

# THREE NEW SPECIES OF THE GENUS *PTERONEMOBIUS* (ORTHOPTERA: GRYLLIDAE: NEMOBIINAE) FROM PAKISTAN WITH A KEY AND THEIR CLADISTIC RELATIONSHIP

S. Kamaluddin and Nasreen Khan

Department of Zoology, Federal Urdu University of Arts, Science and Technology, Gulshan-e- Iqbal Campus, University Road, Karachi-75400, Pakistan.

## ABSTRACT

Three new species to accommodate already described five species of the genus *Pteronemobius* described from various localities of Pakistan, with special reference to their male and female genitalia. A key to all taxa is formulated. All the taxa are compared to each other and cladistic relationship is also briefly discussed showing cladogram.

**Key words:** New species, *Pteronemobius* Orthoptera, Gryllidae, cladistic relationship.

## INTRODUCTION

The representatives of the genus *Pteronemobius* of the sub-family Nemobiinae are distributed throughout the world and mostly are found in tropical regions. They are pest of different crops like rice, cotton, tobacco, tomato, tea and also recorded as household pests of stored food products (Hinton and Cobert, 1949). They are peculiar to their long slender antennae, a large ovipositor, auditory organs placed in the anterior tibiae and a large part of the male elytron transformed into a stridulating organ (Chopard, 1969). He has also been described five genera and 27-species from India and adjacent countries including Pakistan with only one species *P. fascipes* (Walker) recorded from Malir, Sindh.

Vickery (1973) has been worked on the genus *Pteronemobius* and a new genus of the tribe Pteronemobini. He also defined a new genus *Dianemobius* and a type species *Encoptera fascipes* Walker, concluded as a congeneric with *P. concolor* Walker, the type species of *Pteronemobius*. Yamasaki (1979) has been worked on the taxonomy of genus *Pteronemobius* and discovered its second species from Ryukyus mangroove under the name *P. asahiani*, closely allied to the type species of the genus but has a distinguishing character of a number of external moveable spines on the superior margin of hind-tibiae, and also redescribed genus, key to the species and distribution.

Woo *et al.* (1986) have been studied seven species of cricket including *P. ambiguous* from Beijing and described their songs character and showed that the sound of crickets can be used as an important criteria for their identification. Lambin and Guy (1988) have been described the comparative studies of visual fields sizes in *P. lineolatus* and five other crickets.

## MATERIALS AND METHODS

The specimens were collected from different localities of Pakistan by using sweeping method and with the help of light traps in the fields of rice growing areas and wild grasses.

For the study of male and female genitalia the abdomen was removed from the base and boiled in 10% KOH solution on bench lamp for about 5-minutes. These were then washed with tap water and dissected out in the same medium. The examinations of various components and their diagrams were made placing these on the cotton thread immersed in glycerin with the help of eye piece graticule. The abdomen and genitalia were preserved in micro vials with a drop of glycerin, pinned with the specimens.

## RESULTS

### *Pteronemobius* Jacobson and Bianchi

*Pteronemobius* Jacobson and Bianchi 1905, *Orthopteres et Nevropteresde V Empire et des regions voisies* saint peters Bourg, 10: 952; Chopard 1969, *Faun. Ind.*, 2: 157.

**Diagnostic features:** Body usually small sized, not more than 6.5 mm in length, male and female with wings and elytra, pubescent and covered with long black bristles, head small, broader than long, pronotum almost rectangular with lateral margins usually convex, antenna very long about  $1\frac{1}{2}X$  of the body length, anterior tibiae perforated presenting a tympanum, hind femora thick and broad presenting a distinct carination, posterior tibiae very large with 4 marginal spines and six apical spurs.

**Comparative note:** This genus is most closely related to *Speonemobius* Chopard in having elytra of male with distinct mirror but it can easily be separated from the same in having six apical spurs on hind-tibiae with 3 in each sides, body colouration is some what brown and by the other characters as noted in the key and description.

**Types Species:** *Nemobius tartarus* Saussure

**Distribution:** Cosmopolitan

### Key to the species of the genus *Pteronemobius* Jacobson and Bianchi

1. Hind femora with blackish bands, maxillary palpi very dark at base with 4<sup>th</sup> and 5<sup>th</sup> joints nearly white.....*fascipes* (Walker).  
--- Hind femora unicolourous, maxillary palpi not as above.....2.
2. Antennae very pubescent, fifth joint of maxillary palpi very long.....3.  
--- Antennae feebly pubescent, fifth joint of maxillary palpi relatively shorter.....5.
3. Body broad, hind-tibiae with 3-outer and 4-inner spines.....*heterospinus* (Sp.nov.).  
--- Body oblongate, hind-tibiae with 4-spines on each margins.....4.
4. Body generally testaceous with black bands and spots all over the body, apex of ramus of mesal lobe in male narrowly rounded.....*pilicornis* Chopard.  
--- Body brownish black without bands, apex of ramus of mesal lobe in male spinously produced.....*ramospinus* (Sp.nov.).
5. Body larger sized (7-8 mm); ovipositor longer and straight.....*indicus* (Walker).  
--- Body smaller sized (4-7 mm), ovipositor shorter and gently curved.....6.
6. Apex of head broadly rounded, 2<sup>nd</sup> protarsus with 3-equal sized spurs, in male mirror of elytra horizontal.....*sindellus* (Sp.nov.).  
--- Apex of head truncated or sub-rounded, 2<sup>nd</sup> protarsus without spur, in male mirror of elytra oblique.....7.
7. Head short, apex sub-rounded, first protarsus with single spur, first mesotarsus without inner spines.....*montanus* Chopard.  
--- Head large, apex truncated, first protarsus without spur, first mesotarsus with 4-inner spines.....*concolor* (Walker).

### *Pteronemobius concolor* (Walker)

(Figs. 1A to 1D)

*Encoptera concolor* Walker 1871, *Cat. Derm. Salt. Br. M.* 5 : 10.

*Nemobius ceylonicus* Saussure 1877, *Mem. Soc. Geneva* 25 : 86.

*Pteronemobius birmanus* Chopard 1918, *Ann. Soc. Ent. Fr.* 86 : 556; Chopard 1936, *Ceyl. J. Sc.* 20(B) : 42;

Sandrasagara 1954, *J. Bombay Nat. Hist. Soc.* 52 : 550

*Pteronemobius gravelyi* Chopard 1924, *Rec. Ind. Mus.* 26 : 183.

*Pteronemobius heydeni ceylonicus* Chopard 1925, *Ann. Mag. Nat. Hist.* 15(9) : 507.

*Pteronemobius concolor* Chopard 1931, *Bull. Raffles Mus.* No. 6 : 134; 1935, *Ann. Mag. Nat. Hist.* 16(10) : 285; 1936, *Ceyl. J. Sc.* 20(B) : 42; 1969, *Faun. Ind.* 2 : 160; Sandrasagar 1954, *J. Bombay Nat. Hist. Soc.* 52 : 550;

**Colouration:** Body generally dark brown with few light bands or spots on head, pronotum with bristles and spines brown or black all over the body, palpi dark brown, abdomen and legs rufous.

**Head:** Slightly broader than long, about 1.25X of its length, eyes prominent, antecular distance half of the length posterior of head including eyes, apex of head almost truncated, length of antecular distance 0.3mm, posterior of head including eyes 0.88mm, width of head 1.5mm, interocular distance 0.8mm.

**Thorax and Abdomen:** Pronotum almost rectangular shaped, anterior and posterior angles prominent, lateral margins slightly convex, width of pronotum much more than of its length, length of pronotum 1.2mm, width 1.7mm; fore tibiae with two and mid tibiae with three unequal sized terminal spines, hind tibiae with four outer and four inner spines, first segment of hind tarsi with three spines; abdomen narrow at lateral sides, cerci medium sized, length of elytra 3.2mm. Total body length of male 6mm.

**Male genitalia (Figs. 1B to 1D):** Genital plate (**Fig. 1B**) with paraproct small strip-like, epiproct narrowly rounded at apex; genitalia (**Figs. 1C and 1D**), spermatophore tube-like, rami curved inwardly with sharply acute apex, terminal process of epiphallus bilobed with narrowly rounded apices.

**Material examined:** Three males; Islamabad, Lahore, Punjab, Pakistan, on grass; 10-3-1998; leg. Nadeem Tamimi; lodged at Kamaluddin's collection.

**Comparative note:** This species is most closely related to *P. montanus* (Chopard) in having apex of head truncated or sub-rounded, 2<sup>nd</sup> protarsus without spur, in male mirror of elytra oblique but it can easily be separated from the same in having head apex truncated, first protarsus without spur, first mesotarsus with 4-inner spines and by the other characters as noted in the key and description.

***Pteronemobius fascipes* (Walker)  
(Figs. 2A and 2B)**

*Encoptera fascipes* Walker 1869, *Cat. Derm. Salt. Br. M.* 1: 67

*Encoptera alboarta* Walker 1871, *Cat. Derm. Salt. Br. M.* 5: 11

*Nemobius histrio* Saussure 1877, *Mem. Soc. Geneve.* 25: 95; Bolivar 1900, *Ann. Soc. Ent. Fr.*, 68: 993

*Nemobius nigrosignatus* Brunner 1893, *Ann. Mus. Geneva*, 33: 196

*Pteronemobius histrio* Chopard 1924, *Rec. Ind. Mus.* 25: 182

*Pteronemobius fascipes* Chopard 1931, *Bull. Ruffe Mus.* 6: 134; 1936, *Ceyl. J. Sc.* 20(B): 45; 1969, *Faun. Ind.* 2: 164; Sandrasagara 1954, *J. Bombay Nat. Hist. Soc.* 52: 551

**Colouration:** Body generally blackish brown, few yellow bands and spots with black bristles and hairs all over the body, light and dark bands on the legs.

**Head:** Head broader than long, about 1.5X of its length, posterior of head including eyes slightly more than 3X of antecular distance, apex of head broad and rounded, length of antecular distance 0.2mm, posterior of head including eyes 0.7mm, width of head 1.4mm, interocular distance 0.7mm.

**Thorax and Abdomen:** Pronotum almost rectangular shaped, anterior and posterior angles sub-acute, lateral margins almost straight, width of pronotum almost 1.5X of its length, length of pronotum 1.1mm, width 1.6mm, fore and mid tibiae with two terminal spines, hind tibiae with four internal and three external spines on each margin in males, three spines on each margin in females, first segment of hind tarsi with two unequal sized terminal spines, one as long as second segment of tarsi; abdomen oblongate, elytra slightly longer than the abdomen, length of elytra 2.8mm. Total body length of female 5.4mm.

**Female genitalia (Fig. 2B):** Ovipositors highly developed, first and 2<sup>nd</sup> valvulae well developed rod-like with outer margin of apical end sinuated, inner margins of apical end with sharp dentations.

**Materials examined:** Two females; Thatta, Sindh, Pakistan; on grass, 15-6-1999, leg. Nadeem Tamimi; lodged at Kamaluddin's collection.

**Comparative note:** This species is most closely related to *heterospinus* in having six spurs on hind tibiae and general body shape but it can easily be separated from the same in having hind femora with blackish bands, maxillary palpi very dark at base with 4<sup>th</sup> and 5<sup>th</sup> joints nearly white and by the other characters as noted in the key and description.

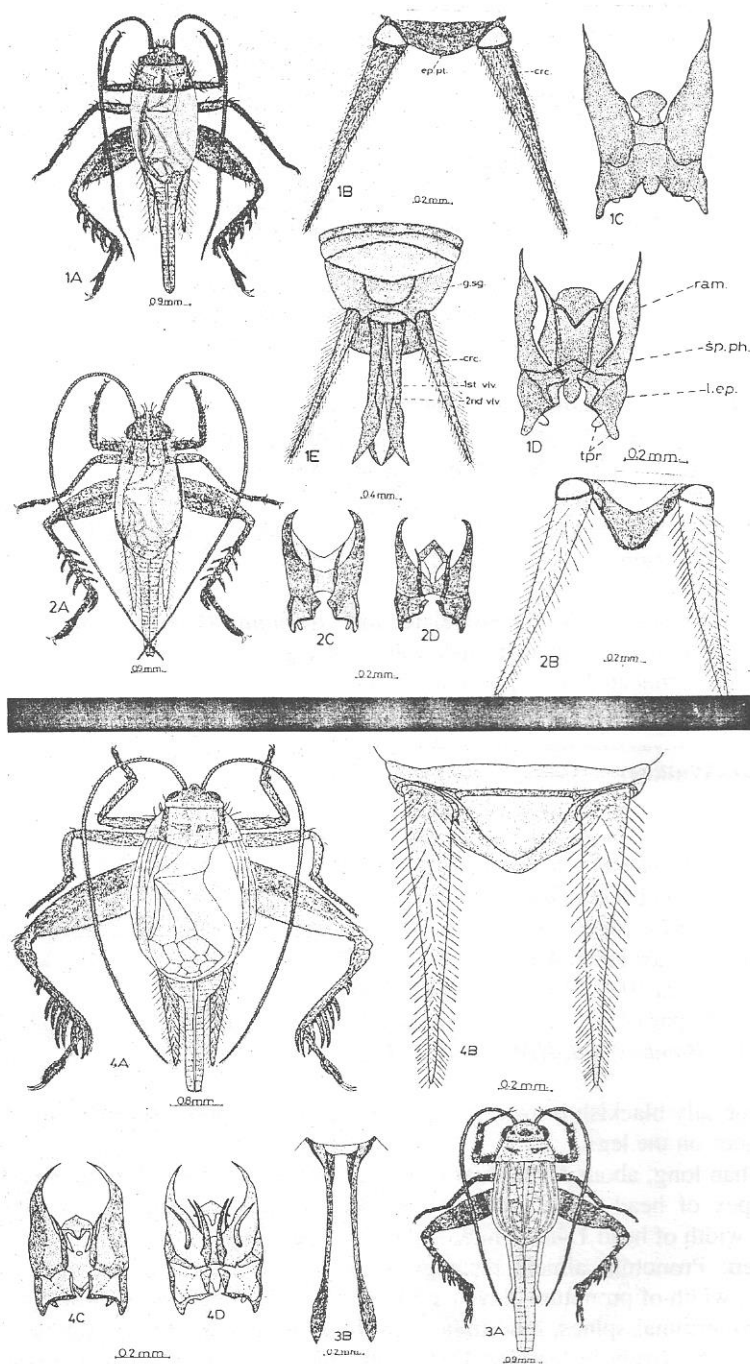


Fig. 1. *Pteronemobius concolor* (Walker) : 1A. entire, dorsal view; 1B. genital plate, dorsal view; 1C. male genitalia, dorsal view; 1D. same, ventral view.

Fig. 2. *P. fascipes* Walker : 2A. entire, dorsal view; 2B. female genitalia, dorsal view.

**Key to the laterings:**

cr. (cerci), ep.pt. (epiproct), gsg. (genital segment), gt.pl. (genital plate), l.ep. (lateral epiphallus), ram. (rami), sp.ph. (spermatophore), tpr. (terminal process of epiphallus), 1<sup>st</sup>.vlv. (first valvula), 2<sup>nd</sup>.vlv. (second valvula).

Fig. 3. *P. heterospinus* (sp.nov.) : 3A. entire, dorsal view; 3B. genital plate, dorsal view; 3C. male genitalia, dorsal view; 3D. same, ventral view.

Fig. 4. *P. indicus* (Walker) : 4A. entire, dorsal view; 4B. genital plate, dorsal view; 4C. male genitalia, dorsal view; 4D. same, ventral view; 4E. female genitalia.

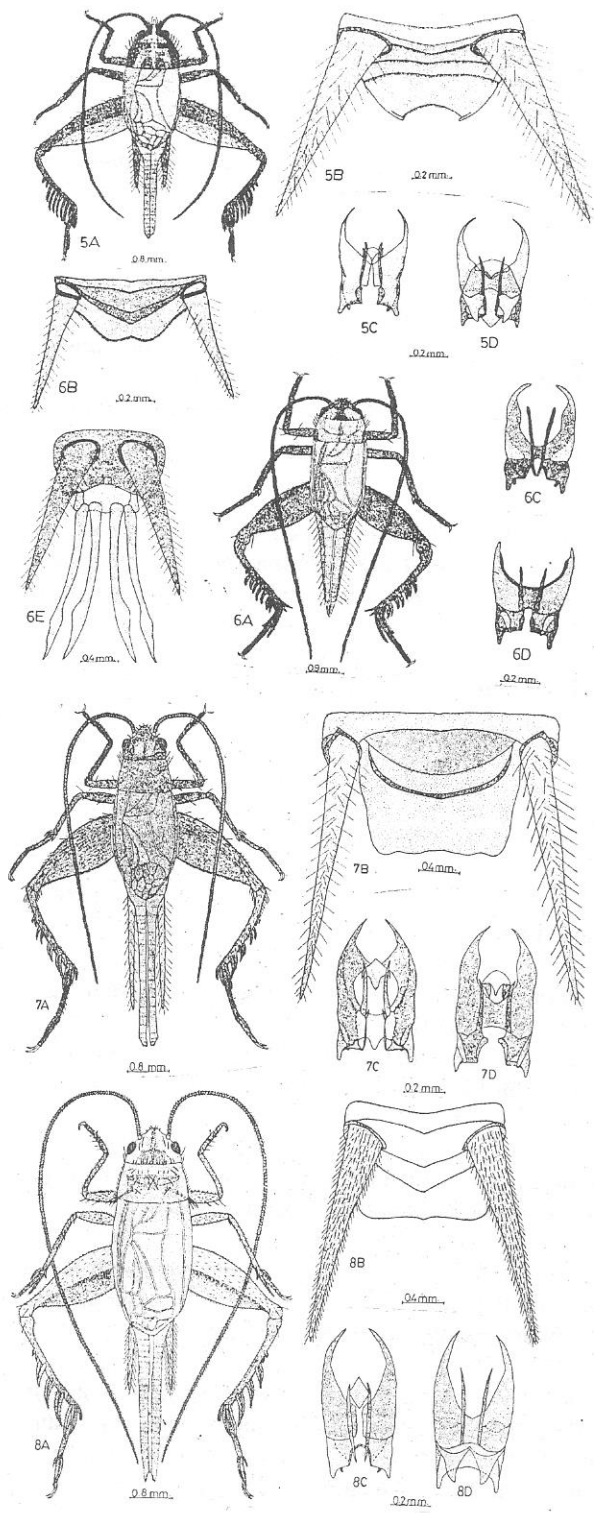


Fig. 5. *P. montanus* Chopard : 5A. entire, dorsal view; 5B. genital plate, dorsal view; 5C. male genitalia, dorsal view; 5D. same, ventral view.  
Fig. 6. *P. pilicornis* Chopard : 6A. entire, dorsal view; 6B. genital plate, dorsal view; 6C. male genitalia, dorsal view; 6D. same, ventral view; 6E. female genitalia, dorsal view.  
Fig. 7. *P. ramospinus* (sp.nov.) : 7A. entire, dorsal view; 7B. genital plate, dorsal view; 7C. male genitalia, dorsal view; 7D. same, ventral view.  
Fig. 8. *P. sindellus* (sp.nov.) : 8A. entire, dorsal view; 8B. genital plate, dorsal view; 8C. male genitalia, dorsal view; 8D. same, ventral view.



***Pteronemobius heterospinus* (Sp. nov.) (Figs. 3A to 3D)**

**Colouration:** Body generally brownish with few spots or bands of light colour, a lot of bristles and hairs present all over the body mostly on head and pronotum.

**Head:** Head wider than long, about 1.6X of its length, posterior of head including eyes 4X the length anteocular distance, apex of head narrowed, length of anteocular distance 0.2mm, posterior of head including eyes 0.8mm, width of head 1.6mm, interocular distance 0.6mm.

**Thorax and Abdomen:** Pronotum almost rectangular shaped, anterior angle sub-acute, posterior angle sub-acutely produced posteriorly, posterior margin medially highly convex, lateral margins convex, anterior margin slightly concave, width of pronotum slightly more than 1.5X of its length, length of pronotum 0.9mm, width 1.5mm; fore tibiae with two terminal spines, mid tibiae with three unequal sized terminal spines, hind tibiae with three outer and four inner marginal spines, first segment of hind tarsi with two unequal sized spines, one very long, slightly more than 2<sup>nd</sup> segment of tarsi; abdomen oblongate, shorter than elytra, cerci long, length of elytra 2.9mm. Total length of male is 4.9mm.

**Male genitalia (Figs. 3B to 3D):** Genital plate (Fig. 3B) with developed paraproct, epiproct somewhat triangular shaped with sub-acute apex, genitalia (Figs. 3C and 3D), spermatophore acutely produced posteriad, rami well developed, curved inwardly with thorn-like apices, terminal portion of epiphallus bilobed with narrowly rounded apices.

**Material examined:** Holotype male; Thatta, Sindh, Pakistan; on grass; 15-6-1999; leg. Nadeem Tamimi; lodged at Kamaluddin's collection; Paratypes two males, other data same as holotype; lodged at Kamaluddin's collection.

**Comparative note:** This species is most closely related to *pilicornis* Chopard and *ramospinus* (Sp.nov) in having antennae very pubescent, fifth joint of maxillary palpi very long but it can easily be separated from the same in having body broad, hind tibiae with three outer and four inner spines and by the other characters as noted in the key and description.

***Pteronemobius indicus* (Walker) (Figs. 4A to 4E)**

*Nemobius indicus* Walker 1869, *Cat. Derm. Salt. Br. M.* 1 : 58; Saussure 1877, *Mem. Soc. Geneva*, 25 : 67.

*Nemobius vagus* Walker 1871, *Cat. Derm. Salt. Br. M.* 5(10).

*Pteronemobius ragus* Chopard 1925, *Ann. Mag. Nat. Hist.* 15 (9); 1931, *Bull. Raffles*

*Mus.* No. 6: 134; 1936, *Ceyl. J. Sc.* 20(B): 43; Sandrasagara 1954, *J. Bombay Nat. Hist. Soc.* 52:560. *Pteronemobius indicus* Chopard 1969, *Faun. Ind.* 2:139.

**Colouration:** Body generally dark brown, few light bands and spots on pronotum, long black and brown spines and bristles all over the body, legs relatively darker than the elytra, body beset with hairs.

**Head:** Head much broader than long, about 1.6X of its length, posterior of head including eyes about 4X of the anteocular distance, apex of head broad and flattened at apex, length of anteocular distance 0.2mm, posterior of head including eyes 0.8mm, width of head 1.6mm, interocular distance 0.7mm.

**Thorax and Abdomen:** Pronotum almost rectangular shaped, anterior and posterior angle sub-acute, anterior margin slightly concave, posterior margin convex, lateral margins slightly convex, width of pronotum slightly more than 1.5X of its length, length of pronotum 1.1mm, width 1.8mm; fore tibiae with one terminal spine, mid tibiae with two terminal spines, hind tibiae with four spines on each margin, first inner one is tuberculiform, first segment of hind tarsi with two unequal sized terminal spines, one slightly shorter than second segment of tarsi; abdomen oblongate, shorter than elytra, cerci medium sized, length of elytra 3.3mm. Total length of male is 5.8mm, female 6.3mm.

**Male genitalia (Figs. 4B to 4E):** Genital plate (Fig. 4B), paraproct large, broad with gently raised lateral margins, apex convex, epiproct small strip-like with convex at apex, genitalia (Figs. 4C and 4D), spermatophore

well developed, sub roundly produced posteriorly, rami straight with sinuated outer and inner margins apically acutely produced, terminal process of epiphallus bilobed with broadly rounded apices.

**Female genitalia (Fig. 4E):** Ovipositors highly developed, first and second valvulae very large, rod-like, outer margin of apical end of first valvulae sharply dentate, outer margin of second valvulae entire and concave.

**Material examined:** Five males, 5 females; Lahore, Thatta, Pakistan; on grass; 15-6-1999; leg. Nadeem Tamimi; lodged at Kamaluddin's collection.

**Comparative note:** This species is most closely related to *P. sindellus* (Sp.nov) in having antennae feebly pubescent, fifth joint of maxillary palpi relatively shorter, but it can easily be separated from the same in having large body sized (7-8 mm), ovipositor longer and straight and by the other characters as noted in the key and description.

#### *Pteronemobius montanus* Chopard (Figs. 5A to 5D)

*Pteronemobius montanus* Chopard 1933, *Slytops* 2:117; 1969, *Faun. Ind.* 2 : 161.

**Colouration:** Body generally brownish, few light brown bands and spots along with long black or brown bristles and hairs all over the body, elytra blackish brown.

**Head:** Head much broader than long about 2X of its length, posterior of head including eyes about 3X the length anteocular distance, apex of head narrowly rounded, length of anteocular distance 0.2mm, posterior of head including eyes 0.6mm, width of head 1.5mm, interocular distance 0.7mm.

**Thorax and Abdomen:** Pronotum almost rectangular shaped anterior and posterior angles sub-rounded, anterior margin slightly concave, posterior margin slightly convex, lateral margins distinctly sinuated, width of pronotum more than 1.5X of its length, length of pronotum 1.0mm, width 1.7mm, mid tibiae with two unequal sized terminal spines, hind tibiae with 3 spines on each margins, first segment of hind tarsi with two unequal sized spines, one very long, and all three legs with long black bristles with thickly hairs; abdomen cylindrical, cerci short, elytra reaching to apex of abdomen, length of elytra 3.2mm. Total length of male 5.6mm.

**Male genitalia (Figs. 5B to 5D):** Genital plate (Fig. 5B) with paraproct short rudimentary, epiproct large, posteriorly deeply concave, cup-like, genitalia (Figs. 5C and 5D) spermatophore some what triangular, posteriorly acutely produced, rami well developed curved inwardly, sickle-shaped, apical process of epiphallus trilobed with sub-acute apices.

**Material examined:** 18 males, Thatta, Sindh, Pakistan; on grass; 15-6-1999, leg. Nadeem Tamimi lodged at Kamaluddin's collection.

**Comparative note:** This species is most closely related to *P. concolor* (Walker) in having apex of head truncated or sub- rounded, 2<sup>nd</sup> protarsus without spur, in males mirror of elytra oblique but it can easily be separated from the same in having shorter head, apex sub-rounded, first protarsus with single spur, first mesotarsus without inner spines and by the other characters as noted in the key and description.

#### *Pteronemobius pilicornis* Chopard (Figs. 6A to 6E)

*Pteronemobius pilicornis* Chopard 1969, *Faun. Ind.*, 2: 167

**Colouration:** Body generally testaceous, with few black bands or spots all over the body, beset with hairs, last joint of maxillary palpi dark brown, in female body beset with long black bristles and hairs mostly on head and pronotum, palpi dark testaceous colour.

**Head:** Head distinctly broader than long, eyes small, anteocular distance less than half of posterior of head including eyes, apex of head rounded, length of anteocular distance 0.3mm, posterior of head including eyes 0.5mm, width of head 1.5mm, interocular distance 0.7mm.

**Thorax and Abdomen:** Pronotum almost rectangular shaped, anterior and posterior angles sub-acute, lateral margins slightly convex, width of pronotum about 1.5X of its length, length of pronotum 1.1mm, width 1.6mm, fore tibiae without spines, mid tibiae with two unequal sized terminal spines, hind tibiae with four spines on each margin, first segment of hind tarsi with two spines, one is very large; abdomen cylindrical, cerci long, length of elytra 3.1mm. Total length of male 5.3mm, female 5.4mm.

**Male genitalia (Figs. 6B to 6D):** Genital plate (**Fig. 6B**), paraproct large with sinuated lateral margin, epiproct small with parallel sided acutely produced at apex, genitalia (**Figs. 6C and 6D**) spermatophore reduced, rami curved inwardly with sub-acute apex, terminal process of epiphallus trilobed with narrowly rounded apices.

**Female genitalia (Fig. 6E):** Ovipositors highly developed, first and second valvulae very large, rod-like, outer margin of apical end of first valvulae dentated, outer margin of only apical tip with small dentitions.

**Material examined:** Five males and four females; Thatta, Sindh, Faisalabad, Lahore, Punjab, Pakistan; on grass; 15-6-1999; leg. Nadeem Tamimi lodged at Kamaluddin's collection.

**Comparative note:** This species is most closely related to *P. ramospinus* (Sp.nov) in having body oblongate, hind tibiae with 4-spines on each margin but it can easily be separated from the same in having testaceous body with black bands and spots, apex of ramus of mesal lobe in male narrowly rounded and by the other characters as noted in the key and description.

*Pteronemobius ramospinus* (Sp.nov.) (**Figs. 7A to 7D**)

**Colouration:** Body generally blackish brown with brown bristles all over the body mostly on pronotum, base of fifth joint of maxillary palpi much darker, lateral lobes of pronotum relatively light than dorsal sides, palpi rufous, apex of fifth joint darker.

**Head:** Head slightly broader than long about 1.5X of its length, apex of head narrowly rounded, posterior of head including eyes 4X of anteocular distance, length of anteocular distance 0.2mm, posterior of head including eyes 0.8mm, width of head 1.6mm, interocular distance 0.8mm.

**Thorax and Abdomen:** Pronotum almost rectangular shaped, anterior and posterior angles sub-acute, lateral margins slightly sinuated, posterior margin almost straight, width of pronotum about 2X of its length, length of pronotum 1mm, width 1.9mm, mid tibiae with three unequal sized terminal spines, hind tibiae with four spines on each margin, first segment of hind tarsi with three spines, two very small, third one is as long as  $\frac{3}{4}$  of last segment of tarsi; abdomen almost elongated, a little broader at its lower end, cerci very long, length of elytra 3.6mm. Total length of male 5.8mm.

**Male genitalia (Figs. 7B to 7D):** Genital plate (**Fig. 7B**) with paraproct very large with sinuated lateral and posterior margins, epiproct small with convex sided and convex at apex, genitalia (**Figs. 7C and 7D**), spermatophore prominent, sub-acutely produced posteriad, rami curved inwardly with sub-acute apex, terminal process of epiphallus trilobed with sub-acutely produced apices.

**Material examined:** Holotype male; Thatta; Pakistan; on grass; 15-6-1999; leg. Nadeem Tamimi; lodged at Kamaluddin's collection; paratypes four males; same data as holotype, lodged at Kamaluddin's collection.

**Comparative note:** This species is most closely related to *P. pilicornis* Chopard in having body oblongate, hind tibiae with 4 spines on each margin but it can easily be separated from the same in having brownish black body without bands, apex of ramus of mesal lobe in males spinously produced and by the other characters as noted in the key and description.

*Pteronemobius sindellus* (Sp.nov.) (**Figs. 8A to 8D**)

**Colouration:** Body usually light brown, few black bands on head and pronotum, elytra blackish with yellow band on lateral side, lateral lobes of pronotum dark brown, palpi whitish, long black and brown bristles all over the body mostly on pronotum and head.



**Head:** Head much broader than long, about 1.5X of its width, posterior of head including eyes about 4X longer than antocular distance, apex of head rounded, length of antocular distance 0.2mm, posterior of head including eyes 0.8mm, width of head 1.6mm, interocular distance 0.8mm.

**Thorax and Abdomen:** Pronotum almost rectangular shaped, anterior and posterior angles prominent, lateral margins convex, width of pronotum slightly less than 1.5X of its length, length of pronotum 1.2mm, width 1.7mm, fore tibiae with three equal sized terminal spines on its second segment of tarsi, mid tibiae with 3 unequal sized spines, hind tibiae with four spines on each margin, first segment of hind tarsi with two spines, one very long reached to the apex of the last segment of tarsi, all three legs with few long black bristles; abdomen oval shaped, cerci short, elytra reaching to the apex of abdomen, length of elytra 3.7mm. Total body length of male 6.2mm.

**Male genitalia (Figs. 8B to 8D):** Genital plate (Fig. 8B), paraproct large, broad with convexly produced lateral margins, postero-medially notched, epiproct with parallel sided, medially sub-acutely produced at apex; genitalia (Figs. 8C and 8D), spermatophore somewhat quadrangular-shaped, acutely produced posteriad, rami curved, elbow-shaped with sharply acute apex, terminal process of epiphallus bilobed with narrowly rounded apices.

**Material examined:** Holotype male; Thatta, Sindh, Pakistan; on grass, 15-6-1999; leg. Nadeem Tamimi; lodged at Kamaluddin's collection; Paratypes 3 males, same data as holotype and lodged at Kamaluddin's collection.

**Comparative note:** This species is most closely related to *P. montanus* Chopard and *P. concolor* (Walker) in having body smaller sized (4-7 mm), ovipositor shorter and gently curved but it can easily be separated from the both in having apex of head broadly rounded, 2<sup>nd</sup> protarsus with 3 equal sized spurs, in males mirror of elytra horizontal and by the other characters as noted in the key and description.

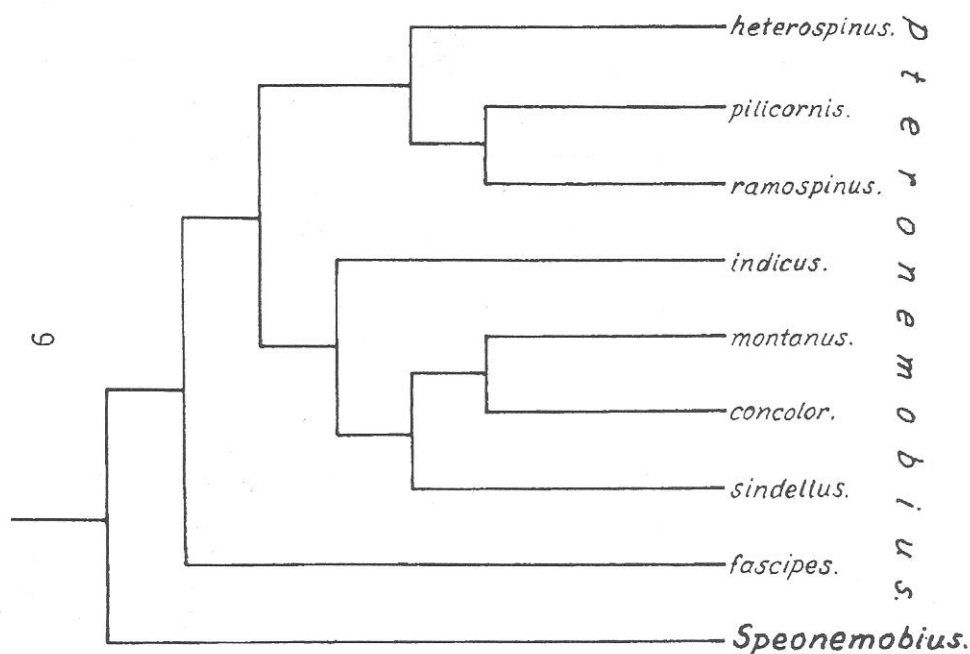


Fig. 9. Cladogram showing relationship of the included taxa in the genus *Pteronemobius* Jacobson and Bianchi.

## DISCUSSION

The representatives of the genus *Pteronemobius* Jacobson and Bianchi are distributed throughout the world and more abundant in tropical and sub-tropical regions. Presently (Fig. 9) eight species including two new species are described with in the genus. The genus *Pteronemobius* plays sister group relationships with *Speonemobius* by their

synapomorphy like elytra of males with distinct mirror and out group relationships by its six apical spurs on hind-tibiae with three in each sides and body brownish in colour as an autapomorphies.

Among the genus the *fascipes* plays out group relationships with rest of the seven species by its autapomorphies like hind-femora with blackish bands and maxillary palpi very dark at base with 4<sup>th</sup> and 5<sup>th</sup> joints nearly white. The rest of the species viz. *heterospinus*, *pilicornis*, *ramospinus*, *indicus*, *montonus*, *concolor* and *sindellus* divided into two groups. Among first group the *pilicornis* and *ramospinus* play sister-group relationships with each other by their synapomorphies body oblongate and hind-tibiae with 4-spines on each margin and out group relationships with *heterospinus* by its autapomorphies like body broad and hind-tibiae with 3-outer and 4-inner spines.

In second group the species *indicus* plays out group relationships by its body larger sized and in females ovipositor longer and straight as autapomorphies with rest of the three species, which play sister-group relationships with each other by their synapomorphies like body smaller sized and in females ovipositor shorter and gently curved. Among these *montanus* and *concolor* play sister-group relationships with each other by their synapomorphies like second protarsus devoid of spur and in males mirror of the elytra oblique in position and out-group relationships with *sindellus* with its autapomorphies like the second protorsus with 3-equal sized spurs and in males mirror of the elytra horizontal.

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