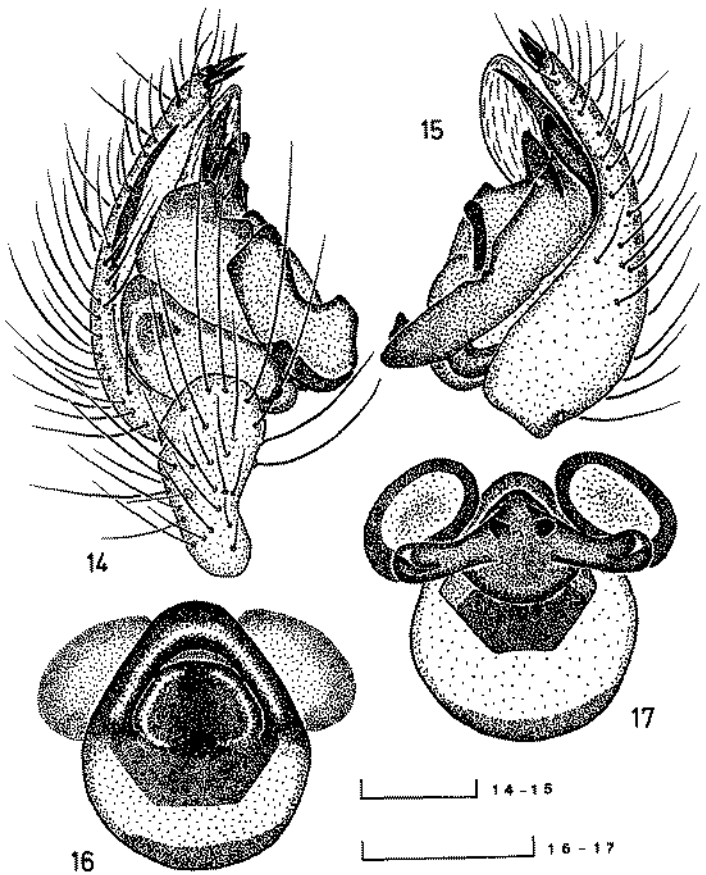
Holotype: ♂ (ZMMU), USSR, Siberia, Krasnoyarsk area, Evenk Autonomous Region, Taymura River, delta of Chambe River, boggy forest of depressed *Larix dahurica* with *Andromeda palustris* and *Betula nana*, 23. VIII. 1982, leg. K. Eskov.

Paratypes: 7♂ 16♀ (ZMMU), 1♂ 2♀ (SMF 34105), same data as holotype. — 1♀ (ZMMU), same locality, forestless *Sphagnum* bog with *Betula nana*, 22. VIII. 1982, leg. K. Eskov. — 1♂ (ZMMU), same locality, little swamp with *Sphagnum* spp., *Carex* spp. and *Salix* sp. in forest of *Larix dahurica* — *Picea sibirica*, 21. VIII. 1982, leg. K. Eskov. — 2♀ (ZMMU), same locality, flood-land swamp with *Carex* spp. and *Comarum palustre*, 18. VIII. 1982, leg. K. Eskov. — 2♀ (ZMMU), Taymura River, delta of Neptenne River, flood-land swamp with *Alnus fruticosa*, in a *Sphagnum* hillock, 4. VIII. 1982, leg. K. Eskov. — 1♂ 1♀ (ZMMU), Krasnoyarsk area, West Sayan Mts., upper flow of Us River, forest of *Picea sibirica-Abies sibiricus-Pinus sibiricus* in canyon along stream, 15. VIII. 1984, leg. A. B. Ryvkin. — 2♂ (ZMMU), Siberia, Tuva Autonomous Republic, West Sayan Mts., Turan, flood-land swamp with *Carex* spp., *Scirpus sylvaticus* and *Fillipendula ulmaria*, 7. VIII. 1984, leg. A. B. Ryvkin. — 1♂ 1♀ (ZMMU), Siberia, Yakut Autonomous Republic, middle flow of Lena River, Pokrovsk, *Sphagnum* bog in forest of *Larix dahurica*, 28. VIII. 1984, leg. A. B. Ryvkin. — 5♂ 4♀ (ZMMU), 1♂ 1♀ (SMF 34106), Siberia, Amur area, environs of Zeya (Tukuringra Mt. Ridge), 400 m, *Sphagnum* bog, 1.-11. IX. 1979, leg. S. A. Serbeniuk. — 1♂ (ZMMU), Siberia, Magadan area, upper flow of Kolyma River, Sibit-Tyellakh (Bolshoy Annachag Mt. Ridge) 500 m, little *Carex* swamp in a depression, on slope, 3. IX. 1984, leg. K. Eskov & Y. Marusik.

Diagnosis: A large lobe of the median apophysis, a couple of stout short apical setae at the apex of cymbium and the direction of the entrance ducts of the vulva are indicative of close affinities of the new species with *ungulatus* Vogelsanger 1944 (see Miller 1967, Wunderlich 1976). However, *sibiricus* n. sp. differs from it by the larger lobe of the median apophysis, with its hind margin

reaching to the anterior edge of the palpal tibia, presence of a third apical seta on the cymbium (not as strong as other two) and a good rim of the upper margin of the epigynal plate.

Description: ♂: Total length 2·90-3·25, carapace 1·30-1·45 long and 1·00-1·05 wide. Carapace, legs and chelicerae yellowish-brown, abdomen dark, yellowish-grey. Anterior margin of cheliceral groove with three teeth, of which the middle one is the largest; both proximal teeth contiguous, distal one set somewhat apart. Palp with a median apophysis forming a very large concave lobe sheathing ventral side of bulbus (Figs. 14-15). Terminal part of the cymbium with three strong setae, of which two, both short and very robust, are located apically, while third, thinner and elongated, at its ectal margin (Fig. 14).



Figs. 14-17. *Robertus sibiricus* n. sp., ♂♀ paratypes. — 14-15) male palp (ectal & mesal views, respectively); 16-17) epigyne & vulva, respectively. — Scale = 0·2 mm.

♀: Total length 2·90-3·70, carapace 1·35-1·50 long and 1·00-1·05 wide. Coloration and armature of cheliceral groove as in ♂. Palpal claw with three medium-sized teeth. Epigynal plate egg-shaped, almost as long as wide; its anterior edge well rimmed (Fig. 16). Vulva with moderately large oval receptacula, entrance ducts of which directed outward perpendicularly to main axis of epigyne (Fig. 17).

Distribution: Siberia: Middle Siberian Plateau, West Sayan Mts., Central Yakutia, N-Cisamuria, upper flow of Kolyma River.

Robertus ungulatus Vogelsanger 1944.

1944 *Robertus ungulatus* Vogelsanger, Mitt. naturforsch. Ges. Schaffhausen, **19**: 160.
1867 *Robertus paradoxus* Miller, Prirod. Prace Ust. cesk. Akad. Brno, (NS) **1** (7): 281, Tabl. X, XI.

Material: 1♂ (ZMMU), USSR, Siberia, Amur area, middle flow of Amur River, Khingan State Reserve, *Corylus* bushes, 8. VIII. 1983, leg. Y. M. Marusik. — 1♀ (ZMMU), same locality, clearing in mixed forest, 1. VIII. 1983, leg. Y. M. Marusik. — 1♀ (SMF 34107), same locality, wet gramineous meadow, 4. VIII. 1983, leg. Y. Marusik.

Distribution: Within the USSR this species has hitherto been recorded only from Estonia (Vilbaste 1980). Outside the USSR it occurs in Middle Europe (Wunderlich 1973).

Zoogeographical remarks: With the discovery of *ungulatus* in the middle flow of Amur River, the range of this species displays a Euro-Far Eastern disjunction. Such pattern is rather exotic, though well-known in biogeography. Among spiders, similar patterns have been registered in, e.g., *Erigonidium graminicolum* (Sundevall 1829), *Hylyphantes nigritus* (Simon 1881), *Nematogmus sanguinolentus* (Walckenaer 1841).

Robertus ussuricus n. sp.

Fig. 8.

Holotype: ♀ (ZMMU), USSR, Far East, Maritime Prov., environs of Ussuriysk, Kamenushka, 25.-30. VI. 1980, leg. V. V. Belov.

Diagnosis: The presence of a medial fovea on the epigynal plate reflects close affinities of the new species with N-American *riparius* (Keyserling 1886), *similis* (Kaston 1946), *laticeps* (Keyserling 1884), *longipalpis* (Kaston 1946), *floridensis* (Kaston), *borealis* (Kaston 1946), *banksi* (Kaston 1946), *crosbyi* (Kaston 1946) and Euro-Siberian *lyrifer* Holm 1939 (see Kaston 1946, Wunderlich 1976). However, *ussuricus* n. sp. differs from all of them by the very wide and almost rounded medial fovea of the epigynal plate and large receptacula.

Description: ♀: Total length 3·36, carapace 1·30 long and 0·95 wide. Carapace, legs and chelicerae yellowish-brown, abdomen pale grey. Anterior margin of cheliceral groove with two very narrowly divided teeth. Palpal claw with one large tooth. Epigynal plate is a regular pentagon with a large, medial, rounded fovea; large oval receptacula almost convergent distally (Fig. 8). — ♂: Unknown.

Distribution: S-Maritime Province, USSR Far East.

Zoogeography of *Robertus*.

Before starting a zoogeographical analysis of *Robertus*, I would like to make some taxonomic remarks on the status of several species described within this genus.

Females of certain species of *Enoplognatha* PAVESI 1880 are known to have a concoloured abdomen, as well as poorly armed chelicerae, thus both habitually resembling representatives of *Robertus* and misleading the taxonomists. For instance, *arganoi* BRIGNOLI 1980 recently described by a single ♀ from Sardinia (BRIGNOLI 1980) is nothing but another junior synonym of *Enoplognatha testacea* SIMON 1884 (cf. WUNDERLICH 1976: 105, figs. 2-4). The same error had earlier been made by KRONEBERG (1875) who had identified this species as *lividus* (see above). Moreover, another form, also described by a single ♀ from Central Italy, namely *cottarellii* BRIGNOLI 1980, apparently belongs in *Enoplognatha* too. Besides, *potanini* SCHENKEL 1963, from the Tien-Shang of China, can hardly be regarded as a *Robertus*. Therefore, the above species will not be incorporated in the following zoogeographical analysis. On the other hand, there are two species that were described by MILLER (1967) as a *Robertus* sp. and "an abnormal specimen of *R. lividus*", both regarded by WUNDERLICH (1973) as dubious species and both discarded by BRIGNOLI (1980). To my mind, they are good species of *Robertus*.

As it has already been shown above, representatives of the genus *Robertus* mainly occur in Europe and N-America. Hence, out of the 20 (this takes into account the above new descriptions and taxonomic notes) and 16 species constituting the faunas of these two regions, respectively, only one is common to both of them. This is the trans-Palaearctic *lividus* which only formally may be treated of Holarctic distribution, as its easternmost outpost is Alaska. The considerably poorer Siberian and Far Eastern fauna (6 species) is also rather peculiar: it shares with Europe the trans-Palaearctic *lividus*, the Euro-Far Eastern *ungulatus* as well as the boreal *lyrifer* reaching westward up to Fennoscandia and the Alps. Therefore, within the trans-Holarctic range of the genus no less than three kernels of regional endemism can be observed; these are Europe, N-America and E-Siberia. Let us cope now with the internal structure of these regional faunas.

Out of the 15 species endemic in N-America, 13 occur along the Atlantic Coast, of which no less than 9 are restricted to this area. Thus, *crosbyi* (KASTON 1946), *pumilis* (EMERTON 1909) and *similis* (KASTON 1946) are confined to the N-Appalachians, while *floridensis* (KASTON 1946) to Florida; *frontata* (BANKS 1892) and *laticeps* (KEYSERLING 1884) are met with in the Appalachians from Connecticut to Tennessee and North Carolina, and the latter species reaches to the Great Lakes Basin; *banksi* (KASTON 1946), *borealis* (KASTON 1946) and *longipalpis* (KASTON 1946) are restricted to both N-Appalachians and Great Lake Basin. The rest of four *Robertus* are wider spread: *spinifer* (EMERTON 1909) reaches westward to the Great Planes of Nebraska, while *eremophilus* (CHAMBERLIN 1928), *fusca* (EMERTON 1894) and *riparius* (KEYSERLING 1886) up to the Rocky Mountains (Utah and Wyoming). None of these forms reaches the Pacific Coast, the latter region harbouring only two species: *arcticus* (CHAMBERLIN & IVIE 1947), endemic in Alaska, and *vigerens* (CHAMBERLIN & IVIE 1933), occurring from Alaska southward up to California. — The distribution of these species has been compiled after KASTON (1946) and CHAMBERLIN & IVIE (1947).

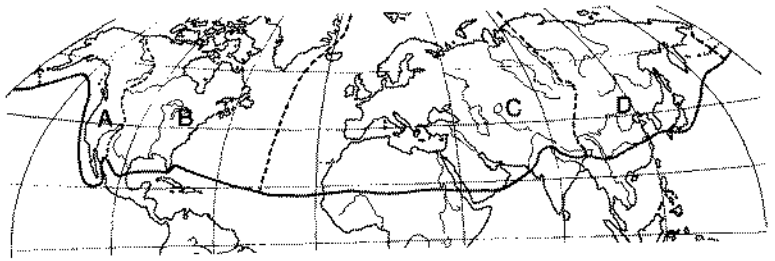
Out of a total of 20 species constituting the fauna of the W-Palaearctic, the majority are confined to S- and Middle Europe. Thus, seven species are restricted to S-Europe: *alpinus* DRESCO 1959 (Italian Alps), *cantabricus* FAGE 1931 and *cardensis* DRESCO 1959 (Spain), *masaurici* (SIMON 1901) and *umbilicatus* DENIS 1961 (France), as well as *golovatchi* n. sp. (Caucasus, USSR) and *mediterraneus* n. sp. (Mediterranean eastward up to the Caucasus). Further seven species mainly occur in Middle Europe: *frivaldszkyi*, *grasshoffi* WUNDERLICH 1976, *heydemanni* WIEHLE 1965, *insignis*, *truncorum* (L. KOCH 1872), as well as both *Robertus* sp. 1 and sp. 2 sensu MILLER (1967). Only four *Robertus* are quite widespread throughout Europe, including its northern part: *arundineti*, *lividus*, *neglectus*, and *scoticus*. These very four species happen to occur eastward even in certain Asian territories: the more southerly *arundineti* reaches E-Kazakhstan, while the other more northerly ones up to the N-Urals (*scoticus*) and the middle flow of the Yenisei River (*lividus* and *neglectus*). One species, *ungulatus*, displays a Euro-Far Eastern disjunction. Besides, one more species, *lyrifer*, obviously of Siberian origin (see below), also occurs in NE-Europe and in the alpine belt of the Alps [distribution of these species compiled after WUNDERLICH (1973) and original data]. None of the European *Robertus* (including *lividus* seemingly absent from the Yenisei to Kamchatka) crosses eastward the Yenisei biogeographical barrier (JOHANNSEN's line, according to DE LATTIN 1967).

The fauna of E-Siberia comprises three species, of which only *lyrifer* is widespread in N-Siberia and westward even reaches Fennoscandia, arealogically being the northernmost representative of the genus, while *kastoni* n. sp. and *sibiricus* n. sp. are endemic in the region in question. They are joined in Kamchatka by *lividus* (apparently having reached it via southern E-Siberia) and in the Manchurian Region by the Euro-Far Eastern *ungulatus*. Within the Manchurian Region, only one endemic *Robertus* has been encountered, *ussuricus* n. sp.

Summarizing the above patterns, a remarkable parallelism in the structure of the Nearctic and Palaearctic faunas can be observed: a parallel impoverishment of both faunas is marked when moving from the Atlantic to the Pacific coasts along the distance away from the major faunal centers in the Appalachians and W-Europe, respectively. Only three species in each region are particularly widespread and reach, though fail to cross, the respective major faunal barriers, i. e. the Rockies and Yenisei. Besides, one species in each region reaching only an "intermediate" barrier respectively, i. e. Great Planes and Urals. The faunas of both Pacific regions (western coast of N-America and NE-Asia) are similarly depauperated, though highly endemic. Besides, in the Atlantic parts of both regions (Nearctic and Palaearctic) the species diversity enriches from north to south, whereas in the Pacific parts, on the contrary, from south to north.

If a regioning of the Holarctic be attempted as based on the distribution of *Robertus*, two separate regions apiece should be distinguished within the Palaearctic and Nearctic, with respective borders along the Yenisei River and Rockies (Map 1).

It is noteworthy that the W-American *vigerens*, Asian *sibiricus* n. sp., *kastoni* n. sp., *ussuricus* n. sp. and Eurasian *lyrifer* and *ungulatus* are all closely related and probably belong to a species group characterized by the presence of strong apical setae on the cymbium and a median fovea on the epigynal plate, which can be distinguished as the *laticeps*-group. The other members of this group inhabit the E-Nearctic (e. g. *laticeps*, *frontata*, *banksi*). The impression is left that the represen-



Map 1. Regioning of the Holarctic based on the distribution of *Robertus*. — A) West American Region (3 species, 2 of them endemic); B) East American Region (13 species, all endemic); C) European Region (20 species, 17 of them endemic; D) East Asian Region (6 species, 3 of them endemic).

tatives of this species-group penetrate particularly effectively the coniferous forests of both W-North America and NE-Asia. If the above taxonomic hypothesis proves correct, the W-American and E-Asian faunas of *Robertus* must be regarded as an impoverished derivative of the E-American one. Thus a dendrogram can be drawn reflecting historical relations between the faunas of the above four regions (Fig. 18, a).

As regards faunal exchanges, it seems that a form ancestral to both particularly closely related *sibiricus* n. sp. and *ungulatus* might have left the Nearctic for Siberia. There it could have passed a pretty long way of morphological evolution to ensure the above two recent species within the *laticeps*-group a good taxonomic isolation from the rest of the group's constituents. The isolation might have been of landscape-zonal origin: *sibiricus* n. sp. is confined to larch taiga, whereas *ungulatus* seems restricted to deciduous forests. Apparently, this process could have taken place in the mountainous parts of the Far East, where both above landscape types

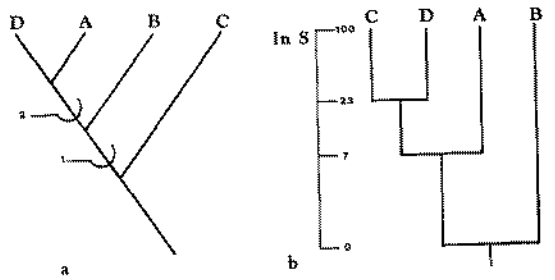


Fig. 18. Dendrograms reflecting historical (a) and actual (b) relations between the regional faunas of *Robertus* in A, B, C, D of Map 1: a) Historical relationships (a "cladogram"), with Character 1: appearance of the *laticeps*-group, and Charakter 2: proliferation of this species-group into a dominant position. b) Similarities (a "phenogram") with a logarithmic scale from the left indicating values of SØRENSEN's coefficient of similarity ($S = \frac{2z}{x+y} \cdot 100\%$, where z are the species common to both regions under comparison, while x and y are the regional faunas).

are known to have long coexisted as separate altitudinal belts. Later on *ungulatus* might have become widespread along the Eurasian nemoral forest zone and reached Europe in the West. The formation of the present Euro-Far Eastern disjunction seems a result of the disruption of the formely single nemoral zone due to the Pleistocene glaciations, aridization of Central Asia, etc. (see review by BORKIN 1984).

As regards *lyrifer*, this species could have penetrated Fennoscandia already in a postglacial time during a restauration of the boreal fauna due to Siberian elements. Its presence nowadays in the alpine belt of the Alps, similarly to the other examples of a boreo-alpine pattern, seems accounted for glacial-interglacial faunal fluctuations. The origin of the patterns like "Siberia-Fennoscandia-Alps" has already been extensivelly analyzed upon arachnological material elsewhere (ESKOV 1981).

In other words, the faunas of all the above four regions are sufficiently isolated. In both Siberia and W-America, one originally European species is present (*lividus*, which is closely related to both *truncorum* and *mediterraneus* n. sp.), while the European fauna comprises one originally Siberian (*lyrifer*) and one originally E-Asian (*ungulatus*) *Robertus*. On the other hand, the E-American fauna has no species in common with any of the other regions. Therefore, a dendrogram reflecting similarities in the species composition of these territories (Fig. 18, b) looks quite different from the previous one (Fig. 18, a). Differences between the two dendrograms lie in the fact that one (Fig. 18, a) reflects the regional faunogenesis and is based on the distribution of the species-groups, whereas the other (Fig. 18, b) displays purely actual similarities in the regional species lists. These differences seem to have analogy to the contradictions arising in taxonomy between phylogenetics (cladism) and phenetics (taxometry).

In conclusion, it seems noteworthy that the representatives of the genus *Robertus* are mainly restricted to the zones of nemoral forests in Europe and E-North America. Such taxa are known, as a rule, to display a third centre of speciation in extratropical E-Asia: e. g. the tree genera *Fagus* and *Castanea*, the vertebrate families Salamandridae and Pelobatidae (Amphibia), the arthropods Astacidae (Decapoda, Crustacea), Xystodesmidae (Polydesmida, Diplopoda) or Sironidae (Opiliones, Arachnida). However, nothing of that sort is observed in *Robertus*: the Manchurian fauna comprises only two species, *ussuricus* n. sp. and *ungulatus*, both displaying close affinities with E-Siberian forms. Of course, the E-Asian fauna is far from perfectly known to state for sure that Japan, let alone China and Korea, is absolutely deprived of *Robertus*. Still it seems reasonable to surmise already now that anyway an E-Asian centre of faunogenesis is considerably less expressed in this case than the European and E-North American ones. In other words, there seems to be no reason whatever to distinguish the Manchurian and Siberian faunas.

It is obvious that, basically, due to extinction of a taxon in one of the three abovementioned areas of its primary range, three combinations can be realized: Europe — E-Asia, Europe — E-North America, and E-Asia — E-North America. Palaeontology witnesses that such processes of extinction really took place in the past. Thus, the giant salamanders (Cryptobranchidae) and freshwater turtle genus *Geoemyda* are known to have become extinct from Europe, but have survived in both E-Asia and E-North America; the frog family Discoglossidae, nowadays confined to Europe and E-Asia, is known in the palaeontological record of North America (BORKIN 1984).

As regards *Robertus*, we obviously face an instance of extinction from the Manchurian region prior to a relatively young repopulation of this territory by a few representatives of Siberian stock. A limited character of this recolonization might have been due to the fact that the E-Siberian *Robertus* swarm adapted to the conditions of a light larch taiga (*Larix*) seems poorly adaptable to the nemoral forests of the Manchurian Region, where rather European and/or N-American representative could have had advantages.

Резюме.

На основании оригинальных материалов и литературных данных в фауне СССР отмечено 13 видов рода *Robertus*, в том числе 5 новых для науки: *golovatchi* n. sp. и *mediterraneus* n. sp. с Кавказа, *kastoni* n. sp. и *sibiricus* n. sp. из Восточной Сибири и *ussuricus* n. sp. из южного Приморья. Установлено, что *arganoi* Brignoli 1980 является младшим синонимом *Enoplognatha testacea* Simon 1884, а *cottarellii* Brignoli 1980 и *potanini* Schenkel 1963 не относятся к роду *Robertus*, который, таким образом, включает 38 валидных видов. В трансголарктическом ареале рода отчетливо выделяются 4 фаунистических центра, соответствующих ядрам регионального эндемизма: Атлантическое и Тихоокеанское побережья Северной Америки, Европа с Западной Сибирью и Средней Азией и Восточная Сибирь с Дальним Востоком. Границами между областями распространения этих фаунистических комплексов является Енисей в Палеарктике и Скалистые Горы в Неарктике. Построены дендрограммы связей между четырьмя указанными региональными фаунами на основе как распространения ключевых групп видов, так и прямой кластеризации видовых списков. Показано, что эти две дендрограммы резко разнятся между собой, что отражает различия между историческим и актуалистическим подходами к биогеографическому анализу. Так, с исторической точки зрения фауны Тихоокеанского побережья Северной Америки и Восточной Азии являются обедненными дериватами Восточноамериканской фауны, тогда как с точки зрения сходства фаунистических списков эти две фауны ближе к Европейской. Род *Robertus* наиболее богато представлен в неморальных лесах Европы и востока Северной Америки и, вопреки ожиданиям, практически отсутствует в Маньчжурии. Судя по всему, в Маньчжурии род вымер, после чего этот регион был реколонизирован отдельными выходцами из Восточной Сибири.

References.

Adashkevitch, B. P. (1974): [To the fauna and significance of spiders (Arachnida, Aranei) of Moldavian vegetable gardens]. — In: [Entomophages and microorganisms in plant protection]: 19-22; Kishinev (Central Committee of the Communist Party of Moldavia) [in Russian].

Azheganova, N. S. (1951): [To the spider fauna of the Troitsk Forest-Steppe Reserve]. — Izv. estestv.-nauchn. Inst. Perm. Univ., **13** (2/3): 137-156; Perm [in Russian].

Borkin, L. Y. (1984): [Euro-Far Eastern disjunctions in amphibians]. — Trudy Zool. Inst. AN SSSR, **124**: 55-88; Leningrad [in Russian].

Brignoli, P. M. (1980): Ragni d'Italia XXXIII. Il genere *Robertus* (Araneae, Theridiidae). — Fragm. ent., **15** (2): 259-265; Roma.

Chamberlin, R. V. & Ivie, W. (1947): The spiders of Alaska. — Bull. Univ. Utah, **37** (10): 1-103; Salt Lake City.

Dunin, P. M. (1984): [The fauna and ecology of spiders (Aranei) of Apsheron Peninsula (Azerbaidjan SSR)]. — In: [The fauna and ecology of arachnids]: 45-60; Perm (Perm State Univ.) [in Russian].

Eskov, K. Y. (1981): [Zoogeography of the spider genus *Hilaira* (Aranei, Linyphiidae)]. — Zool. Zhurn., **60** (11): 1629-1639; Moscow [in Russian].

Holm, Å. (1973): On the spiders collected during the Swedish expeditions to Novaya Zemlya and Yenisei in 1875 and 1876. — Zool. Scripta, **2** (3): 71-110; Stockholm.

Kaston, B. J. (1946): North America spiders of the genus *Ctenium*. — Amer. Mus. Novit., 1306: 1-19; New-York.

Kroneberg, A. (1875): [Spiders, Araneae]. — In: "Fedtschenko's Reise in Turkestan." — Izv. obstch. lyubit. estestv. antropol. etnogr., **19** (3): 1-58; Moscow [in Russian].

Kulczyński, W. (1916): Araneae Sibiriae occidentalis Arcticae. — Zap. imper. Akad. Nauk, (8) **28** (11): 1-44; Petrograd.

— — — (1926): Arachnoidea Camchadalica. — Ezhegod. Zool. Mus. AN SSSR, **27**: 29-72; Leningrad.

Lattin, G. de (1967): Grundriss der Zoogeographie. — 602 S.; Jena (VEB Gustav Fischer).

Miller, F. (1967): Studien über die Kopulationsorgane der Spinnengattungen *Zelotes, Micaria, Robertus* und *Dipoena*, nebst Beschreibung einiger neuer oder unvollkommen bekannter Spinnenarten. — Prirod. Prace Ust. cesk. Akad. Brno, (NS) **1** (7): 251-298; Brno.

Pakhorukov, N. M. (1979): [The spiders of the northern Urals (an eco-faunistic survey)]. — Autoreferat Ph. D. Theses: 1-22; Leningrad (Leningrad State Univ.) [in Russian].

Pereleshina, V. I. (1930): [Materials to the spider fauna of the western and southwestern parts of East Europe]. — Ezhegod. Zool. Mus. AN SSSR, **31**: 359-391; Leningrad [in Russian].

Savelieva, L. G. (1979): [Zoogeographical complexes of spiders (Aranei) from East Kazakhstan]. — In: [Nature and management of East Kazakhstan]: 139-148; Alma-Ata (Nauka) [in Russian].

Schenkel, E. (1963): Ostasiatische Spinnen aus dem Muséum d'Histoire Naturelle de Paris. — Mém. Mus. natn. Hist. nat. Paris, (NS) Ser. A Zool. **25**: 289-481; Paris.

Spassky, S. A. & Luppova, E. (1945): [Materials to the spider fauna of Tadjikistan]. — Ent. Obozr., **28** (1/2): 43-55; Leningrad [in Russian].

Sternbergs, M. T. (1983): [Spiders (Chelicerata, Aranei)]. — In: [The Moritsala Nature Reserve. Flora and Fauna]: 41-47; (Avots) [in Russian].

Sytshevskaja, V. J. (1935): Etude sur les araignées de la Kamchatka. — Folia Zool. Hydrobiol., **8** (1): 80-103; Riga.

Vilbaste, A. (1980): The spider fauna of Estonian mires. — Esti NSV Tead. Akad. Toimet., (Biol.) **29** (4): 313-327; Tallinn.

Wunderlich, J. (1973): Weitere seltene und bisher unbekannte Arten sowie Anmerkungen zur Taxonomie und Synonymie (Arachnida: Araneae). — Senckenbergiana biol., **54** (4/6): 405-428; Frankfurt a. M.

— — — (1976): Zur Kenntnis der mitteleuropäischen Arten der Gattungen *Enoplognatha* Pavesi und *Robertus* O. Pick.-Cambridge (Araneida: Theridiidae). — Senckenbergiana biol., **57** (1/3): 97-112; Frankfurt a. M.

ZHELTUKHINA, V. I. (1984): [The species composition and habitat distribution of spiders of the Central-Forest State Reserve]. — In: [The fauna and ecology of arachnids]: 101-111; Perm (Perm State Univ.) [in Russian].

ZONSTEIN, S. L. (1984): [To the fauna and ecology of spiders (Aranei) of the lower strata of the walnut-fruit forests of southern Kirghizia]. — Ent. Issled. v. Kirghizii, 17: 144-151; Frunze [in Russian].

Author: KIRILL Y. ESKOV, c/o National Committee of Soviet Biologists, Leninsky prospekt 33, Moscow V-71, USSR.