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Crab spiders of the family Thomisidae from the Kingdom of Bhutan (Arachnida, Araneae)

by Hirotsugu Ono

Abstract. Specimens of spiders of the family Thomisidae (Arachnida, Araneae), collected mainly in the mountainous areas of Bhutan, are taxonomically studied. They are classified into 33 species of 17 genera. Eight new species are described under the names, *Oxytate bhutanica* sp.nov., *Loxobates minor* sp.nov., *Talaus samchi* sp.nov., *Lysiteles ambrosii* sp.nov., *Lysiteles bhutanus* sp.nov., *Lysiteles wittmeri* sp.nov., *Lysiteles punctiger* sp.nov. and *Synaema albomaculatum* sp.nov.

Key words: Taxonomy – Araneae – Thomisidae – Bhutan – spider fauna – species diversity – new species

Introduction

The present paper deals with the result of a taxonomic study of the spider family Thomisidae based on specimens obtained from the Kingdom of Bhutan during an expedition made by Department of Zoology of the Natural History Museum, Basel in 1972. An outline of the research, especially concerning botanical and ecological data on the collecting sites, appears in detail in BARONI URBANI et al. (1973). The research was carried out in Bhutan between April and July 1972. Some 25,000 individuals of Arthropoda exclusive of insects were collected from many sites in the western part of the country at an altitude of between 200 m and 3,800 m (see map given in BARONI URBANI et al. 1973: 326). From these, about 300 crab spider specimens (Thomisidae) were sorted and entrusted to me for study.

The fauna of this group was previously completely unknown in Bhutan, although it had been relatively well investigated in neighbouring countries in northern Asia, namely in Nepal (ONO 1978, 1979, 1980b), India (TIKADER 1980), Myanmar [Burma] (THORELL 1887, 1895), southern Siberia (LOGUNOV 1994, MARUSIK & LOGUNOV 1990, LOGUNOV & MARUSIK 1994), China (SONG & ZHU 1997, SONG, ZHU & CHEN 1999), Korea (PAIK 1974) and Japan (ONO 1988). The study of the present material should be invaluable not only for the Bhutanese fauna but also for further study of species diversity in Asian spiders.

Material and Methods

The crab spiders of the family Thomisidae do not build webs but lie in wait on plants or on the ground for passing insects. They are collected mainly by sweeping and sifting. The specimens reported here were classified into 33 species of 17 genera in 3 subfamilies. However, 8 species have not been determined to species level because of their immature development. Thus, 25 species were recognised, all of which were newly recorded from Bhutan. Of these, 8 species seem to be new to science and will be described in this paper.

Most of the specimens, including types used for this paper, are deposited in the collection of the Department of Zoology of the Natural History Museum Basel, Switzerland (NMB), while some reference specimens are kept in the collection of the Department of Zoology, National Science Museum, Tokyo, Japan (NSMT).

The coloration was observed in alcohol.

Abbreviations

ALE	.....	anterior lateral eye
AME	.....	anterior median eye
AME-ALE	.....	distance between AME and ALE
AME-AME	.....	distance between AMEs
ap	.....	apical or in the apical position
PLE	.....	posterior lateral eye
PME	.....	posterior median eye
PME-PLE	.....	distance between PME and PLE
PME-PME	.....	distance between PMEs

Taxonomy

Subfamily Strophiinae SIMON, 1895

Genus *Strigoplus* SIMON, 1885

Strigoplus albostriatus SIMON, 1885

Bull. Soc. zool. Fr. **10**: 446.

Type material examined. 2 syntypes (female and male) : Singapore, Malacca, 1884, J. de Morgan leg., in Museum National d'Histoire Naturelle, Paris.

Other specimens examined. 1 female and 1 juvenile: Balu-Jhula, 6 km E of Phuntsholing, moist sal forest at an altitude of 200 m, Bhutan, 28.IV.1972. [NMB 2690 a, b]

Distribution. Bhutan, India, Myanmar, Vietnam, Malay Peninsula and Java.

Notes. This species is widely distributed in the tropical and subtropical areas of southeastern Asia. From these areas, two further species have been described under this genus, namely *Strigoplus guizhouensis* SONG in SONG & CHAI, 1990, from Guizhou Province in China, and *S. netravati* TIKADER, 1963, from southern India. A detailed comparison between these spiders may be necessary.

Subfamily Dietinae SIMON, 1895

Genus *Oxytate* L. KOCH, 1878*Oxytate bhutanica* sp.nov.

Figs 1–5

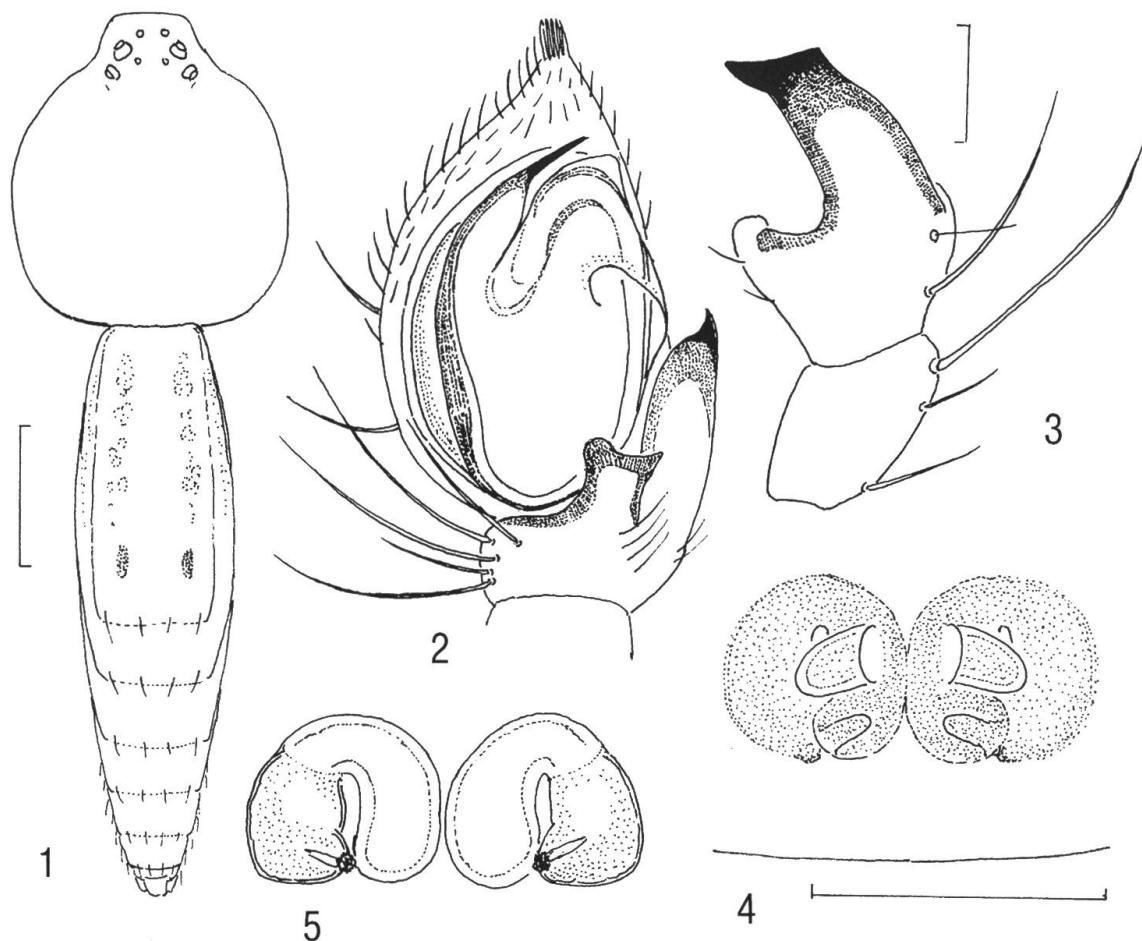
Type material examined. Holotype: male: 87 km NE of Phuntsholing, evergreen forest with many oak trees at an altitude of 1,700 m, Bhutan, 22.V.1972 [NMB 2673 a]

Other specimens examined. 1 female: 21 km E of Wangdi Phodrang, evergreen forest at an altitude between 1,700 and 2,000 m, Bhutan, 25.VI.1972 [NMB 2673 b]. 1 juvenile: Thimphu, coniferous forest at an altitude between 2,300 and 2,500 m, Bhutan, 23.IV.1972 [NMB 2673 c]; 1 juvenile: Chimakothi, 98 km NE of Phuntsholing, broad-leaved forest at an altitude between 1,900 and 2,300 m, Bhutan, 22.V.1972 [NMB 2673 d].

Description. Measurements based on the male holotype and a female from Wangdi Phodrang. Body length ♀ 7.80 mm, ♂ 6.30 mm; prosoma length ♀ 2.40 mm, ♂ 2.22 mm, width ♀ 2.04 mm, ♂ 2.04 mm; opisthosoma length ♀ 5.46 mm, ♂ 4.08 mm, width ♀ 2.34 mm, ♂ 1.20 mm; lengths of legs [total length (femur + patella + tibia + metatarsus + tarsus)]: ♀, I 10.40 mm (3.12 + 1.20 + 3.04 + 2.24 + 0.80), II 10.08 mm (3.04 + 1.20 + 2.80 + 2.24 + 0.80), III 5.92 mm (1.68 + 0.64 + 1.68 + 1.32 + 0.60), IV 6.24 mm (2.20 + 0.64 + 1.56 + 1.28 + 0.56), ♂ I 9.84 mm (3.04 + 1.00 + 2.68 + 2.12 + 1.00), II 9.36 mm (2.92 + 0.96 + 2.40 + 2.12 + 0.96), III 5.24 mm (1.56 + 0.60 + 1.44 + 1.04 + 0.60), IV 5.40 mm (1.80 + 0.60 + 1.36 + 1.08 + 0.56).

Prosoma flat, longer than wide (length/width ♀ 1.18, ♂ 1.09), without long setae. Eyes: ALE > PLE > AME (PME, ALE/AME ♀ 1.50, ♂ 1.25, PLE/PME ♀ 1.25, ♂ 1.28, AME-AME / AME-ALE ♀ 1.00, ♂ 1.20, PME-PME/PME-PLE ♀ 0.75, ♂ 0.73, median ocular area longer than wide or as long as wide (length/width ♀ 1.00, ♂ 1.14), wider behind than in front (anterior width/ posterior width ♀ 0.88, ♂ 0.86), clypeus/ AME-AME ♀ 2.33, ♂ 2.00. Labium longer than wide (length/width ♀ 1.57, ♂ 1.67), sternum longer than wide (length/width ♀ 1.19, ♂ 1.15). Leg formula I-II-IV-III; tarsi with claw tufts.

Spiniformation (for terminology, see ONO 1988: 13). ♀ Femur: I dorsal 1-1-1-1-1 (weak), prolateral 1-1-1-1, retrolateral 0-0-0-1 (weak), II dorsal 1-1-1-1-1 (weak), prolateral 0-1-0-1, retrolateral 0-0-0-1 (weak), III dorsal 0-1-0-1 (weak), prolateral 0-0-0-1, IV dorsal 0-1-0-1 (weak); patella: I-IV dorsal 1-0-1 (weak), prolateral 1, respectively; tibia: I-II dorsal 1-0-1, pro- and retrolateral 1-1-1, ventral 2-2-2-0, III-IV dorsal 1-1-0, III pro- and retrolateral 0-0-1 respectively; metatarsus: I-II pro- and retrolateral 1-1-0-1 ap, ventral 2-2-0 respectively, III pro- and retrolateral 1 respectively, IV none. ♂ Femur: I dorsal 1-1-1-1-1, prolateral 0-1-1-1, retrolateral 0-0-0-1, II dorsal 1-1-1-1-1, pro- and retrolateral 0-0-0-1 respectively, III dorsal 0-1-1-1, pro- and retrolateral 0-0-0-1, IV dorsal 1-1-1-1, pro- and retrolateral 0-0-0-1; patella: I-IV dorsal 1-1, I-II pro- and retrolateral 1 respectively; tibia: I-IV dorsal 1-1, I-II pro- and retrolateral 1-1-1, ventral 2-2-2-0, III prolateral 1-0-1, retrolateral 1-1, IV prolateral 1-0-1, retrolateral 0-1; metatarsus I-II pro- and retrolateral 1-1-0-1 ap, ventral 2-2-2-0, III prolateral 1-1-0, retrolateral 1, ventral 2-2-0, IV pro- and retrolateral 1, ventral 2-0.



Figs 1–5: *Oxytate bhutanica* sp.nov., male holotype. 1, pro- and opisthosoma of female, dorsal view; 2, tibia and tarsus of male palp, ventral view; 3, patella and tibia of male palp, retrolateral view; 4, epigynum, ventral view; 5, internal structure of female genitalia, dorsal view. [Scales: 1, 1 mm; 2–5, 0.2 mm.]

Male palp (Figs 2–3). Tibia with ventral and retrolateral apophyses: ventral apophysis wide and sclerotised; retrolateral apophysis large and strongly sclerotised, apically with a tooth. Bulb longer than wide, without apophysis, embolus short and spiniform.

Opisthosoma much longer than wide (length/width ♀ 2.33, ♂ 3.40), furnished with long setae.

Female genitalia (Figs 4–5). Epigynum wider than long, with a pair of small guide pockets, openings narrow, intromittent orifices situated between guide pockets and epigastric furrow. Intromittent canal short, spermathecae reniform.

Coloration and markings (Fig. 1). Female and male: Prosoma yellow or light yellow without markings, chelicerae, maxillae, labium and sternum light yellow or yellowish white, palps and legs light yellowish brown. Opisthosomal dorsum yellowish white or yellow, with white spots, venter light yellow.

Distribution. Known only from Bhutan.

Diagnosis. This new species is closely related to *Oxytate parallela* (SIMON, 1880), widely distributed in China, but is distinguished from the latter by the structure of male

palm and female genitalia. The retrolateral apophysis on the male palpal tibia of this new species (Fig. 3) is wider and stronger than that of the Chinese species, and the openings of guide pockets in the female genitalia of the new species (Fig. 4) are smaller. *Oxytate attenuata* (THORELL, 1895) described from Burma (Myanmar) also resembles this new species, but the ventral apophysis on the palpal tibia of the Burmese spider is unique in shape and its female is unknown. Although Phuntscholing (male) and Wangdi Phodrang (female) belong to different valley systems in Bhutan, I treat them as same species because spiders of the genus *Oxytate* show a relatively wide distributional range.

Etymology. The specific epithet was derived from the name of the country.

Genus *Loxobates* THORELL, 1877

Loxobates minor sp.nov.

Figs 6–8

Type material examined. Holotype male: 21 km E of Wangdi Phodrang, evergreen forest at an altitude between 1,700 and 2,000 m, Bhutan, 25.VI.1972 [NMB 2671 a].

Description. Measurements based on the male holotype (female unknown). Body length 3.18 mm; prosoma length 1.56 mm, width 1.50 mm; opisthosoma length 1.80 mm, width 1.14 mm; lengths of legs [total length (femur + patella + tibia + metatarsus + tarsus)]: I 5.72 mm (1.88 + 0.56 + 1.44 + 1.20 + 0.64), II 5.56 mm (1.84 + 0.60 + 1.36 + 1.12 + 0.64), III 3.20 mm (1.00 + 0.44 + 0.72 + 0.64 + 0.40), IV 3.44 mm (1.20 + 0.40 + 0.76 + 0.68 + 0.40).

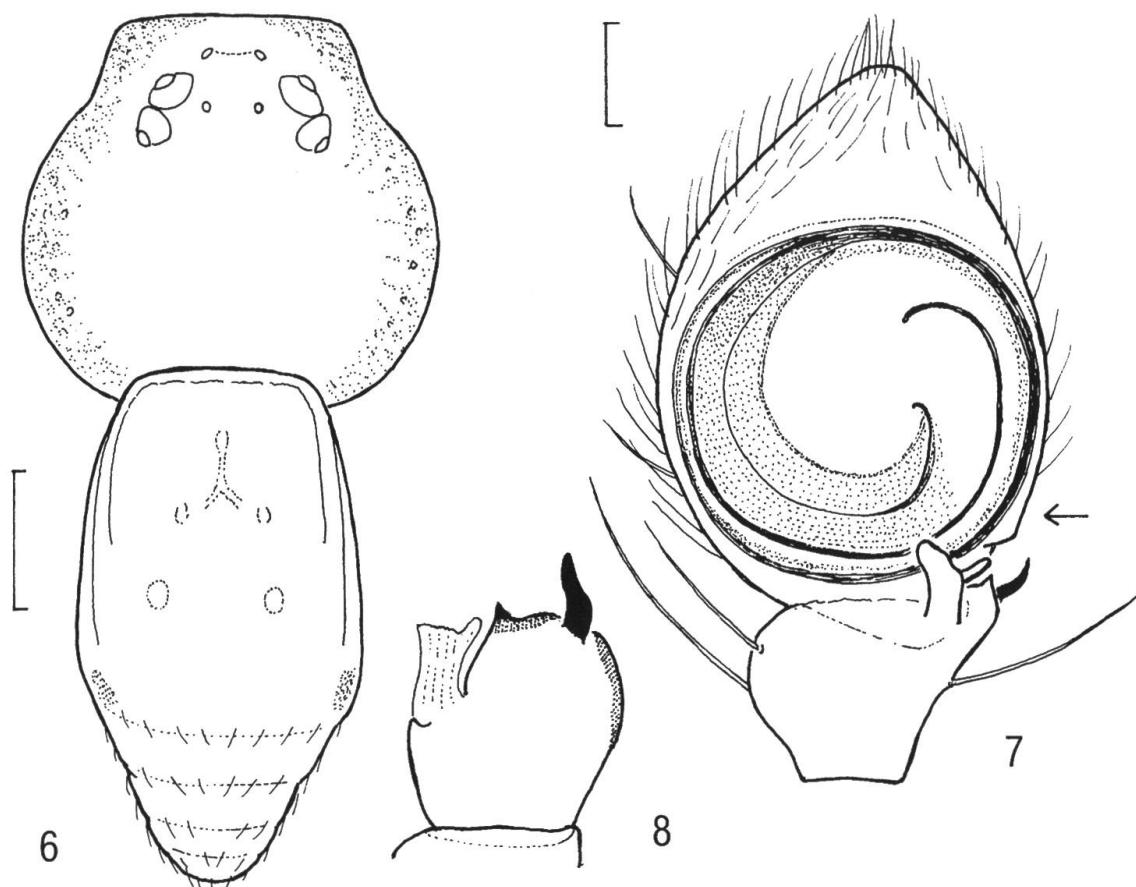
Prosoma longer than wide (length/width 1.04), without long setae. Eyes: ALE>PLE>AME>PME, ALE/AME 1.25, PLE/PME 1.33, AME-AME / AME-ALE 1.80, PME-PME/PME-PLE 0.57, median ocular area longer than wide (length/width 1.21), anterior width equal to posterior width, clypeus/ AME-AME 2.44, tubercles of lateral eyes close to each other. Labium longer than wide (length/width 1.16), sternum longer than wide (length/width 1.20). Leg formula I-II-IV-III; tarsi with claw tufts.

Spiniformation (for terminology, see ONO 1988: 13). Femur: I dorsal 1–1–1–1–1, prolateral 0–2–1–0–1, retrolateral 0–0–1–0–1, II dorsal 1–1–1–0–1, prolateral 1–0–1–0–1, retrolateral 0–0–1–0–1, III–IV dorsal 0–0–1–1–1; patella: I–IV dorsal 1–1 (weak), I–II pro- and retrolateral 1 respectively; tibia: I–II dorsal 1–1–0 (weak), pro- and retrolateral 1–1–1, ventral 2–2–2, III–IV dorsal 1–1 (weak), pro- and retrolateral 0–1 respectively; metatarsus: I–II pro- and retrolateral 1–1–1 ap, I ventral 2–1–0–2, II ventral 2–2–2, III prolateral 0–1, ventral 1, IV pro- and retrolateral 0–1.

Male palp (Figs 7–8). Tibia with ventral, intermediate and retrolateral apophyses: ventral apophysis small, apically with a blunt tooth; retrolateral apophysis digitiform and strongly sclerotised; intermediate apophysis with a small denticle. Embolus filiform and long; the position of its tip shown in Fig. 7 by an arrow.

Opisthosoma longer than wide, but not very long (length/width 1.58).

Coloration and markings (Fig. 6). Prosoma reddish brown, darker at the sides, chelicerae, maxillae, labium and sternum yellowish brown, legs I–II yellowish brown, legs III–IV and palps light yellow. Opisthosomal dorsum white, without marking, venter light yellowish white.



Figs 6–8: *Loxobates minor* sp.nov., male holotype. 6, pro- and opisthosoma, dorsal view; 7, tibia and tarsus of male palp, ventral view (arrow: position of the tip of embolus); 8, tibia of male palp, retrolateral view. [Scales: 6, 0.5 mm; 7–8, 0.1 mm.]

Distribution. Known only from the type locality.

Diagnosis. This new species resembles *Loxobates daitoensis* ONO, 1988, known from southern Japan and eastern China, in the structure of male palp. However, the retrolateral apophysis on palpal tibia is digitiform and much smaller than that of the latter species and the embolus is longer and winding around tegulum (Figs 7–8).

Etymology. The specific name is derived from the smaller size.

Subfamily *Thomisinae* SUNDEVALL, 1833

Genus *Tmarus* SIMON, 1875

Tmarus spp.

Material examined. 1 juvenile: Thimphu River, altitude?, Bhutan, 29.IV.1972 [NMB 2692 a]; 1 juvenile: same area, 23.IV.1972 [NMB 2692 b].

Notes. Two species were recognised but not identifiable with known species.

Genus *Philodamia* THORELL, 1894

Philodamia armillata THORELL, 1895

Descr. Cat. Spid. Burma 1895: 303.

Type material examined. Holotype female: Lower Burma, E. W. Oates leg., in the Natural History Museum, London.

Other specimens examined. 1 female: Thimphu River, altitude?, Bhutan, 29.IV.1972 [NMB 2688 b]; 3 juveniles: Balu Jhula, 6 km E of Phuntsholing, sal forest at an altitude of 200 m, Bhutan, 28.IV.1972 [NMB 2688 a].

Distribution. Bhutan and Myanmar (Burma).

Notes. This species was originally described by THORELL (1895) from British Burma (Myanmar). Having compared the present material with the type specimen of this species preserved in the Natural History Museum, London, I could not find any specific differences between them.

Genus *Xysticus* C. L. KOCH, 1835

Xysticus simplicipalpatus ONO, 1978

Senckenbergiana biol. 59: 272.

Type material examined. Holotype male: Gompa near Tarakot on the northen side of the Dhaulagiri Massif, at an altitude between 3,300 and 3,400 m, Nepal, 11–16.V.1970, J. Martens leg. Numerous female and male paratypes: Senckenberg Museum, Frankfurt am Main.

Other specimens examined. 7 females, 6 males, 1 immature female and 1 immature male: 87 km NE of Phuntsholing, evergreen forest with oak trees at an altitude of 1,700 m, Bhutan, 22.V.1972 [NMB 2694 d, m, k, j, i, f, n, p]; 1 male: same locality, 30.IV.1972 [NMB 2694 b]; 2 females, 7 males and 2 immature females: Chimakothi, 98 km NE of Phuntsholing, broad-leaved forest at an altitude between 1,900 and 2,300 m, Bhutan, 22.V.1972 [NMB 2694 e, l, o, g, h]; 2 females and 5 males: Thimphu, temperate, coniferous forest at an altitude between 2,300 and 2,500 m, Bhutan, 31.V.1972 [1 male and 4 females: NMB 2694 q, r, 1 male and 1 female: NSMT-Ar 4847]; 1 male and 1 immature male: same locality, 16.–27.IV.1972 [NMB 2694 t, u]; 1 immature female: same locality, 30.IV.1972 [NMB 2694 a]; 1 male and 2 immature males: Paro, temperate, coniferous forest at an altitude of 2,300 m, Bhutan, 19.V.1972 [NMB 2694 c]; 1 female: same locality, VI.1972 [NMB 2694 v]; 2 females and 1 male: Changra (Kunga Rabdeng Dzong), 18 km S of Tongsa, evergreen forest, secondary and cultivated land at an altitude of 1,900 m, Bhutan, 22.VI.1972 [1 female: NMB 2694 s, 1 male and 1 female: NSMT-Ar 4848].

Distribution. Bhutan and Nepal.

Note. This is an abundant species in this material.

Xysticus croceus FOX, 1937

J. Wash. Acad. Sci. 27: 19.

Type material. Holotype female: Suifu, Szechwan, China, 1922, D.C. Graham leg., in the National Museum of Natural History, Washington DC. (Not examined.)

Other specimens examined. 2 Females: 87 km NE of Phuntsholing, evergreen forest with oak trees at an altitude of 1,700 m, Bhutan, 22.V.1972 [NMB 2693 a, b].

Distribution. Bhutan, Nepal, India, China, Korea and Japan.

Note. This species is widely distributed in the temperate zone of eastern Asia from Japan to Nepal.

***Xysticus* spp.**

Material examined. Species A – 1 juvenile: Dorju-la, rhododendron-coniferous forest at an altitude of 3,100 m, Bhutan, 6.VI.1972 [NMB 2695 a]; 1 juvenile: Sampa-Kothoka, evergreen broad-leaved forest at an altitude between 1,400 and 2,600 m, Bhutan, 9.VI.1972 [NMB 2695 c]; 5 juvenile: Sha Gogona, rhododendron-coniferous forest at an altitude of 3,100 m, Bhutan, 10.–12.VI.1972 [NMB 2695 f, g]; 1 immature male: Dechhi Paka, cultivated area in rhododendron-coniferous forest at an altitude of 3,400 m, Bhutan, 20.VI.1972 [NMB 2695 d]. Species B – 1 juvenile: Samchi, subtropic, cultivated area at an altitude of 400 m, Bhutan, 7.–11.V.1972 [NMB 2695 e]. Species C – 1 juvenile: 13 km E of Wangdi Phograng, evergreen forest at an altitude of 1,300 m, Bhutan, 7.VI.1972 [NMB 2695 b].

Note. These immature specimens, while recognisable as three species, were not identifiable to species level.

Genus *Oxyptila* SIMON, 1864

***Oxyptila* sp.**

Material examined. 1 juvenile: 87 km NE of Phuntsholing, evergreen forest with oak trees at an altitude of 1,700 m, Bhutan, 22.V.1972 [NMB 2687 a].

Note. Although this juvenile specimen is not identifiable to species level, its record confirms an occurrence of the genus *Oxyptila* in the Holarctic part of Bhutan.

Genus *Talaus* SIMON, 1886

***Talaus samchi* sp.nov.**

Figs 9–13

Type material examined. Holotype male: Samchi, subtropical, cultivated area at an altitude of 300 m, Bhutan, 7.–11.V.1972 [NMB 2670 a]; paratypes: 3 females: same data as for the holotype [NMB 2670 b, c].

Description. Measurements based on the male holotype and a female paratype. Body length ♀ 2.96 mm, ♂ 2.60 mm; prosoma length ♀ 1.16 mm, ♂ 1.24 mm, width ♀ 1.08 mm, ♂ 1.08 mm; opisthosoma length ♀ 1.80 mm, ♂ 1.40 mm, width ♀ 1.80 mm, ♂ 1.36 mm; lengths of legs [total length (femur + patella + tibia + metatarsus + tarsus)]: ♀, I 2.88 mm (0.96 + 0.36 + 0.60 + 0.60 + 0.36), II 3.12 mm (1.00 + 0.40 + 0.68 + 0.64 + 0.40), III 2.12 mm (0.68 + 0.28 + 0.48 + 0.40 + 0.28), IV 2.28 mm (0.72 + 0.28 + 0.52 + 0.48 + 0.28), ♂ I 3.60 mm (1.08 + 0.44 + 0.80 + 0.80 + 0.48), II 3.84 mm (1.16 + 0.48 + 0.84 + 0.84 + 0.52), III 2.48 mm (0.80 + 0.32 + 0.52 + 0.52 + 0.32), IV 2.52 mm (0.80 + 0.32 + 0.52 + 0.52 + 0.36). Variation in body length of females: 2.16–2.96 mm.

Prosoma longer than wide (length/width ♀ 1.07, ♂ 1.15), with long setae. Eyes: ALE > PLE > AME > PME, PME very small, ALE/AME ♀ ♂ 1.67, PLE/PME ♀ ♂ 4.00,

AME-AME / AME-ALE ♀ 0.41, ♂ 0.42, PME-PME/PME-PLE ♀♂ 1.00, median ocular area wider than long (length/width ♀ 0.73, ♂ 0.80), wider behind than in front (anterior width/ posterior width ♀♂ 0.67), clypeus/ AME-AME ♀ 1.56, ♂ 1.40, tubercles of lateral eyes apart from each other. Chelicera normal; labium longer than wide (length/width ♀♂ 1.25), sternum longer than wide (length/width ♀ 1.30, ♂ 1.19), with a dent in the middle and a projecting posterior end. Leg formula II-I-IV-III; claws of legs I-II with 5 teeth, of legs III-IV with 3 teeth; femora of leg I without dorsal spine.

Spiniformation (for terminology, see ONO 1988: 13). ♀ Femur: I pro- lateral 0-0-1-1, II-III dorsal 1-1-0-0, IV dorsal 0-1-0-0 or 1-1-0-0; patella: I-IV dorsal 1-1, I-II prolateral and I-IV retrolateral 1, respectively; tibia: I-IV dorsal 1-1, I prolateral 1-1-1, retrolateral 1-1, ventral 2-2, II prolateral 0-1-1, retrolateral 1-1, ventral 1-2, III pro- and retrolateral 0-1, ventral 1, IV prolateral 0-1, ventral 1; metatarsus: I prolateral 1-1-1, retrolateral 0-1-1, ventral 2-2, II pro- and retrolateral 0-1-1, ventral 2-2, III-IV pro- and retrolateral and ventral 1, respectively. ♂ Femur: I prolateral 0-0-1-1, II dorsal 0-1-1-1 (left) or 0-1-1-0 (right), III dorsal 1-1-0 (left) or 1-1-1 (right), IV dorsal 1-0 (left) or 1-1 (right); patella: I-IV dorsal 1-1, I-II pro- and I-IV retrolateral 1, respectively; tibia: I-IV dorsal 1, I pro- and retrolateral 1-1-1, ventral 2-2, II prolateral 1-1-1, retrolateral 0-1-1, ventral 2-2, III-IV pro- and retrolateral 0-1, III ventral 2, IV ventral 1; metatarsus I-II prolateral 1-1-1, retrolateral 0-1-1, ventral 2-2, III-IV pro- and retrolateral and III ventral 1, respectively.

Male palp (Figs 10-11). Tibia with ventral, retrolateral and dorsal apophyses: ventral apophysis large, apically with a small hook; retrolateral apophysis digitiform and strongly sclerotised; dorsal apophysis with a denticle. Bulb longer than wide without projection, embolus long and filiform, apically pointed.

Opisthosoma slightly longer or as long as wide (length/width ♀ 1.00, ♂ 1.03) with strong hairs. Opisthosoma of male dorsally furnished with a sclerotised plate.

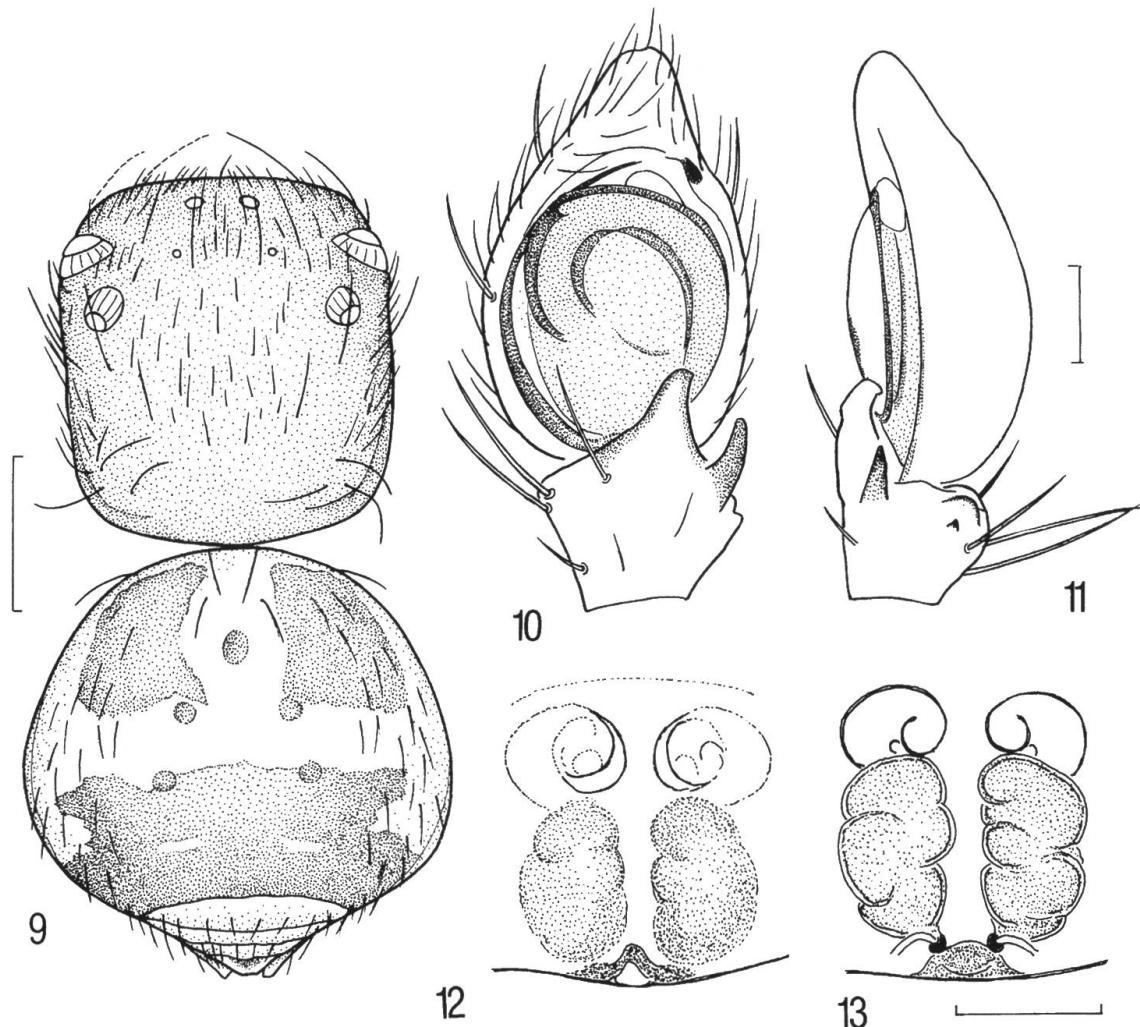
Female genitalia (Figs 12-13). Epigynum longer than wide, intromittent orifices visible, median septum lacking. Intromittent canal short and winding, spermathecae large and reniform.

Coloration and markings (Fig. 9). ♀♂ Prosoma chestnut or brown, chelicerae, maxillae and labium dark brown, sternum dark brown, lighter centrally. Legs and palps: femora, tibiae and metatarsi of legs I-II of male and the basal part of femora of legs I-II of female chestnut, other segments of legs I-II, all segments of legs III-IV and palps yellow in the two sexes. Opisthosomal dorsum yellowish white (female) or light brown (male) with black markings, venter black.

Distribution. Known only from the type locality.

Diagnosis. This new species resembles *Talaus triangulifer* SIMON, 1886 described from Sumatra (female holotype in the Museum National d'Histoire Naturelle, Paris, examined), but is distinguishable from it by the shape of genital openings and the length of intromittent canal in female genitalia.

Etymology. The specific name is derived from the type locality.



Figs 9–13: *Talaus samchi* sp.nov., male holotype and one of female paratypes. 9, pro- and opisthosoma of male, dorsal view; 10, tibia and tarsus of male palp, ventral view; 11, tibia and tarsus of male palp, retrolateral view; 12, epigynum, ventral view; 13, internal structure of female genitalia, dorsal view. [Scales: 9, 0.5 mm; 10–13, 0.1 mm.]

Genus *Lysiteles* SIMON, 1895

Lysiteles amoenus ONO, 1980

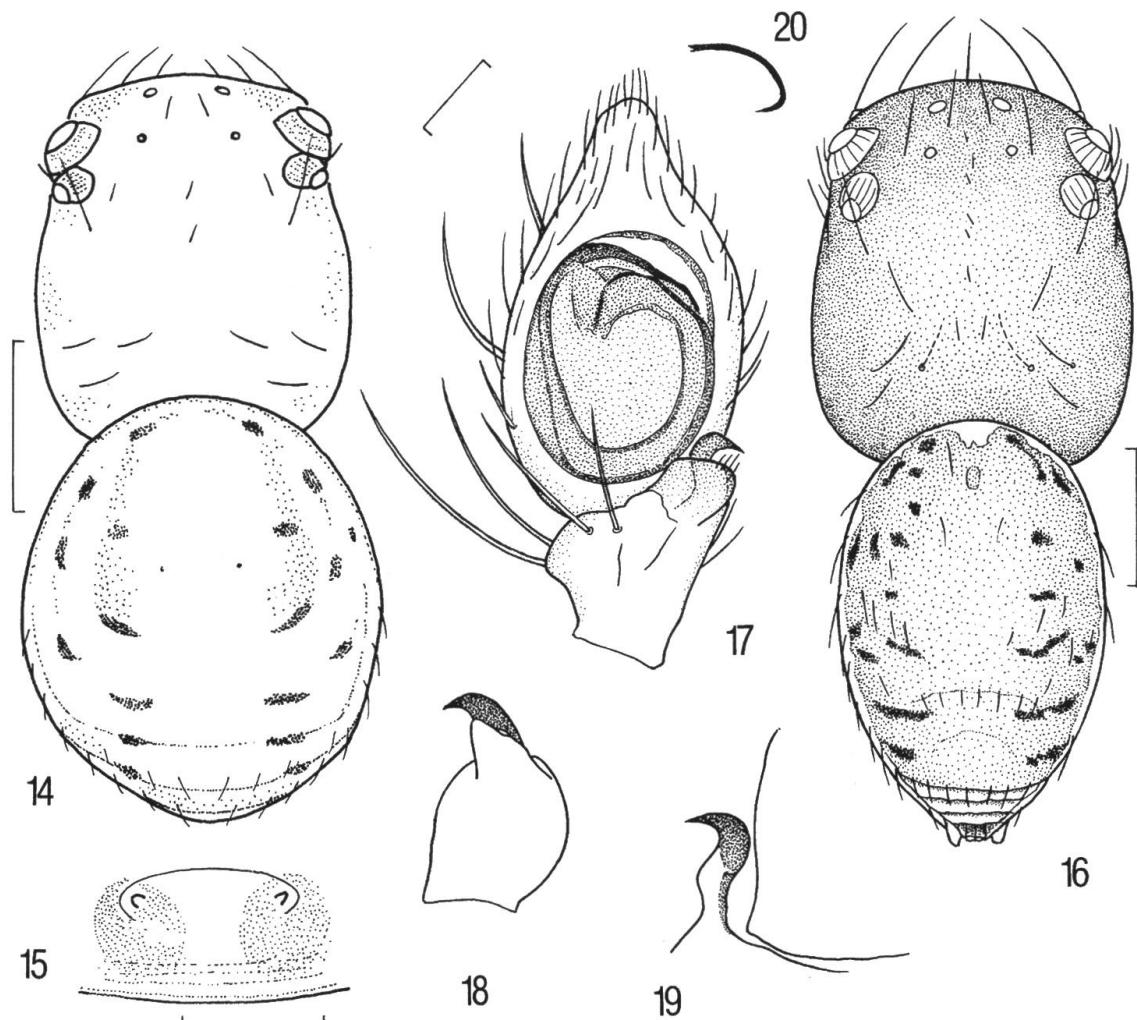
Senckenbergiana biol. **60**: 214.

Type material examined. Holotype female: Sonkang, Taichung, Taiwan, 9.V.1971, Y.-I. Chu leg., in the Senckenberg Museum, Frankfurt am Main.

Other specimens examined. 1 female: Samchi, subtropical, cultivated area at an altitude of 300 m, Bhutan, 7.–11.V.1972 [NMB 2678 a].

Figs 14–15

Distribution. Bhutan and Taiwan.



Figs 14–20: *Lysiteles* spp. 14–15, *Lysiteles amoenus* ONO, 1980, female from Bhutan; 16–20, *Lysiteles minusculus* SONG & CHAI, 1990, male from Bhutan. 14, 16, pro- and opisthosomata, dorsal view; 15, Epigynum, ventral view; 17, tibia and tarsus of male palp, ventral view; 18, tibia of male palp, retrolateral view; 19, retrolateral tibial apophysis, dorsal view; 20, the apical part of embolus of male palp, axial view. [Scales: 14, 16, 0.5 mm; 15, 17–20, 0.1 mm.]

Notes. This small and beautiful species has not been recorded since its original description (ONO 1980 a) based on a female from Taiwan. Although the pattern on the opisthosoma of the present specimen is somewhat different from that of the Taiwanese specimen (cf. Fig. 14 and ONO 1980a: Fig. 31), no differences were found between the specimens in any other characters including the shape of epigynum (Fig. 15). Judging from these two records, it can be surmised that the species is widely distributed in China. Male is unknown.

Measurements on the Bhutanese specimen: Body length 2.20 mm, prosoma length 1.20 mm, width 0.96 mm, opisthosoma length 1.20 mm, width 1.16 mm.

Lysiteles minusculus SONG & CHAI, 1990

Figs 16–20

From Water onto Land 1990: 368.

Type material. Holotype male: Xuan'en, Hubei, China, 25.V.1989, in the collection of the Institute of Zoology, Academia Sinica, Beijing. (Not examined.)

Other specimens examined. 1 male: Thimphu River, altitude?, Bhutan, 23.IV.1972 [NMB 2682 a].

Description. (Based on the Bhutanese male specimen.) Measurements: Body length 2.60 mm; prosoma length 1.32 mm, width 1.04 mm; opisthosoma length 1.44 mm, width 1.00 mm. PMA / AME 3.33. Male palp (Figs 17–20): Ventral tibial apophysis large and sclerotised, retrolateral one long and rostriform; embolus long, filiform, apically curved and pointed. The tip of embolus is not visible in ventral view.

Coloration and markings. Prosoma dark yellowish brown without any markings; chelicerae, maxillae, labium and sternum light yellowish brown, legs yellow, femora of legs I–II prolaterally chestnut. Opisthosomal dorsum greyish brown with black spots, white at the sides, venter grey.

Distribution. Bhutan and China.

Notes. This male specimen was identified with the Chinese species described by SONG & CHAI (1990) from Hubei Province, China, mainly on the basis of the agreement in the structure of male palpal organ. The general appearance of this species closely resembles that of *Lysiteles amoenus*.

Lysiteles kunmingensis SONG & ZHAO, 1994

Figs 21–27

Acta arachnol. sin. 3: 114.

Type material. Holotype male: Kunming, Yunnan, in the collection of the Institute of Zoology, Academia Sinica, Beijing. (Not examined.)

Other specimens examined. 1 juvenile: Kamjee, 24 km NE of Phuntsholing, evergreen forest at an altitude of 1,400 m, 12.V.1972 [NMB 2680 b]; 7 females and 3 males: 87 km NE of Phuntsholing, evergreen forest with oak trees at an altitude of 1,700 m, Bhutan, 22.V.1972 [NMB 2680 c, d]; 1 male, 2 immature females and 1 immature male: Thimphu, temperate, coniferous forest at an altitude between 2,300 and 2,500 m, Bhutan, 23.IV.1972 [NMB 2680 a]; 16 females and 2 male: 13 km E of Wangdi Phodrang, evergreen forest at an altitude of 1,300 m, Bhutan, 7.VI.1972 [13 females and 1 male: NMB 2680 f, g, e, 3 females and 1 male: NMST-Ar 4849–4850]; 6 females: 21 km E of Wangdi Phodrang, evergreen forest at an altitude between 1,700 and 2,000 m, Bhutan, 15.VI.1972 [NMB 2680 i, j]; 1 female: from Sampa to Kothoka, evergreen forest at an altitude between 1,400 and 2,600 m, Bhutan, 9.VI.1972 [NMB 2680 h].

Description. (Based on the Bhutanese specimens.) Measurements based on a female and a male from Wangdi Phodrang. Body length ♀ 4.40 mm, ♂ 3.44 mm; prosoma length ♀ 1.76 mm, ♂ 1.72 mm, width ♀ 1.56 mm, ♂ 1.52 mm; opisthosoma length ♀ 2.72 mm, ♂ 1.80 mm, width ♀ 2.68 mm, ♂ 1.52 mm; lengths of legs [total length (femur + patella + tibia + metatarsus + tarsus)]: ♀, I 5.04 mm (1.52 + 0.68 + 1.16 + 1.04 + 0.64), II 5.24 mm (1.56 + 0.72 + 1.20 + 1.08 + 0.68), III 3.56 mm (1.16 + 0.52 + 0.80 + 0.64 + 0.44), IV 3.88 mm (1.20 + 0.52 + 0.92 + 0.76 + 0.48), ♂ I 6.12 mm (1.88 + 0.76 + 1.48 + 1/24 + 0.76), II 6.36 mm (2.00 + 0.76 + 1.56 + 1.32 + 0.72), III 3.72 mm (1.20 + 0.52 + 0.88 + 0.68 + 0.44), IV 3.88 mm (1.24 + 0.52 + 0.92 + 0.72 + 0.48). Variation of body length: ♀ 3.30–4.40 mm, ♂ 2.80–3.44 mm.

Prosoma longer than wide (length/width ♀ 1.12, ♂ 1.13), with long setae. Eyes: ALE> PLE> AME> PME, ALE/AME ♀ 1.71, ♂ 2.00, PLE/PME ♀ 1.60, ♂ 2.00, AME-AME / AME-AME ♀ 1.00, ♂ 0.89, PME-PME/PME-PLE ♀ 1.00, ♂ 0.93, median ocular area wider than long (length/width ♀ 0.80, ♂ 0.82), wider behind than in front (anterior width/ posterior width ♀ 0.85, ♂ 0.88), clypeus/ AME-AME ♀ 1.20, ♂ 1.50. Chelicera of male normal. Maxillae distally projecting, labium longer than wide (length/width ♀ 1.43, ♂ 1.80), sternum longer than wide (length/width ♀ 1.22, ♂ 1.05). Leg formula II-I-IV-III; tarsal claws of legs I-II with 10 (female) or 6 (male) teeth, those of legs III-IV with 4 teeth.

Spiniformation (for terminology, see ONO 1988: 13). ♀ Femur: I dorsal 1-0, prolateral 1-1-1-1, II dorsal 1-1-0-0, prolateral 0-0-0-1, III dorsal 1-1-0-1, IV dorsal 0-1-0; patella: I-IV dorsal 1-1 (weak), IV retrolateral 1 (long hair); tibia: I-IV dorsal 1-1, I-II pro- and retrolateral 1-1, ventral 2-2, respectively, III-IV pro- and retrolateral 0-1, respectively; metatarsus: I-II prolateral 0-1-0-1 ap, retrolateral 0-1-1 ap, ventral 2-2, III-IV prolateral 1-1-0, III retrolateral 0-1-0, ventral 2, IV retrolateral 1-1-0, ventral 1. ♂ Femur: I-II dorsal 1-1-1-1, I prolateral 0-0-2-1-1, retrolateral 0-0-0-1-1, II prolateral 0-0-1-1-1, retrolateral 0-0-0-1-1, III dorsal 1-1-1-1 (left) or 1-1-1-1-1 (right), prolateral 0-0-0-1, IV dorsal 1-1-1-1, prolateral 0-0-0-1; patella: I-IV dorsal 1-1 (weak), pro- and retrolateral 1 (occasionally long hair); tibia: I-IV dorsal 1-1, I-II pro- and retrolateral 1-1-1, ventral 2-2, III-IV pro- and retrolateral 1-1, ventral 1; metatarsus I-II prolateral 1-1-1 ap, retrolateral 0-1-1 ap, ventral 2-2, III-IV pro- and retrolateral 1-1-0, ventral 2.

Male palp (Figs 22-24). Tibia with ventral and retrolateral apophyses: the ventral apophysis digitiform, apically curved; the retrolateral one small and dentiform. Bulb slightly longer than wide, embolus short and twisted, apically pointed.

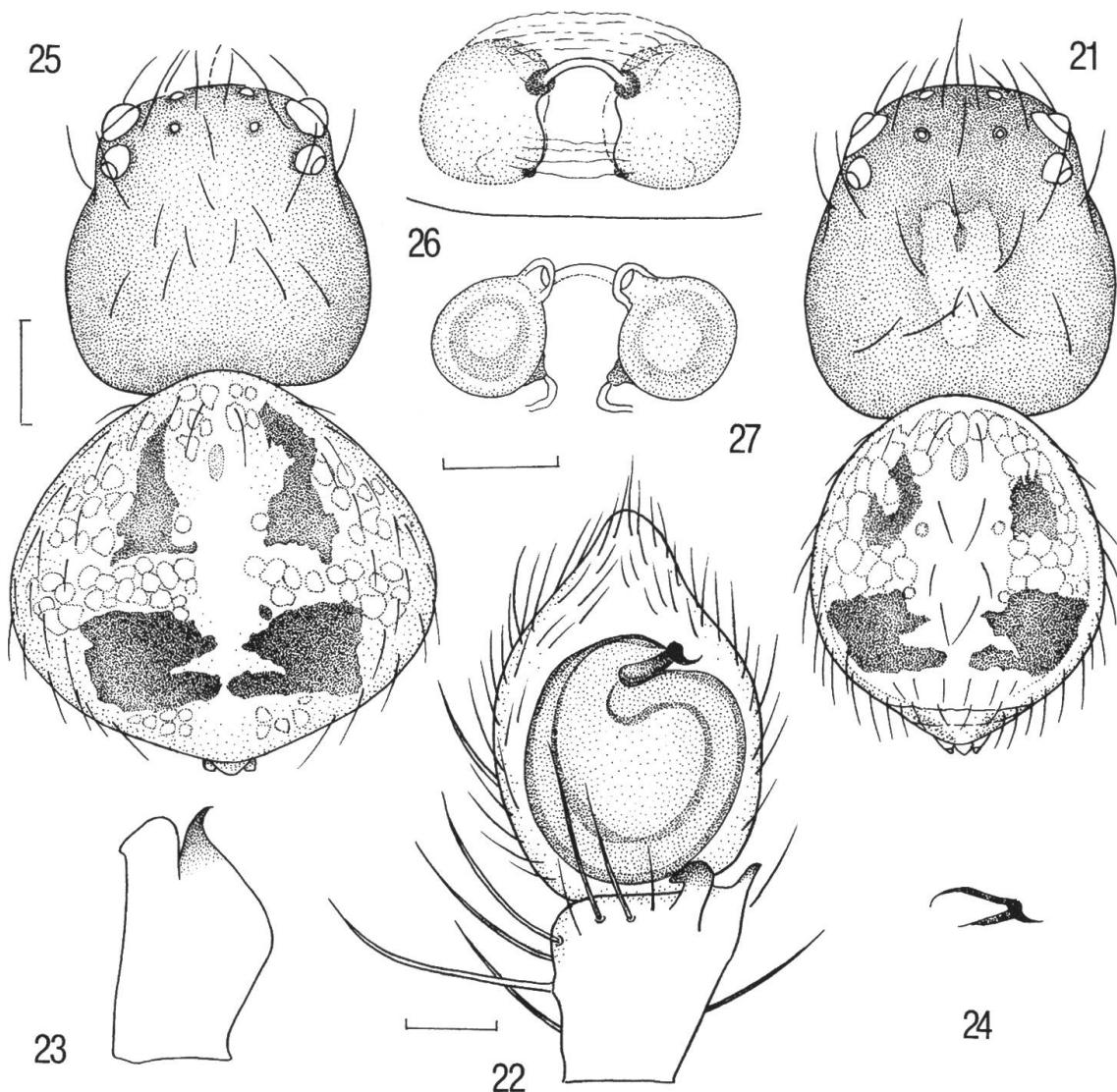
Opisthosoma almost as long as wide (female) or longer than wide (male) [length/width ♀ 1.01 (variation 0.92-1.01), ♂ 1.18 (variation 1.14-1.18)], with relatively long hairs.

Female genitalia (Figs 26-27). Epigynum wider than long, sclerotised fold not much developed. Intromittent canal very short, spermathecae globular.

Coloration and markings (Figs 21 male and 25 female). ♀ Prosoma chestnut without markings, chelicerae chestnut, maxillae, labium and sternum yellowish brown, legs I-II light yellowish brown, legs III-IV and palps yellow. Opisthosomal dorsum white, with two pairs of black markings, blackish brown at the sides, venter yellow with a U-shaped black marking in the centre. ♂ Prosoma chestnut, lighter in the middle, chelicerae chestnut, maxillae and labium light brown, sternum yellowish brown, femora of legs I chestnut, other segments of legs I and legs II-IV yellowish brown. Opisthosomal dorsum white, yellowish in the middle, with two pairs of black markings, venter yellowish white, with a pair of black stripes in the middle.

Distribution. Bhutan and China (Yunnan).

Notes. Relatively common in Bhutan, this spider was regarded as *Lysiteles kunmingensis* SONG & ZHAO, 1994 from Yunnan, China, on the basis of agreement of the structures of the male palp in observed specimens and the original description. The female of the spider will be described for the first time above.



Figs 21–27: *Lysiteles kunmingensis* SONG & ZHAO, 1994, from Bhutan. 21 (male), 25 (female), pro- and opisthosomata, dorsal view; 22, tibia and tarsus of male palp, ventral view; 23, tibia of male palp, retrolateral view; 24, embolus, axial view; 26, epigynum, ventral view; 27, internal structure of female genitalia, dorsal view. [Scales: 21, 25, 0.5 mm; 22–24, 26–27, 0.1 mm.]

On the other hand, the present specimens strikingly resemble those of *Lysiteles excultus* (O. PICKARD-CAMBRIDGE, 1885) described from Murree in northern Pakistan, especially in the structure of female genitalia and the shape of retrolateral apophysis on the male palpal tibia as well as in the condition of abdomen (cf. MARUSIK 1993: Figs 19–24). The only difference between the two species can be observed in the shape of embolus of the male palp (cf. Figs 22, 24 in the present paper with MARUSIK 1993: Fig. 23).

Lysiteles ambrosii sp.nov.

Figs 28–33

Type material examined. Holotype male: 87 km NE of Phuntsholing, evergreen forest with oak trees at an altitude of 1,700 m, Bhutan, 22.V.1972 [NMB 2667 a]; paratype: 1 female: same data as for the holotype [NMB 2667 b].

Description. Measurements based on the male holotype and a female paratype. Body length ♀ 2.88 mm, ♂ 3.12 mm; prosoma length ♀ 1.28 mm, ♂ 1.44 mm, width ♀ 1.16 mm, ♂ 1.32 mm; opisthosoma length ♀ 1.68 mm, ♂ 1.80 mm, width ♀ 1.44 mm, ♂ 1.24 mm; lengths of legs [total length (femur + patella + tibia + metatarsus + tarsus)]: ♀, I 4.52 mm (1.36 + 0.52 + 1.08 + 1.00 + 0.56), II 4.68 mm (1.40 + 0.52 + 1.12 + 1.04 + 0.60), III 3.00 mm (0.96 + 0.40 + 0.72 + 0.52 + 0.40), IV 3.12 mm (1.04 + 0.36 + 0.76 + 0.60 + 0.36), ♂ I 7.04 mm (1.96 + 0.64 + 1.80 + 1.72 + 0.92), II both absent, III 4.36 mm (1.36 + 0.52 + 1.12 + 0.92 + 0.44), IV 4.52 mm (1.48 + 0.52 + 1.08 + 0.96 + 0.48).

Prosoma longer than wide (length/width ♀ 1.10, ♂ 1.09), with long setae. Eyes: ALE > PLE > AME > PME, ALE/AME ♀ ♂ 1.67, PLE/PME ♀ ♂ 2.00, AME-AME / AME-ALE ♀ ♂ 1.00, PME-PME/PME-PLE ♀ 1.00, ♂ 0.85, median ocular area as long as wide (length/width ♀ ♂ 1.00), wider behind than in front (anterior width/ posterior width ♀ 0.91, ♂ 0.92), clypeus/ AME-AME ♀ ♂ 1.60. Labium longer than wide (length/width ♀ 1.20, ♂ 1.40), sternum as long as wide or slightly longer than wide (length/width ♀ 1.06, ♂ 1.00). Leg formula II–I–IV–III; tarsal claws of legs I–II with 10 teeth (female) or 4–5 teeth (male), of legs III–IV with 4 teeth.

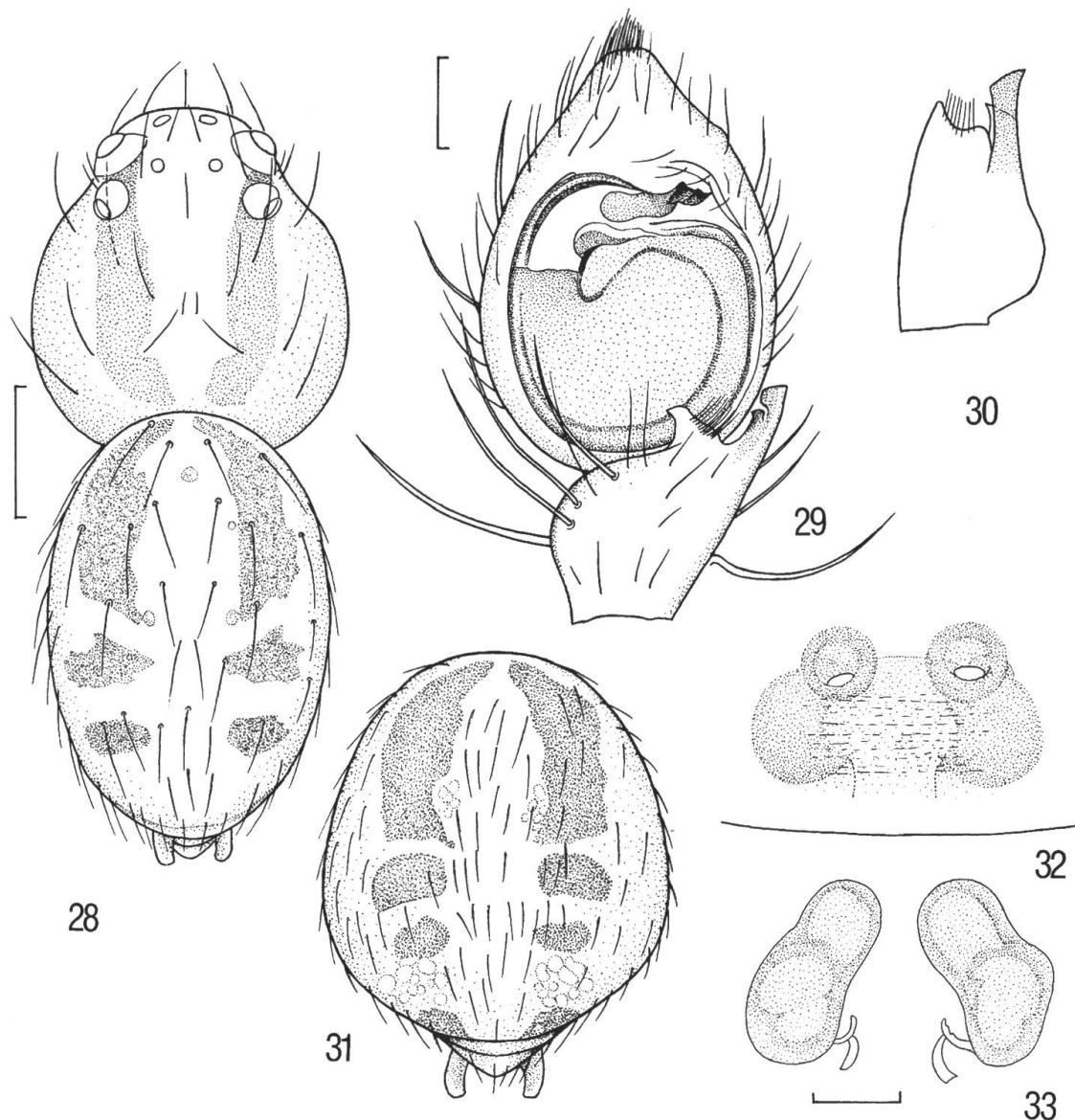
Spiniformation (for terminology, see ONO 1988: 13). ♀ Femur: I–III dorsal 1–1–0–1, I prolateral 0–1–1–1, IV dorsal 1–1–0–0; patella: I–IV dorsal 1–1 (weak); tibia: I–IV dorsal 1–1 (weak), I pro- and retrolateral 1–1–1, ventral 2–2, respectively, III pro- and retrolateral 0–1, IV pro- and retrolateral 1–1; metatarsus: I–II pro- and retrolateral 1–1–1 ap, ventral 2–2, respectively, III pro- and retrolateral 1–1, IV pro- and retrolateral 1–1–0, III–IV ventral 1. ♂ Femur: I, III–IV dorsal 1–1–1–1, I prolateral 0–1–1–1; patella: I, III–IV dorsal 1–1 (long), I pro- and retrolateral and III–IV retrolateral 1, respectively; tibia: I, III–IV dorsal 1–1 (long), I prolateral 1–1, retrolateral 1–1–1, ventral 2–2, III–IV pro- and retrolateral 1–1, ventral 2; metatarsus I pro- and retrolateral 1–1–1 ap, ventral 2–2, III–IV pro- and retrolateral 1–1, ventral 2. Leg II of male absent.

Male palp (Figs 29–30). Tibia with ventral and retrolateral apophyses: the ventral apophysis digitiform, furnished with several long hairs; the retrolateral apophysis strongly sclerotised and spatulate. Bulb longer than wide, embolic division well-developed, its basal part very thick, apical part of embolus twisted.

Opisthosoma longer than wide (length/width ♀ 1.16, ♂ 1.45), with long hairs (in female relatively shorter).

Female genitalia (Figs 32–33). Epigynum wider than long, intromittent orifices visible in ventral view, sclerotised plate lacking; intromittent canal very short, spermathecae reniform.

Coloration and markings (Figs 28 male, 31 female). ♀ ♂ Prosoma yellow (female) or light yellowish brown (male), with a pair of brown stripes, chelicerae, maxillae, labium, sternum and palps yellow, tibiae distally, metatarsi and tarsi of legs I yellowish brown, other segments of legs I and all segments of legs II–IV yellow. Opisthosoma



Figs 28–33: *Lysiteles ambrosii* sp.nov., male holotype and female paratype. 28, pro- and opisthosoma of male, dorsal view; 29, tibia and tarsus of male palp, ventral view; 30, tibia of male palp, retrolateral view; 31, opisthosoma of female, dorsal view; 32, epigynum, ventral view; 33, internal structure of female genitalia, dorsal view. [Scales: 28, 31, 0.5 mm; 29–30, 32–33, 0.1 mm.]

yellow, with three pairs of black spots on dorsaum and black lines on the sides, venter light yellowish brown.

Distribution. Bhutan; known only from the type locality.

Diagnosis. This new species resembles *Lysiteles inflatus* SONG & CHAI, 1990, described from Hubei, China, but is distinguishable from the latter by the shape of embolus and the structure of female genitalia. The well developed embolic base and the ventral tibial apophysis furnished with many long hairs are characteristic of this species (Figs 29–30).

Etymology. This species is dedicated to Dr. Ambros Hänggi, Natural History Museum, Basel.

Lysiteles niger ONO, 1979

Figs 34–35

Senckenbergiana biol. 59: 102.

Type material examined. Holotype female: Daman in Mahabarat Mountains at an altitude between 2,500 m and 2,900 m, eastern Nepal, 21–25.II.1970, J. Martens leg., in the Senckenberg Museum, Frankfurt am Main. **Other specimens examined.** 2 Females and 2 males: 87 km NE of Phuntsholing, evergreen forest with oak trees at an altitude of 1,700 m, Bhutan, 22.–23.V.1972 [1 female and 1 male: NMB 2683 h, i, 1 female and 1 male: NSMT-Ar 4851]; 1 immature female: Golakha, 33 km NE of Phuntsholing, evergreen broad-leaved forest at an altitude of 1,780 m, Bhutan, 29.IV.1972 [NMB 2683 b]; 1 female: Chimakothi, 98 km NE of Phuntsholing, broad-leaved forest at an altitude between 1,900 and 2,300 m, Bhutan, 22.V.1972 [NMB 2683 d]; 1 female and 1 male: Thimphu River, altitude?, Bhutan, 29.IV.1972 [NMB 2683 a]; 1 female: Dotanang Monastery, Tango, 12 km N of Thimphu, coniferous forest with some broad-leaved trees at an altitude between 2,500 and 2,900 m, Bhutan, 30.VI.1972 [NMB 2683 g]; 1 immature male: Paro, coniferous forest at an altitude of 2,300 m, Bhutan, 19.V.1972 [NMB 2683 c]; 3 females and 1 male: 13 km E of Wangdi Phodrang, evergreen forest at an altitude of 1,300 m, Bhutan, 7.VI.1972 [NMB 2683 e]; 1 female: 21 km E of Wangdi Phodrang, evergreen forest at an altitude between 1,700 and 2,000 m, Bhutan, 15.VI.1972 [NMB 2683 f].

Distribution. Bhutan and Nepal.

Notes. This species was described on the basis of a female specimen collected from the Mahabharat Mountains in the eastern part of Nepal. In the Bhutan Collection, a dozen specimens were found that could be identified with this Nepalese species, including males previously unknown.

The males collected in Bhutan show a similarity to *Lysiteles annapurnus* ONO, 1979, not only in general appearance but also in the structure of the male palp. However, the retrolateral tibial apophysis of the specimens from Bhutan is relatively wider than that of *L. annapurnus*. The later species was described on the basis of a male specimen collected from the Annapurna Massif in the western part of Nepal, and its female is not known. A description of males of the present material will not be given in this paper, because the male of *L. niger* was not obtained from near the type locality in Nepal.

The coloration and markings of the opisthosoma in females are variable: some individuals have a yellowish ground colour with white spots and black markings (Fig. 34), while some are blackish, as in the Nepalese holotype (Fig. 35).

Lysiteles maius ONO, 1979

Senckenbergiana biol. 59: 103.

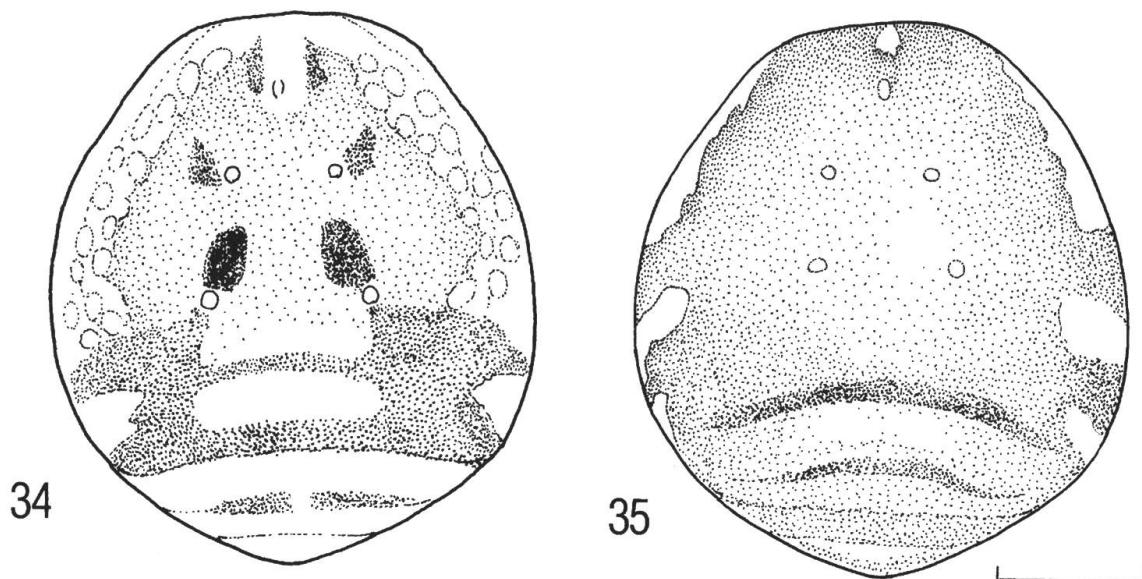
Lysiteles maior: BRIGNOLI, 1983, Cata. Aran.: 609. [An unjustified emendation. For further explanation see ONO 1988: 138.]

Type material examined. Holotype male: Dhorpatan on the southern side of the Dhaulagiri Massif at an altitude of 3,300 m, Nepal, 16.V.1973, J. Martens leg., in the Senckenberg Museum, Frankfurt am Main.

Other specimens examined. 1 female and 1 male: Thimphu, coniferous forest at an altitude between 2,300 and 2,500 m, Bhutan, 21.V.1972 [NMB 2681 a, b].

Distribution. Bhutan, Nepal, China, Siberia, Sakhalin and Japan.

Notes. This species is widely distributed from Nepal, through China to Japan. Although the shape of female genitalia agrees well between individuals of Nepal, Bhutan, China and Japan, the shape of embolus is variable. This species is closely related to *Lysiteles niger* ONO, 1979 and *L. annapurnus* ONO, 1979.



Figs 34–35: *Lysiteles niger* ONO, 1979, opisthosomata of females, dorsal view; 34, 87 km NE of Phuntsholing; 35, Thimphu. [Scale: 0.5 mm.]

***Lysiteles saltus* ONO, 1979**

Senckenbergiana biol. 59: 99.

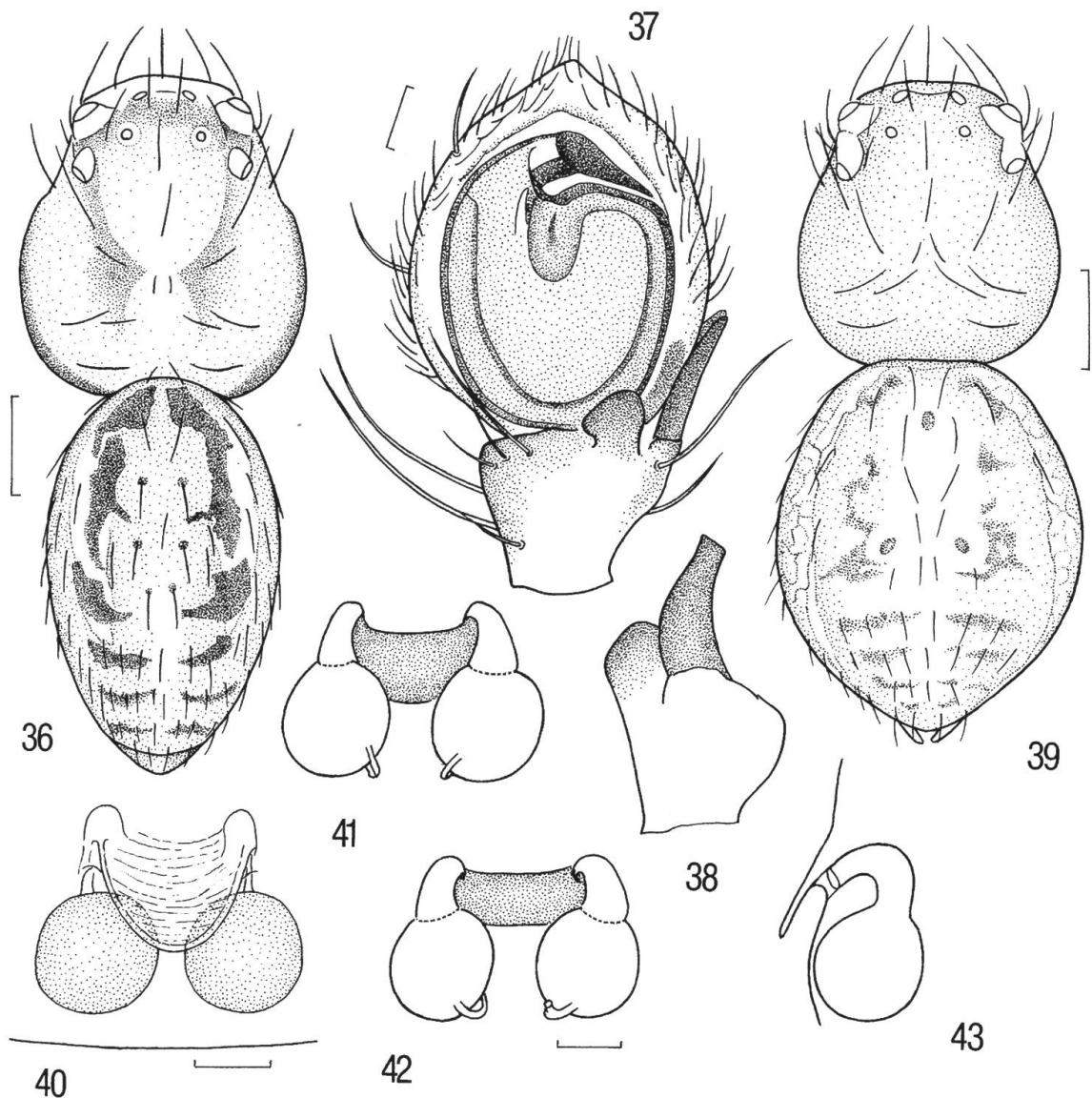
Type material examined. Holotype female and 1 paratype female: Gorapani Pass on the southern side of the Annapurna Massif at an altitude between 2,850 m and 3,130 m, Nepal, 10–14.XII.1969, J. Martens leg., in the Senckenberg Museum, Frankfurt am Main.

Other specimens examined. 8 females and 3 males: Sha Gogona, cultivated area in rhododendron-coniferous forest at an altitude of 3,100 m, Bhutan, 10.–15.VI.1972 [7 females and 2 males: NMB 2684 d, a, 1 female and 1 male: NSMT-Ar 4852].

Description. (Based on the Bhutanese specimens.) Measurements based on a female [NMB 2684 b] and a male [NMB 2684 d]. Body length ♀ 3.36 mm, ♂ 3.52 mm; prosoma length ♀ 1.44 mm, ♂ 1.68 mm, width ♀ 1.32 mm, ♂ 1.48 mm; opisthosoma length ♀ 2.00 mm, ♂ 1.92 mm, width ♀ 1.64 mm, ♂ 1.24 mm; lengths of legs [total length (femur + patella + tibia + metatarsus + tarsus)]: ♀, I 4.28 mm (1.28 + 0.52 + 0.96 + 0.92 + 0.60), II 4.12 mm (1.28 + 0.48 + 0.92 + 0.88 + 0.56), III 3.04 mm (0.96 + 0.40 + 0.72 + 0.52 + 0.44), IV 3.24 mm (1.00 + 0.40 + 0.76 + 0.60 + 0.48), ♂ I 5.48 mm (1.64 + 0.64 + 1.28 + 1.16 + 0.76), II 5.56 mm (1.68 + 0.64 + 1.32 + 1.20 + 0.72), III 3.44 mm (1.12 + 0.48 + 0.80 + 0.60 + 0.44), IV 3.68 mm (1.20 + 0.48 + 0.84 + 0.72 + 0.44). Variation of body length: ♀ 3.36–3.72 mm, ♂ 3.20–3.52 mm.

Prosoma longer than wide (length/width ♀ 1.09, ♂ 1.14), with long setae. Eyes: ALE > PLE > AME > PME, ALE/AME ♀ ♂ 1.67, PLE/PME ♀ ♂ 2.00, AME-AME / AME-ALE ♀ ♂ 1.00, PME-PME/PME-PLE ♀ 0.92, ♂ 0.96, median ocular area wider than long (length/width ♀ ♂ 0.93), wider behind than in front (anterior width/ posterior width ♀ 0.87, ♂ 0.80), clypeus/ AME-AME ♀ 1.14, ♂ 1.29. Chelicerae of male normal, labium longer than wide (length/width ♀ 1.40, ♂ 1.33), sternum longer than wide (length/width ♀ 1.13, ♂ 1.11). Leg formula I–II–IV–III in female, II–I–IV–III in male;

Figs 36–43



Figs 36–43: *Lysiteles saltus* ONO, 1979. 36–41, female and male from Bhutan; 42–43, female holotype from Nepal. 36 (male), 39 (female), pro- and opisthosomata, dorsal view; 37, tibia and tarsus of male palp, ventral view; 38, tibia of male palp, retrolateral view; 40, epigynum, ventral view; 41–42, internal structure of female genitalia, dorsal view; 43, same, lateral view. [Scales: 36, 39, 0.5 mm; 37–38, 40–43, 0.1 mm.]

tarsal claws of legs I–II with 8 teeth (female) or 4 teeth (male), of legs III–IV with 3–4 teeth.

Spiniformation (for terminology, see ONO 1988: 13). ♀ Femur: I dorsal 0–1–1 (left) or 0–1–0 (right), prolateral 0–1–1–1–0, II dorsal 1–1–1–1–1 (left) or 1–1–0 (right), III dorsal 1–1, IV dorsal 1 (left) or 1–1 (right); patella: I–IV dorsal 1–1; tibia: I–IV dorsal 1–1, I pro- and retrolateral 1–1, ventral 2–2, II prolateral 0–1–1 (left) or 1–1–1 (right), retrolateral 0–1, ventral 2–1–2 (left) or 2–2 (right), III–IV pro- and retrolateral 1–1, respectively, III ventral 1 (left) or 1–2 (right), IV ventral 1 (left) or none (right); metatarsus: I pro- and retrolateral 0–1–1 ap, ventral 2–2, II prolateral 0–1–1 ap (left) or

0–0–1 (right), retro-lateral 0–1–1 ap, ventral 2–2, III–IV pro-lateral 1–1, retro-lateral 1, ventral 2. ♂ Femur: I–III dorsal 1–1–1–1, I pro-lateral and IV dorsal 0–1–1–1 (1–1–1–1 in another individual), respectively; patella: I–IV dorsal 1–1, IV retro-lateral 1; tibia: I–IV dorsal 1–1, I–II pro- and retro-lateral 1–1–1, ventral 2–2, III–IV pro- and retro-lateral 1–1, ventral 2; metatarsus I–II pro- and retro-lateral 1–1–0–1 ap, ventral 2–2, III–IV pro- and retro-lateral 1–1, ventral 2.

Male palp (Figs 37–38). Tibia with ventral and retro-lateral apophyses: the ventral apophysis digitiform, short and wide, apically curved; the retro-lateral apophysis developed and strongly sclerotised. Bulb longer than wide, embolus large and developed.

Opisthosoma longer than wide (length/width ♀ 1.22, ♂ 1.55), with strong hairs.

Female genitalia (Figs 40–43). Epigynum wider than long, sclerotised fold large and labiated [the length variable (cf. Fig. 40 and ONO 1979: Fig. 18)]; intromittent canal relatively longer than that of the following species, *Lysiteles bhutanus* sp.nov. (cf. Figs 43 and 51), spermathecae globular.

Coloration and markings (Figs 36 male, 39 female). ♀ Prosoma dark yellow, chelicerae, maxillae, labium, sternum, legs and palps yellow; opisthosomal dorsum dark yellow, with brown markings, white at the sides, venter dark yellow, with a pair of brown stripes centrally (indistinct in some individuals). ♂ Prosoma yellowish brown, with indistinct U-shaped marking in brown, chelicerae brown, maxillae and labium light yellowish brown, sternum light yellowish brown, darker marginated, tarsi of legs I–II distally black, other segments of legs I–II light yellowish brown, legs III–IV and palps yellow; opisthosomal dorsum yellowish brown with blackish-brown markings, venter yellow with a pair of black stripes centrally.

Distribution. Bhutan, Nepal and Tibet.

Notes. This species was originally described based on female specimens collected from the Annapurna Massif of the Nepal Himalayas (ONO 1979). SONG & ZHU (1997) recorded and described both the sexes of the species from Tibet, China. A description is given on the basis of the present material as follows. The male from the type locality has not been obtained.

Lysiteles bhutanus sp.nov.

Figs 44–51

Type material examined. Holotype male: Sha Gogona, cultivated area in rhododendron-coniferous forest at an altitude of 3,100 m, Bhutan, 10.–12.VI.1972 [NMB 2666 a]; paratypes: 1 female: same data as for the holotype [NMB 2666 b], 10 females: same data as for the holotype [9 females: NMB 2666 k, l, 1 female: NSMT-Ar 4853], 5 females: Dorju-la, rhododendron-coniferous forest at an altitude of 3,100 m, Bhutan, 6.–29.VI.1972 [NMB 2666 h, j].

Other specimens examined. 1 Female, 1 male and 1 juvenile: Chimakothi, 98 km NE of Phuntsholing, broad-leaved forest at an altitude between 1,900 and 2,300 m, Bhutan, 22.V.1972 [NMB 2666 d, c]; 1 female and 1 male: Dotanang Monastery, Tango, 12 km N of Thimphu, coniferous forest also with broad-leaved trees at an altitude between 2,500 and 2,900 m, Bhutan, 30.VI.1972 [NMB 2666 g, f]; 1 female: from Sampa to Kothoka, evergreen forest at an altitude between 1,400 and 2,600 m, Bhutan, 9.VI.1972 [NMB 2666 e].

Description. Measurements based on the male holotype and a female paratype from the type locality. Body length ♀ 4.32 mm, ♂ 3.60 mm; prosoma length ♀ 1.64 mm, ♂ 1.68

mm, width ♀ 1.48 mm, ♂ 1.52 mm; opisthosoma length ♀ 2.68 mm, ♂ 2.00 mm, width ♀ 2.32 mm, ♂ 1.28 mm; lengths of legs [total length (femur + patella + tibia + metatarsus + tarsus)]: ♀, I 5.40 mm (1.68 + 0.68 + 1.28 + 1.08 + 0.68), II 5.52 mm (1.68 + 0.72 + 1.32 + 1.12 + 0.68), III 3.88 mm (1.24 + 0.56 + 0.88 + 0.72 + 0.48), IV 4.04 mm (1.32 + 0.52 + 0.96 + 0.80 + 0.44), ♂ I 7.28 mm (2.24 + 0.76 + 1.80 + 1.60 + 0.88), II 7.48 mm (2.28 + 0.72 + 1.88 + 1.68 + 0.92), III 4.60 mm (1.40 + 0.56 + 1.12 + 0.92 + 0.60), IV 4.92 mm (1.52 + 0.56 + 1.20 + 1.08 + 0.56). Variation of body length: ♀ 3.50–4.32 mm.

Prosoma longer than wide (length/width ♀ ♂ 1.11), with long setae. Eyes: ALE > PLE > AME (PME, ALE/AME ♀ ♂ 2.00, PLE/PME ♀ 2.00, ♂ 1.33, AME-AME / AME-ALE ♀ 1.00, ♂ 1.17, PME-PME/PME-PLE ♀ 0.92, ♂ 0.82, median ocular area wider than long (length/width ♀ 1.88, ♂ 0.93), wider behind than in front (anterior width/posterior width ♀ 0.82, ♂ 0.87), clypeus/ AME-AME ♀ ♂ 1.29. Chelicerae normal, labium longer than wide (length/width ♀ 1.33, ♂ 1.60), sternum longer than wide (length/width ♀ 1.22, ♂ 1.15). Leg formula II–I–IV–III; tarsal claws of legs I–II with 10 (female) or 4 teeth, of leg III–IV with 2 teeth.

Spiniformation (for terminology, see ONO 1988: 13). ♀ Femur: I dorsal 0–1–1–1 (left) or 0–1–0–1 (right), prolateral 0–1–2–1–1, II–III dorsal 1–1–1–1, IV dorsal 1–1–1–1 (left) of 0–1–1–1 (right); patella: I–IV dorsal 1–1, III–IV retrolateral 1 (weak); tibia: I–IV dorsal 1–1, I–II pro- and retrolateral 1–1–1, ventral 2–2, III–IV pro- and retrolateral 1–1, III ventral 2, IV ventral 1; metatarsus: I–II pro- and retrolateral 1–1–1 ap, ventral 2–2, III–IV pro- and retrolateral 1–1, ventral 2. ♂ Femur: I dorsal 1–1–1–1 (left) or 1–1–1–1 (right), prolateral 1–1–1–1, II–IV dorsal 1–1–1–1; patella: I–IV dorsal 1–1, I–II pro- and retrolateral 1, respectively; tibia: I–IV dorsal 1–1, I–II pro- and retrolateral 1–1–1, ventral 2–2, III–IV pro- and retrolateral 1–1, ventral 2; metatarsus I–II pro- and retrolateral 1–1–1 ap, ventral 2–2, III–IV pro- and retrolateral 1–1, ventral 2, respectively.

Male palp (Figs 45–47). Tibia with ventral and retrolateral apophyses: the ventral apophysis wide and short, distally curved; the retrolateral one wide and obtuse and variable (Figs 46–47). Bulb longer than wide, embolus spiniform, straight and sharpened.

Opisthosoma longer than wide (length/width ♀ 1.16, ♂ 1.56), with strong hairs.

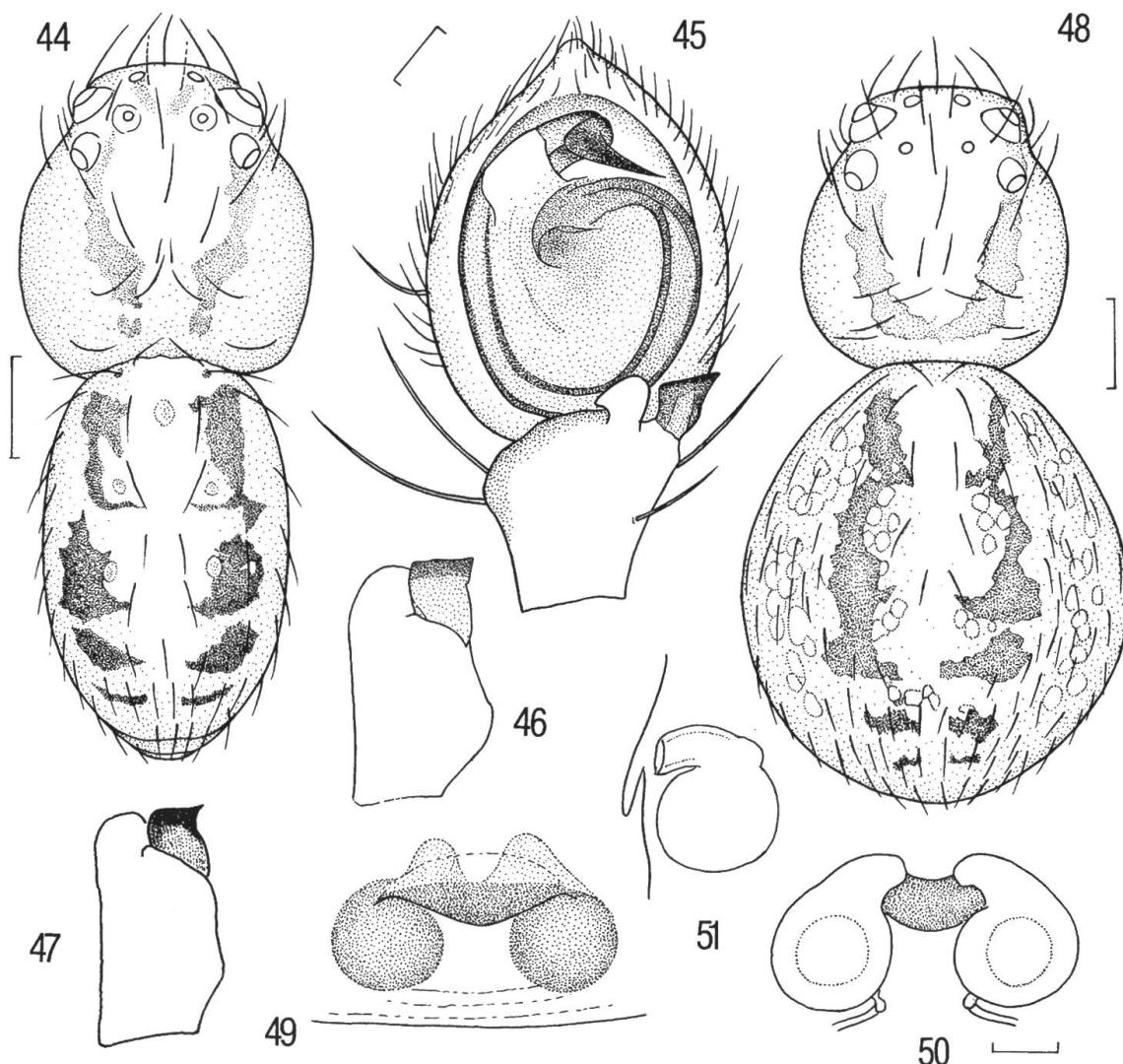
Female genitalia (Figs 49–51). Epigynum wider than long, sclerotised fold hard and lingulate; interomittent canal shorter than in the former species, spermathecae globular.

Coloration and markings (44 male, 48 female). ♀ Prosoma light yellowish brown, with a U-shaped brown marking, chelicerae, maxillae, labium, legs and palps light yellowish brown, sternum yellow; opisthosomal dorsum yellowish brown, with white spots and dark brown markings (some individuals without markings), venter light yellowish brown with a pair of brown stripes centrally ♂ Prosoma yellow with a U-shaped brown marking, chelicerae, maxillae, labium and sternum yellow, tarsi of legs I–II distally black, other parts of legs I–II light yellowish brown, legs III–IV and palps yellow; opisthosomal dorsum yellow, with black markings, venter yellowish white with indistinct, small, black spots.

Distribution. Bhutan.

Diagnosis. This new species resembles *Lysiteles saltus* ONO, 1979, *L. niger* ONO, 1979, *L. maius* ONO, 1979 and *L. annapurnus* ONO, 1979, but is distinguishable from these species by the shape of retrolateral tibial apophysis of male palp and the length of intromittent canal in the female genitalia.

Etymology. The specific name is derived from the country.



Figs 44–51: *Lysiteles bhutanicus* sp.nov. :44–46, male holotype, 47, male from Tango, 48–51, female paratype. 44 (male), 48 (female), pro- and opisthosomata, dorsal view; 45, tibia and tarsus of male palp, ventral view; 46–47, tibiae of male palp, retrolateral view; 49, epigynum, ventral view; 50, internal structure of female genitalia, dorsal view; 51, same, lateral view. [Scales: 44, 48, 0.5 mm; 45–47, 49–51, 0.1 mm.]

Lysiteles himalayensis ONO, 1979

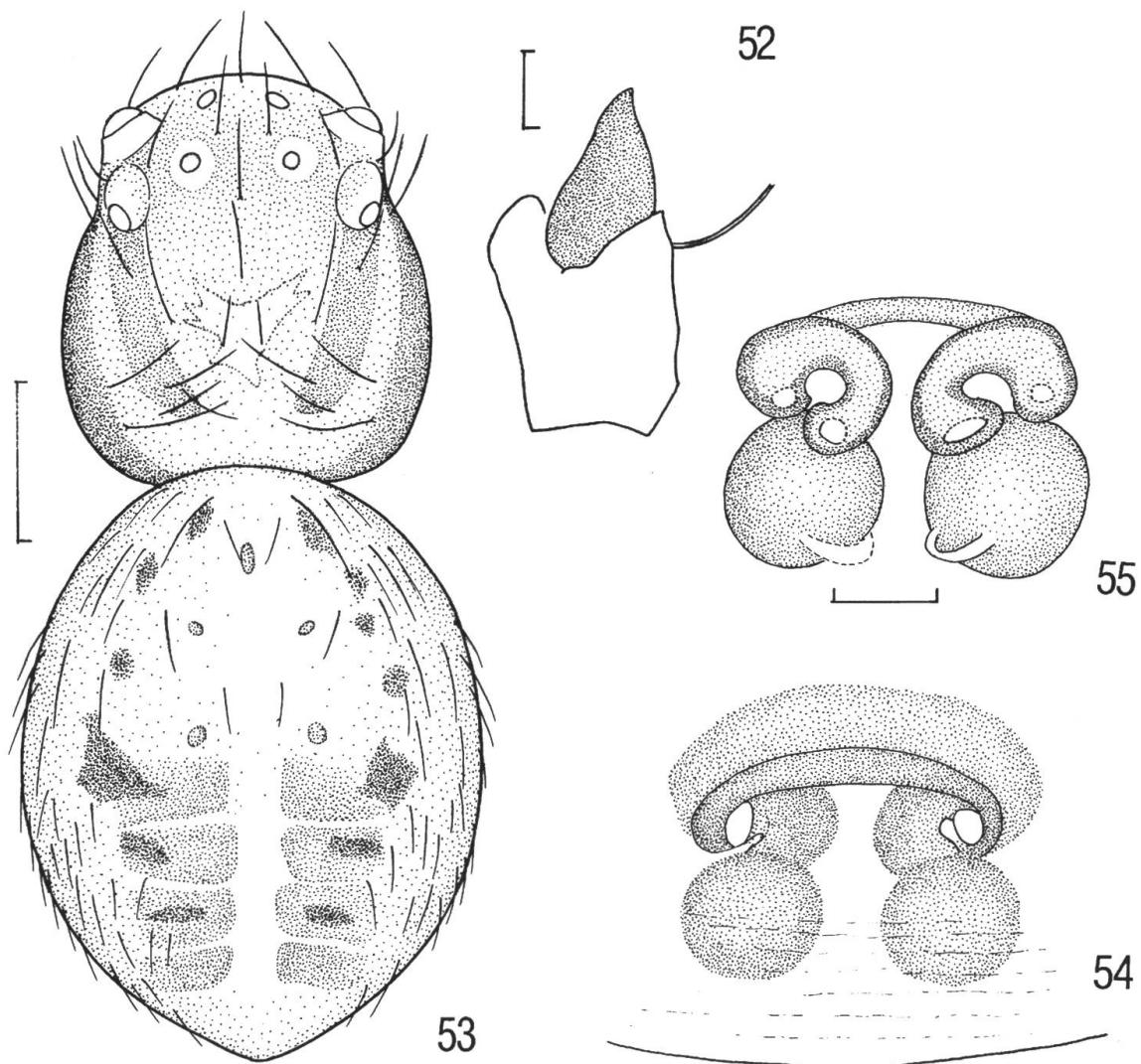
Figs 52–55

Senckenbergiana biol. 59: 102.

Type material examined. Holotype male: Thankur on the western side of the Dhaulagiri Massif at an altitude of 3,350 m, Nepal, 26–27.V.1973, J. Martens leg., in the Senckenberg Museum, Frankfurt am Main.

Other specimens examined. 8 females, 1 male and 1 immature male: Sha Gogona, cultivated area in rhododendron-coniferous forest at an altitude of 3,100 m, Bhutan, 10.–12.VI.1972 [NMB 2679 d, c]; 1 female: Kothoka to Sha Gogona, rhododendron-coniferous forest at an altitude between 2,600 m and 3,400 m, Bhutan, 10.VI.1972 [NMB 2679 a]; 3 females: Dechhi Paka, village, 5 km SE of Pele-la, cultivated area in rhododendron-coniferous forest at an altitude of 3,300 m, Bhutan, 20.VI.1972 [1 female: NMB 2679 b, 1 female: NSMT-Ar 4854].

Description. (Based on the Bhutanese material; females only.) Measurements based on a female from Sha Gogona. Body length 3.00 mm; prosoma length 1.24 mm, width 1.12



Figs 52–55: *Lysiteles himalayensis* ONO, 1979, from Bhutan. 52, Tibia of male palp, retrolateral view; 53, pro- and opisthosoma of female, dorsal view; 54, epigynum, ventral view; 55, internal structure of female genitalia, dorsal view. [Scales: 52, 54–55, 0.1 mm; 53, 0.5 mm.]

mm; opisthosoma length 1.80 mm, width 1.44 mm; lengths of legs [total length (femur + patella + tibia + metatarsus + tarsus)]: I 3.76 mm (1.12 + 0.52 + 0.84 + 0.76 + 0.52), II 3.80 mm (1.16 + 0.52 + 0.84 + 0.76 + 0.52), III 2.64 mm (0.92 + 0.36 + 0.56 + 0.44 + 0.40), IV 2.84 mm (0.92 + 0.36 + 0.68 + 0.48 + 0.40).

Prosoma longer than wide (length/width 1.11), without long setae. Eyes: ALE>PLE>AME>PME, ALE/AME 1.67, PLE/PME 1.60, AME-AME / AME-ALE 1.17, PME-PME/PME-PLE 1.00, median ocular area wider than long (length/width 0.86), wider behind than in front (anterior width / posterior width 0.86), clypeus/ AME-AME 1.00. Labium longer than wide (length/width 1.40), sternum longer than wide (length/width 1.20). Leg formula II-I-IV-III; tarsal claws of legs I-II with 3 teeth, of legs III-IV with 2 teeth.

Spiniformation (for terminology, see ONO 1988: 13). Femur: I dorsal 1, prolateral 0-0-1-1-1, II dorsal 1-1-0, III dorsal 1-1-0 (left) or 1 (right); patella: I-IV dorsal 1-1, III-IV retrolateral 1 (weak); tibia: I-IV dorsal 1-1, I-II pro- and retrolateral 1-1, ventral 2-2, III-IV pro- and retrolateral 0-1, ventral 1; metatarsus: I-II pro- and retrolateral 0-1-1 ap, ventral 2-2, III-IV pro- and retrolateral and ventral 1, respectively.

Opisthosoma longer than wide (length/width 1.25), with strong hairs.

Female genitalia (Figs 54-55). Epigynum wider than long, intromittent orifices visible, sclerotised fold large and developed; intromittent canal relatively long and curved, spermathecae globular.

Coloration and markings (Fig. 53). Prosoma yellowish brown, white centrally, darker marginated and with a pair of brown stripes at the sides, chelicerae, maxillae and labium yellowish brown, sternum yellow, darker at the sides, femora of legs I prolaterally brown, other parts of legs I and leg II light yellowish brown, metatarsi of legs III distally with a brown ring, other parts of legs III, legs IV and palps yellow; opisthosomal dorsum white, with black markings, blackish brown at the sides, venter white, with a broad stripe in the middle.

Distribution. Bhutan and Nepal.

Notes. This species was originally described on the basis of a male collected from the Dhaulagiri Massif in Nepal. Although the retrolateral tibial apophysis of male palp of the Bhutanese specimen is a little wider than that of the holotype (cf. Fig. 52 with ONO 1979: Fig. 31), the difference seems within the range of variation. The body length of the only male in the present material is 2.80 mm. A first description of hitherto unknown females of this species as above.

Lysiteles wittmeri sp.nov.

Figs 56-61

Type material examined. Holotype male: Thimphu River, altitude?., Bhutan, 29.IV.1972 [NMB 2669 a]; paratype: 1 female: Nobding, 41 km NE of Wangdi Phodrang, evergreen forest at an altitude of 2,800 m, Bhutan, 17.-18. VI.1972 [NMB 2669 b].

Description. Measurements based on the male holotype and a female paratype. Body length ♀ 3.90 mm, ♂ 4.24 mm; prosoma length ♀ 1.72 mm, ♂ 1.88 mm, width ♀ 1.56 mm, ♂ 1.68 mm; opisthosoma length ♀ 2.28 mm, ♂ 2.48 mm, width ♀ 1.76 mm, ♂ 1.28 mm; lengths of legs [total length (femur + patella + tibia + metatarsus + tarsus)]: ♀,

I 4.60 mm (1.40 + 0.68 + 1.12 + 0.92 + 0.48), II 4.84 mm (1.52 + 0.72 + 1.12 + 0.96 + 0.52), III 3.52 mm (1.16 + 0.52 + 0.76 + 0.68 + 0.40), IV 3.64 mm (1.16 + 0.48 + 0.80 + 0.76 + 0.44), ♂ I 6.32 mm (1.80 + 0.88 + 1.60 + 1.36 + 0.68), II 6.38 mm (1.88 + 0.86 + 1.64 + 1.32 + 0.68), III 4.00 mm (1.28 + 0.56 + 0.96 + 0.76 + 0.44), IV 4.16 mm (1.28 + 0.52 + 1.00 + 0.88 + 0.48).

Prosoma longer than wide (length/width ♀ 1.10, ♂ 1.12), with long setae. Eyes: ALE>PLE>AME>PME, ALE/AME ♀ 1.71, ♂ 2.00, PLE/PME ♀♂ 1.67, AME-AME / AME-ALE ♀ 1.00, ♂ 0.90, PME-PME/PME-PLE ♀ 0.96, ♂ 0.86, median ocular area wider than long (length/width ♀ 0.75, ♂ 0.84), wider behind than in front (anterior width/ posterior width ♀ 0.80, ♂ 0.84), clypeus/AME-AME ♀ 1.00, ♂ 1.22. Chelicerae of male normal; labium longer than wide (length/width ♀ 1.33, ♂ 1.50), sternum longer than wide (length/width ♀ 1.28, ♂ 1.15). Leg formula II-I-IV-III; tarsal claws of legs I-II with 4-5 teeth, of legs III-IV 3-4 teeth.

Spiniformation (for terminology, see ONO 1988: 13). ♀ Femur: I dorsal 1, prolateral 0-1-1-0 (left) of 0-1-1 (right), II-III dorsal 1-1-0, IV dorsal 1; patella: I-IV dorsal 1-1 (weak); tibia: I-IV dorsal 1-1 (weak), I-II prolateral 1-1-1, retrolateral 0-1-1, ventral 2-2, III-IV prolateral 1-1, retrolateral 0-1, ventral 2; metatarsus I-II prolateral 1-1-1 ap, retrolateral 0-1-1 ap, ventral 2-2, III-IV prolateral 1-1, retrolateral 0-1, ventral 2. ♂ Femur: I, III-IV dorsal 1-1-1-1, II dorsal 1-1-1-1-1, I prolateral 0-2-2-1, retrolateral 0-1-1, II prolateral 0-1-1-0-1, retrolateral 0-1-1, III-IV prolateral 0-0-0-1; patella: I-IV dorsal 1-1 (weak), III-IV retrolateral 1, respectively; tibia: I-IV dorsal 1-1 (weak), I-II prolateral and I retrolateral 1-1-1, respectively, II retrolateral 0-1-1, I-II ventral 2-2, III-IV pro- and retrolateral 1-1, ventral 2-0; metatarsus: I-IV prolateral 1-1-1 ap, I-II retrolateral 0-1-1 ap, ventral 2-2, III-IV retrolateral 1-1, ventral 2.

Male palp (Figs 57-58). Tibia with ventral and retrolateral apophyses: the ventral apophysis wide and apically curved and pointed; the retrolateral one digitiform and strongly sclerotised. Bulb slightly longer than wide, embolus short and hook-shaped.

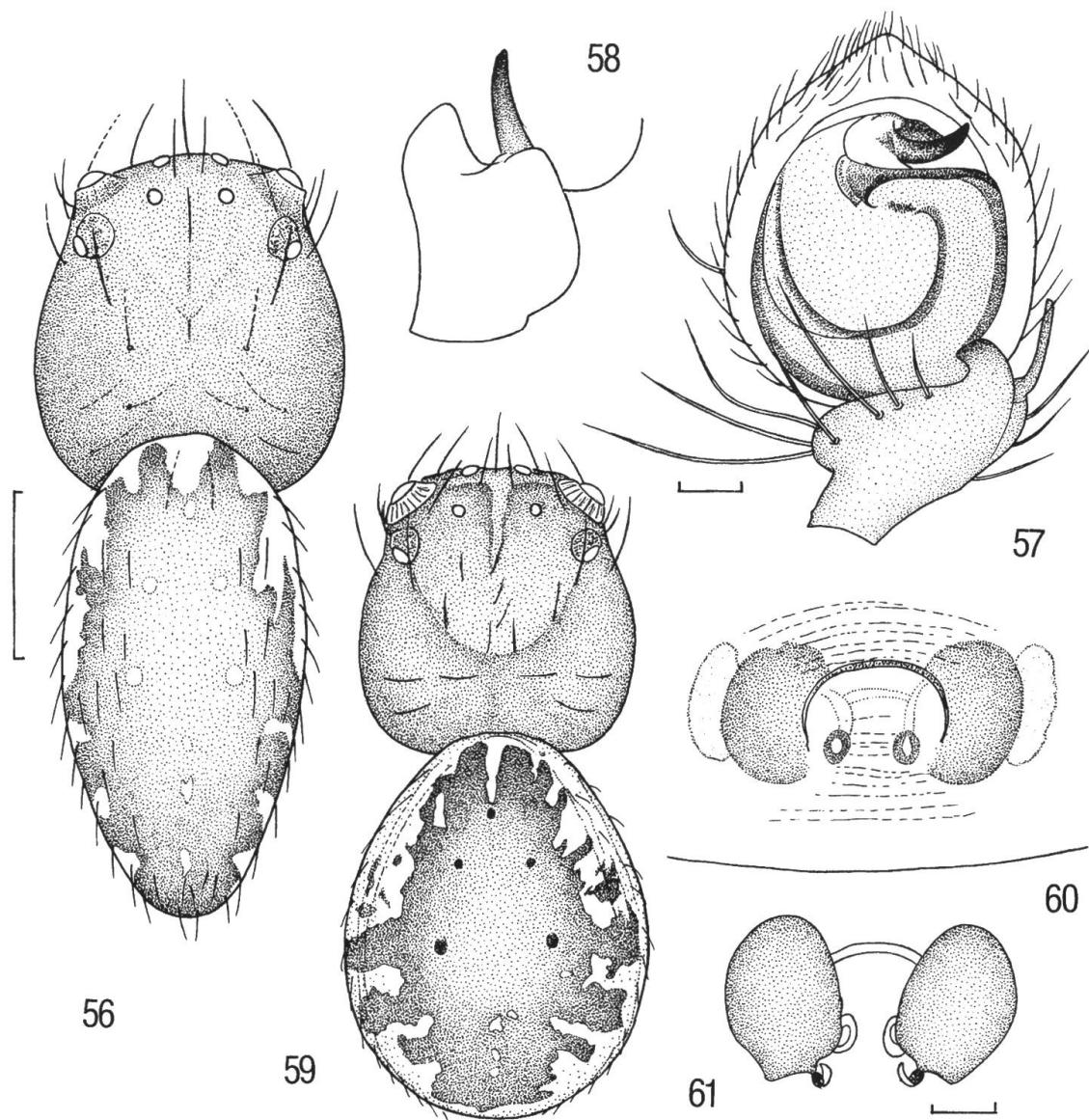
Opisthosoma longer than wide (length/width ♀ 1.30, ♂ 1.93), females with stout hairs, males with relatively long hairs.

Female genitalia (Figs 60-61). Epigynum wider than long, intromittent orifices visible in ventral view, sclerotised fold thin and indistinct; intromittent canal very short, spermathecae oval.

Coloration and markings (Figs 56 male, 59 female). ♀♂ Prosoma blackish brown, without markings, chelicerae, maxillae and labium blackish brown, sternum brown, femora of leg I blackish brown, prolaterally with a large white spot, femora of legs II-IV distally blackish, tibiae of legs I-IV proximally and distally, metatarsi of legs I-IV distally blackish brown, other parts of legs and palps yellowish brown. Opisthosomal dorsum blackish brown, white marginated, venter black with white splashes.

Distribution. Known only from Bhutan.

Diagnosis. This new species resembles *Lysiteles quiae* SONG & WANG, 1991 described from Shaanxi, China, and the following new species, *L. punctiger* sp.nov., but is distinguishable from other species by the structure of female genitalia. The openings of female genitalia are situated in the posterior part of epigynum in the new species, while



Figs 56–61: *Lysiteles wittmeri* sp.nov. , male holotype and female paratype. 56 (male), 59 (female), pro- and opisthosomata, dorsal view; 57, tibia and tarsus of male palp, ventral view; 58, tibia of male palp, retrolateral view; 60, epigynum, ventral view; 61, internal structure of female genitalia, dorsal view. [Scales: 56, 59, 0.5 mm; 57–58, 60–61, 0.1 mm.]

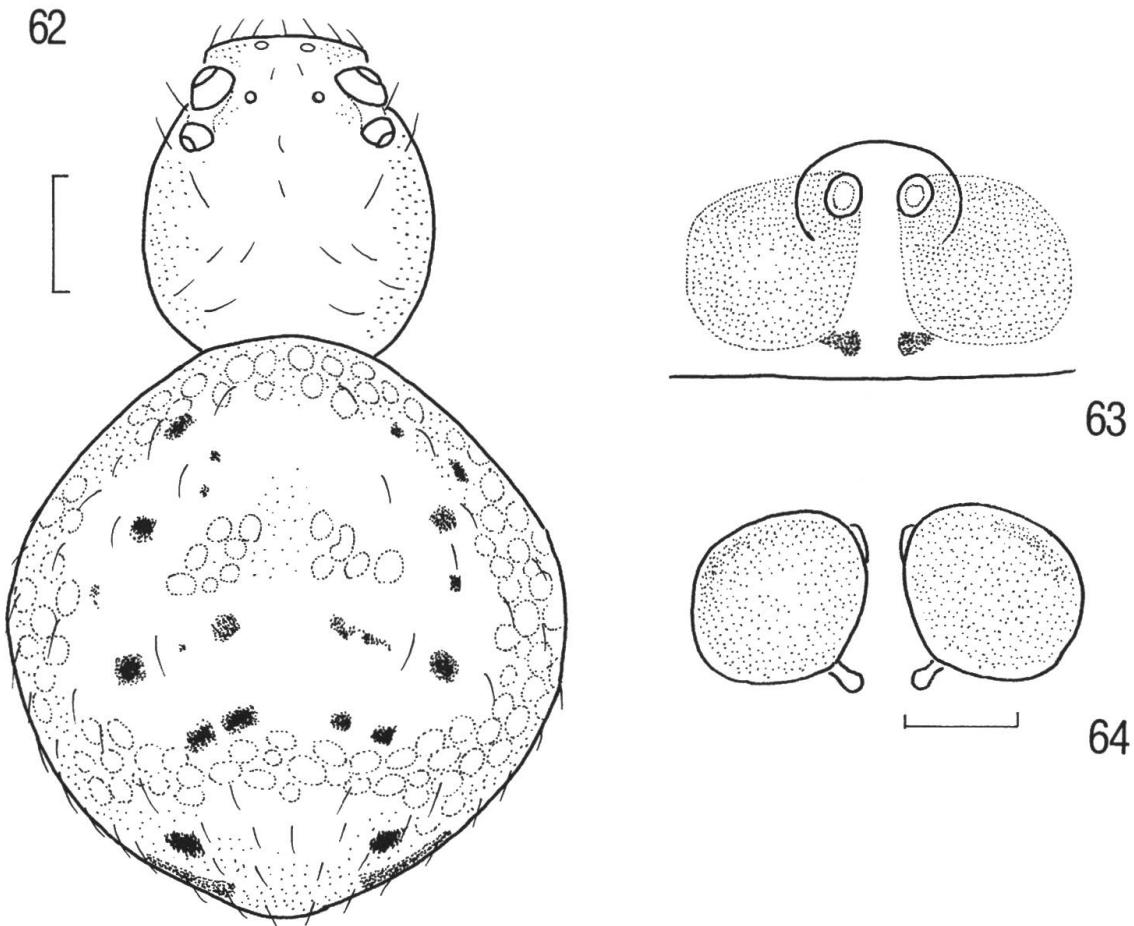
those are in the anterior part in the other two species. The embolus of male palp of *Lysiteles wittmeri* sp.nov. is much thicker and stronger than that of *L. quiae*.

Etymology. This species is dedicated to the late Dr. W. Wittmer.

***Lysiteles punctiger* sp.nov.**

Figs 62–64

Type material examined. Holotype female: 87 km NE of Phuntsholing, evergreen forest with oak trees at an altitude of 1,700 m, Bhutan, 22.V.1972 [NMB 2668 a]; paratypes: 2 females: same data for the holotype [NMB 2668 b].



Figs 62–64: *Lysiteles punctiger* sp.nov., female holotype. 62, pro- and opisthosomata, ventral view; 63, epigynum, ventral view; 64, internal structure of female genitalia, dorsal view. [Scales: 62, 0.5 mm; 63–64, 0.1 mm.]

Description. (Based on females only; male unknown.) Measurements based on the holotype: Body length 3.70 mm; prosoma length 1.32 mm, width 1.16 mm; opisthosoma length 2.44 mm, width 2.32 mm; lengths of legs [total length (femur + patella + tibia + metatarsus + tarsus)]: I 3.88 mm (1.20 + 0.48 + 0.92 + 0.80 + 0.48), II 4.20 mm (1.36 + 0.48 + 0.96 + 0.88 + 0.52), III 2.52 mm (0.80 + 0.36 + 0.56 + 0.44 + 0.36), IV 2.76 mm (0.92 + 0.32 + 0.68 + 0.52 + 0.32). Body lengths of paratypes 2.52–3.48 mm.

Prosoma longer than wide (length/width 1.14), with long setae. Eyes: ALE > PLE > AME > PME, ALE/AME 1.67, PLE/PME 2.00, AME-AME / AME-ALE 0.94, PME-PME/PME-PLE 1.00, median ocular area wider than long (length/width 0.87), wider behind than in front (anterior width / posterior width 0.87), clypeus/ AME-AME 1.20. Labium longer than wide (length/width 1.40), sternum longer than wide (length/width 1.28). Leg formula II–I–IV–III; tarsal claws of legs I–II with 6 teeth, of legs III–IV with 3 teeth.

Spiniformation (for terminology, see ONO 1988: 13). Femur: I dorsal 0–0–1–0–0, prolateral 0–0–1–1–1, II–III dorsal 0–1–1–0–0, IV dorsal 0–0–1–0–0; patella: I–IV dorsal 1–0–0–1, I–II pro- and retrolateral 1; tibia: I–IV dorsal 1–1, I prolateral 1–1–1, II

prolateral and I-II retrolateral 0–1–1, I-II ventral 2–2, III-IV pro- and retrolateral 0–1, ventral 1; metatarsus: I-II pro- and retrolateral 1–1–1 ap, ventral 2–2, III-IV prolateral 1–1, III retrolateral 0–1, IV retrolateral 0–1.

Opisthosoma longer than wide (length/width 1.05), with relatively short hairs.

Female genitalia (Figs 63–64). Epigynum wider than long, intromittent orifices visible in ventral view, sclerotised fold indistinct; intromittent canal very short, spermathecae globular.

Coloration and markings (Fig. 62). Prosoma light yellowish brown, without markings, chelicerae, maxillae, labium and sternum yellowish white, legs and palps yellow; opisthosomal dorsum yellow with black spots, white at the sides, venter yellowish white, with black lines at the sides.

Distribution. Bhutan; known only from the type locality.

Diagnosis. As was explained in the diagnosis of the former species, this new species seems to be closely related to *Lysiteles quiae*, but is distinguished from the latter by the length of intromittent canal and the absence of sclerotised fold in female genitalia. The male is unknown in this new species.

Etymology. The specific epithet is derived from the markings of the opisthosoma, with many black spots.

Genus *Synaema* SIMON, 1864

Notes. “*Synema*” is Simon’s original generic name but as stated earlier (ONO 1988) I support the traditional usage of “*Synaema*” corrected by THORELL (1869).

Synaema albomaculatum sp.nov.

Figs 65–71

Type material examined. Holotype male: Thimphu, river, Bhutan, 23.IV.1972 [NMB 2672 a]; paratype: 1 male: same data as for the holotype [NMB 2672 b].

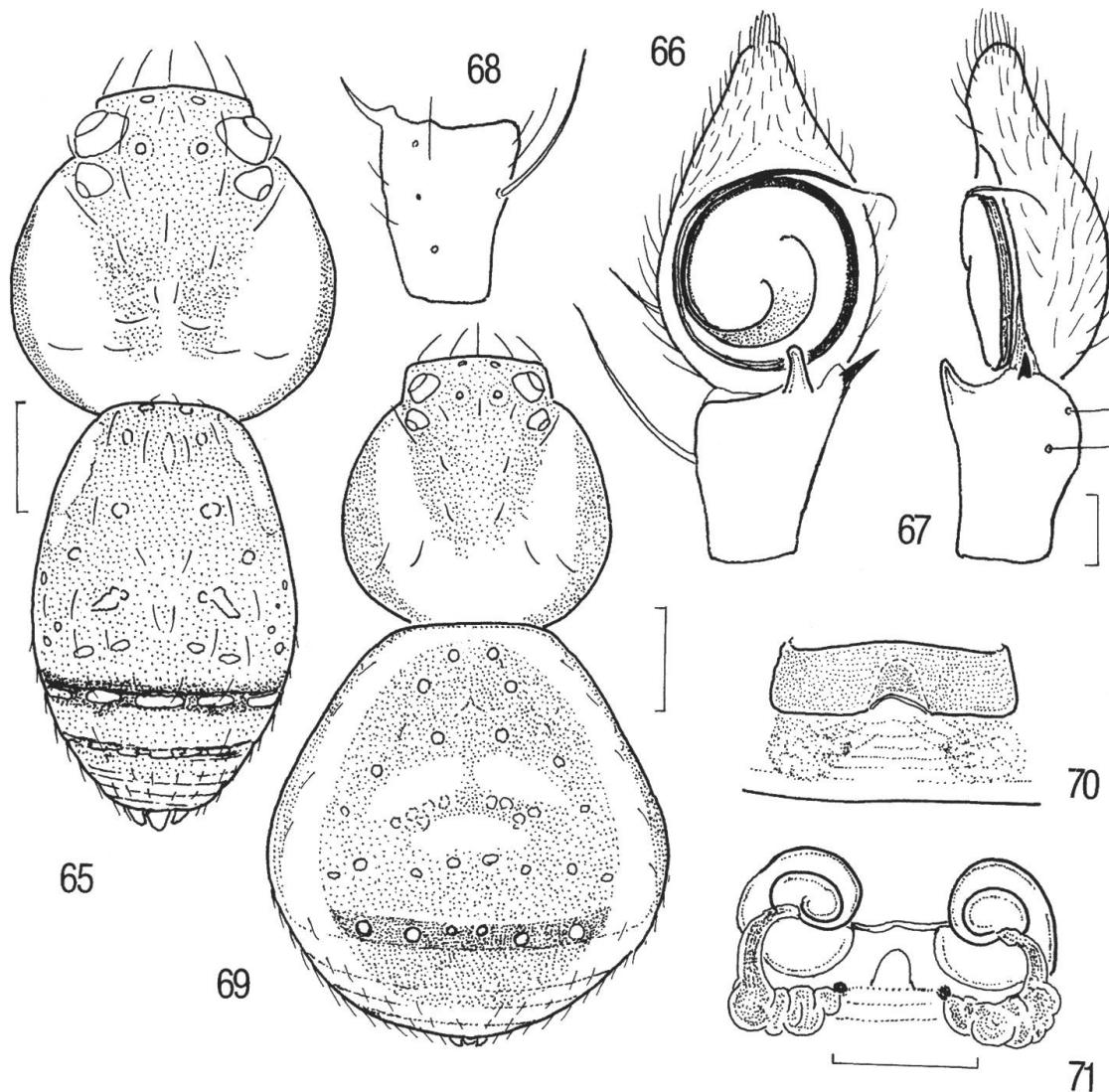
Other specimen examined. 1 female: Changra (Kunga Rabdeng Dzong), 18 km SE of Tongsa, evergreen and secondary forests and cultivated areas at an altitude of 1,900 m, Bhutan, 23.VI.1972 [NMB 2672 c].

Description. Measurements based on the male holotype and a female specimen from Changra. Body length ♀ 4.90 mm, ♂ 3.40 mm; prosoma length ♀ 1.88 mm, ♂ 1.60 mm, width ♀ 1.80 mm, ♂ 1.44 mm; opisthosoma length ♀ 3.12 mm, ♂ 1.84 mm, width ♀ 2.76 mm, ♂ 1.32 mm; lengths of legs [total length (femur + patella + tibia + metatarsus + tarsus)]: ♀, I 8.12 mm (2.40 + 0.88 + 2.12 + 1.88 + 0.84), II 7.88 mm (2.36 + 0.84 + 2.04 + 1.84 + 0.80), III 4.08 mm (1.32 + 0.56 + 1.04 + 0.68 + 0.48), IV 4.68 mm (1.60 + 0.56 + 1.20 + 0.88 + 0.44), ♂ I 7.52 mm (2.24 + 0.72 + 2.16 + 1.60 + 0.80), II 8.10 mm (2.24 + 0.76 + 2.16 + 2.04 + 0.90), III 3.96 mm (1.20 + 0.48 + 0.96 + 0.84 + 0.48), IV 4.48 mm (1.56 + 0.48 + 1.04 + 0.92 + 0.48). Variation of body length: ♂ 3.10–3.40 mm.

Prosoma longer than wide (length/width ♀ 1.04, ♂ 1.11), with long setae. Eyes: ALE>PLE>AME>PME, ALE/AME ♀ 2.00, ♂ 1.67, PLE/PME ♀ 2.00, ♂ 1.83, AME-AME / AME-ALE ♀ 1.06, ♂ 1.00, PME-PME/PME-PLE ♀ 0.81, ♂ 0.65, median ocular

area as long as wide (length/width $\varphi\sigma$ 1.00), wider behind than in front (anterior width/posterior width φ 0.85, σ 0.78), clypeus/AME-AME φ 1.11, σ 1.25. Labium longer than wide (length/width φ 1.33, σ 1.40, sternum longer than wide (length/width φ 1.25, σ 1.10). Leg formula II-I-IV-III; tarsal claws of legs I-II with 3-4 teeth, of legs III-IV with 2-3 teeth.

Spiniformation (for terminology, see ONO 1988: 13). φ Femur: I dorsal 0-0-1-0-1, prolateral 0-0-1-1-1, retrolateral 0-0-0-1-1, II dorsal 0-0-1-0-1, prolateral 0-0-0-0-1, retrolateral 0-0-0-0-1, III-IV dorsal 0-1-0-1; patella: I-IV dorsal 1-0-1 (weak), I-II pro- and retrolateral and IV retrolateral 1, respectively; tibia: I-IV dorsal 1-0-1, I-II pro- and retrolateral 1-1-1, ventral 2-2-2-2 or 2-2-3-2 (left leg I), III-IV



Figs 65-71: *Synaema albomaculatum* sp.nov., male holotype. 65 (male), 69 (female), pro- and opisthosomata, dorsal view; 66, tibia and tarsus of male palp, ventral view; 67, same, retrolateral view; 68, tibia of male palp, dorsal view; 70, epigynum, ventral view; 71, internal structure of female genitalia, dorsal view. [Scales: 65, 69, 0.5 mm; 66-68, 70-71, 0.1 mm.]

prolateral 1–1, retrolateral 0–1, ventral 1; metatarsus: I–II pro- and retrolateral 1–1–1 ap, I ventral 2–2–2–2, II ventral 2–1–2–2, III–IV pro- and retrolateral 1–1, ventral 2. ♂ Femur: I dorsal 0–1–1–1–1, prolateral 0–0–1–1–1, retrolateral 0–0–0–1–1, II dorsal 0–1–1–1–1, pro- and retrolateral 0–0–0–1–1, III–IV dorsal 1–1–1–1, III retrolateral and IV pro- and retrolateral 0–0–0–1, respectively; patella: I–IV dorsal 1–1, I–II pro- and retrolateral and III–IV retrolateral 1, respectively; tibia: I–IV dorsal 1–1, I–II pro- and retrolateral 1–1–1, ventral 2–2–2–2 ap, III–IV pro- and retrolateral 1–1, ventral 0–2–2 ap; metatarsus I–II pro- and retrolateral 1–1–1 ap, ventral 2–0–2, III–IV pro- and retrolateral 1–1, ventral 2.

Male palp (Figs 66–68). Tibia with ventral and retrolateral apophyses: the ventral apophysis digitiform; the retrolateral one small and spiniform, straight. Bulb as long as wide, embolus filiform and very long, apically slightly curved.

Opisthosoma longer than wide (length/width ♀ 1.13, ♂ 1.39), with short hairs.

Female genitalia (Figs 70–71). Epigynum wider than long, intromittent orifices covered with a large sclerotised plate and not visible in ventral view; intromittent canal winding, spermathecae small and reniform.

Coloration and markings (Figs 65 male, 69 female). ♀ Prosoma yellow, cephalic part greyish brown, at the sides blackish brown, chelicerae yellowish brown, maxillae, labium and palps and legs III–IV yellow, femora, patellae and tibiae of legs I–II brown, with black rings, metatarsi and tarsi yellow; opisthosoma grey, marginated with white, with a black, transverse line and many white spots. ♂ Prosoma yellowish brown, cephalic part grey, at the sides blackish brown, chelicerae, maxillae, labium, sternum, legs III–IV and palps light yellowish brown, legs I–II dark yellowish brown, femora and tibiae with black rings. Opisthosomal dorsum greyish brown, furnished with many white spots, with a pair of large white markings anteriorly and a black, transverse line in the posterior part, venter greyish white, its posterior part and spinnerets black.

Distribution. Bhutan.

Diagnosis. This new species is unique in the markings of the opisthosoma: several silvery spots. The shape of male palp and the structure of female genitalia of this new species resemble those of *Synaema globosum* (FABRICIUS, 1775) and its related species. However, the tip of the embolus is strongly curved, and the sclerotised plate of epigynum is much wider than long.

Etymology. The specific epithet is derived from the white spots on the opisthosoma.

Genus *Diaeaa* THORELL, 1869

Diaeaa subdola O. PICKARD-CAMBRIDGE, 1885

Sci. Res. 2nd. Yarkand Miss. 1885: 62.

Type material. Holotype male: Murree, northern Pakistan, 11.VI–14.VII.1873, in the collection of the Hope Department of Entomology, Oxford. (Not examined.)

Other specimens examined. 1 female: 21 km E of Wangdi Phodrang, evergreen forest at an altitude between 1,700 m and 2,000 m, Bhutan, 25.VI.1972 [NMB 2675 a].

Distribution. This species is widely distributed in East Asia from Pakistan to Japan.

Note. For descriptions see ONO (1988), ONO et al. (1990) and MARUSIK (1993).

***Diae a suspicosa* O. PICKARD-CAMBRIDGE, 1885**

Sci. Res. 2nd. Yarkand Miss. 1885: 61

Type material. Holotype male: Murree, northern Pakistan, 11.VI–14.VII.1873, in the collection of the Hope Department of Entomology, Oxford. (Not examined.)

Other specimens examined. 3 Females, 3 males and 6 juveniles: Chimakothi, 98 km NE of Phuntsholing, broad-leaved forest at an altitude between 1,900 and 2,300 m, Bhutan, 14., 22. and 25.V.1972 [2 female, 2 males and 5 juveniles: NMB 2676 b, c, e, d, 1 female, 1 male and 1 juvenile: NSMT-Ar 4855]; 1 male and 1 immature female: Gidaphu, 25 km SW of Thimphu, temperate coniferous forest at an altitude of 2,300 m, Bhutan, 2.VI.1972 [NMB 2676 f]; 3 females, 6 males and 17 juveniles: Thimphu, temperate coniferous forest at an altitude between 2,300 and 2,500 m, Bhutan, 14.–31.V.1972 [NMB 2676 k, p, n, m, o, r, l, q]; 1 male and 2 females: Thimphu River, altitude?., Bhutan, 29.IV.1972 [NMB 2676 a]; 1 female: Dotanang Monastery, Tango, 12 km N of Thimphu, coniferous forest also with broad-leaved trees at an altitude between 2,500 and 2,900 m, Bhutan, 30.VI.1972 [NMB 2676 j]; 4 females, 1 male and 1 immature female Dorju-la, rhododendron-coniferous forest at an altitude of 3,100 m, Bhutan, 6., 23. and 29.VI.1972 [3 female and immature female: NMB 2676 i, g, 1 female and 1 male: NSMT-Ar 4856]; 1 female: Tongsa, misty forest at an altitude of 2,150 m, Bhutan, 24.VI.1972 [NMB 2676 h].

Distribution. This species seems to be widely distributed in the mountainous areas of Asia.

Notes. *Diae a xinjiangensis* SONG & HU, 1986, described from Qira, Xinjiang Uygur Autonomous Region, was synonymised with this West Asian species by MARUSIK (1993). In Bhutan, this species is one of the dominant species of the thomisids.

Genus *Misumenops* O. PICKARD-CAMBRIDGE, 1900

***Misumenops pseudovatius* (SCHENKEL, 1936)**

Misumena pseudovatia: Schenkel, 1936, Ark. Zool. 29A: 132.

Misumenops pseudovatius: SONG & ZHU, 1997, Fauna Sin. Thom. Phil.: 141.

Type material. 1 male and 11 juveniles syntypes: Tan-chang, in a farm at an altitude of ca 1,900 m, Kansu, China, 5.X.1930, D. Hummel leg., in the collection of the Natural History Museum, Stockholm. (Not examined.)

Other specimens examined. 2 males and 1 immature female: Samchi, subtropical, cultivated area at an altitude of 300 m, Bhutan, 21.IV.1972 [NMB 2686 b, a]; 2 females and 1 male: Sampa, 13 km E of Wangdi Phodrang, evergreen forest at an altitude of 1,300 m, Bhutan, 7.VI.1972 [NMB 2686 c].

Distribution. Bhutan and China.

Notes. This species was previously known from the northeastern part of China.

Genus *Heriaeus* SIMON, 1875

***Heriaeus* sp.**

Material examined. 1 juvenile: 87 km NE of Phuntsholing, evergreen forest at an altitude of 1,700 m, Bhutan, 22.V.1972 [NMB 2677 a].

Genus *Misumena* LATREILLE, 1804

Misumena sp.

Material examined. 1 female: Nobding, 41 km E of Wangdi Phodrang, evergreen forest at an altitude of 2,800 m, Bhutan, 17.–18.VI.1972 [NMB 2685 a].

Genus *Runcinia* SIMON, 1875

Runcinia albostriata BÖSENBERG & STRAND, 1906

Abh. senckenb. naturf. Ges. 30: 252.

Type material. Holotype female: Saga, Japan, W. Dönitz leg., in the collection of the Senckenberg Museum, Frankfurt am Main. (Not examined.).

Other specimens examined. 2 females: Samchi, subtropical, cultivated area at an altitude of 300 m, Bhutan, 7.–11.V.1972 [NMB 2689 c, b]; 1 female: Wangdi Phodrang, meadow at an altitude of 1,300 m, Bhutan, 7.VI.1972 [NMB 2689 a].

Distribution. Bhutan, Bangladesh, Thailand, China, Korea, Taiwan and Japan.

Notes. This spider is commonly found in the rice fields of southeastern Asia (OKUMA et al. 1993).

Genus *Thomisus* WALCKENAER, 1805

Thomisus sp.

Material examined. 1 juvenile: Thimphu, river, Bhutan, 23.IV.1972 [NMB 2691 a].

Genus *Camaricus* THORELL, 1887

Camaricus formosus THORELL, 1887

Ann. Mus. civ. Stor. nat., Genova 5(2): 262.

Type material examined. 2 male syntypes from Bhamo, Birma, 1885, L. Fea leg., in the collection of the Museo Civico di Storia Naturale G. Doria, Genova.

Other specimens examined. 3 immature males: Samchi, subtropical, cultivated area at an altitude of 300 m, Bhutan, 7.–11.V.1972 [NMB 2674 c, a, b]; 1 juvenile: Thimphu, river, 29.IV.1972 [NMB 2674 d].

Distribution. Bhutan, India, China, Vietnam, Malaysia and Indonesia (Sumatra and Java).

Notes. Since TIKADER (1977) removed this species from synonyms of *Camaricus maugei* (WALCKENAER, 1837) without detailed explanation, this name has been widely used for an Asian species recorded from many countries. However, some problems remain to be solved. What is *Camaricus maugei*? Although the type locality of this species was not mentioned in the original description and nobody examined the type specimen, SIMON (1895) identified African and Asian spiders with *C. maugei*. Do all the spiders recorded from Asia belong to one species? Their genital organs should be morphologically studied.

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