Biting midges from Northern Pakistan with descriptions of three new species (Diptera: Ceratopogonidae)1

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Key words: Ceratopogonidae, Culicoides, kohistanensis, pakistanensis, papillatus, Pakistan.

Abstract: Twenty-one species belonging to the genus Culicoides were recorded from six localities in northern part of Pakistan. Almost all species are the Central Asian elements. Three new species, C. kohistanensis, C. pakistanensis and C. papillatus, are described and figured.

Biting midges of the genus Culicoides in the neighboring areas of Pakistan have hitherto been reported from the Russian Central Asia (Gutsevich, 1973), Iran and Afghanistan (Navai, 1977), India (Sen and Das Gupta, 1959), Southeast Asia (Wirth and Hubert, 1989) and China (Lee, 1988), but the information of Pakistani Culicoides is nearly lacking except for some records by Navai (1977).

Biting midges used in this study were collected by light trap at Hunza, Gulmit, Mingora, Chilas, Kalam and Dir between 31 July and 12 August, 1987, by the junior author. The specimens were examined and found 21 species including three new species.

The holotypes and allotype of the new species are deposited in the National Science Museum (Natural History), Tokyo.

Records of Collections

Subgenus Avaritia Fox, 1955


Specimens examined. 13 females (F), 7 males (M), 31 July, Mingora; 7F, 1M, 9 August, Kalam; 28F, 5M, 12 August, Dir.

Distribution. Africa, the Near and Middle East, India, and Pakistan.

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2. **Culicoides maculatus** Shiraki, 1913 Taiwan Sotokufu Noji Tokubetsu Hokoku, 8: 296.

*Specimens examined.* 4F, 9 August; 6F, 12 August, Dir.

*Distribution.* Taiwan, the Indo-China, Indonesia, Philippines, China, Japan, and Pakistan.

3. **Culicoides obsoletus** Meigen 1918 Syst. Beschr., 1: 76.

*Specimens examined.* 6F, 9 August, Kalam.

*Distribution.* Widespread in Eurasia and North America.

*Remarks.* Female morphological characters of some species related to *C. obsoletus* very similar, therefore the present identification is indefinite due to no male specimens available.

Subgenus *Beltranmyia* Vargas, 1953


*Specimens examined.* 1F, 3 August, Gulmit; 1F, 1M, 4 August, Mingora; 1F, 9 August, Kalam; 1 intersex, 12 August, Dir.

*Distribution.* North Africa, Europe, the Near East to India, the Indo-China, Japan and Pakistan.


*Specimens examined.* 2F, 4 August, Mingora.

*Distribution.* France, Central Asia, Mongolia, and Pakistan.

Subgenus *Culicoides* Latreille, 1809

6. **Culicoides papillatus** sp. n.

*Female* (Figs. 1, 5 and 8). *Body:* Large, brown.

*Head:* Eyes contiguous for a short distance, bare. Antenna with segments in lengths (µm) of 60-47-50-50-50-47-60-62-75-87-129, AR 1.02; sensilla coeloconica on segments 3, 11-15, number of sensilla on one side 4, 1, 1, 2, 2. Palpal segments (Fig. 5) in lengths (µm) of 25-90-100-40-40, PR 3.4; third segment slightly swollen on distal half with sensilla scattered on surface of distal portion of segment. Mouthparts long, P/H Ratio 0.93; mandible with 16 teeth. Epipharyngeal wall of cibarial pump with about 80 small papillae.

*Thorax:* Brown, scutum without prominent pattern, scutellum each a pair of mid-scutellar and lateral bristles.

*Legs:* Brownish, apices of all femora pale, apex of hind tibia pale with five spines, the first longest.

*Wing* (Fig. 1): Length 1.55 mm, CR 0.63. Pattern as figured, anterior wing margin with three narrow transverse, dark areas; first spot not very dark, located halfway from costa to media and a small spot on veins Cu2 and 1st A; second spot dark, lying at apex of first radial cell and base of second, with reduced intensity as a spot across median fork and following course of vein Cu1 to posterior wing margin; third spot appearing as a transverse spot located from end of costa near vein M1 to vein M2, vein M2 to a third way of vein M3+4; veins M1 and M2 with dark streaks apically. Microtrichia sparse, confined distal thirds of wing. Halter pale.
Figs. 1-4  Wings of *Culicoides* species.

1: *C. papillatus* sp. n., female. 2: *C. pakistanensis* sp. n., female. 3: *C. pakistanensis* sp. n., male. 4: *C. kokistanensis* sp. n., female.
Figs. 5–11  Palpi and spermathecae of females and male genitalia of *Culicoides* species.

5: Palpus of *C. papillatus* sp. n. 6: palpus of *C. pakistanensis* sp. n. 7: palpus of *C. kohistanensis* sp. n. 8: spermathecae of *C. papillatus* sp. n. 9: spermathecae of *C. pakistanensis* sp. n. 10: spermathecae of *C. kohistanensis* sp. n. 11: genitalia of *C. pakistanensis* sp. n.

Abdomen: Brown, spermathecae (Fig. 8) probably ovoid, with short necks, ca 54 by 60 and 54 by 50 (μm), very long rudimentary spermatheca and ring present.

*Holotype.* 1F, 9 August 1987, Kalam, Pakistan, S. Shinonaga.

*Discussion.* The wing pattern of *C. papillatus* sp. n. is generally similar to those of the Japanese *C. dubius* Arnaud, 1959 and the Malaysian *C. trimaculipennis* Wirth and Hubert, 1989, but the presence of about 80 cibarial papillae is very characteristic among the species belong to the subgenera *Culicoides* or *Hoffmania.*

*Specimens examined.* 1F, 31 July, Hunza.
*Distribution.* Widespread in Eurasia.

Subgenus *Oecacta* Poey, 1951

*Specimens examined.* 1F, 4 August, Mingora.
*Distribution.* Kenya, Azerbajdzhan, Turkmen, and Pakistan.

*Specimens examined.* 1F, 4 August, Mingora.
*Distribution.* India, Indonesia, the Indo-China, Borneo, Taiwan, Japan, and Pakistan.

*Specimens examined.* 1F, 12 August, Dir.

*Distribution.* Europe to Japan.

*Remarks.* The holotype and paratype specimens had been collected by S. Kitaoka at the top of Mt. Hijiri about 3,000 m high, where the midges fed on him.


*Specimens examined.* 1F, 12 August, Dir.

*Distribution.* Central Asia, China, and Pakistan.


*Specimens examined.* 4F, 23M, 31 July, Hunza; 1F, 5 August, Chilas; 222F, 7 August, Kalam; 28F, 4M, 12 August, Dir.

*Distribution.* Turkmen, and Pakistan.

13. **Culicoides kohistanensis** sp. n.

*Female* (Figs. 4, 7 and 10). Body: Medium-sized, brown.

*Head:* Eyes narrowly separated, bare. Antennal segments in lengths of 30-25-25-25-25-25-25-25-50-47-52-55-75, AR 1.09; sensilla on segments 3-10, mean number of sensilla 2.5, 2.0, 2.0, 1.5, 1.5, 1.0, 2.0. Palpal segments (Fig. 7) in lengths of 17-45-62-17-22, PR 1.6; third segment greatly swollen with large deep pit opening by a smaller pore. Mouthparts short, P/H Ratio 0.56; mandible with 13 teeth.

*Thorax:* Light brown, scutellum without prominent pattern, scutellum with 1 midscutellar bristle and a pair of lateralar bristles.

*Legs:* Light brown, fore and mid femora with apical pale areas fore and mid tibiae with subapical bands, hind leg totally dark, tibial comb with 4 spines the first longest.

*Wing* (Fig. 4): Length 0.92 mm, CR 0.54; pale brown with faint spots; anterior margin with two pale costal spots, the first on crossvein, the second distad of second radial cell; two pale spots between median fork and mediocubital fork in cell M₂ and each one in cell M₁ and anal cell. Macrotrichia distributed on distal half and anal cell. Halter pale.

*Abdomen:* Light brown, spermathcae (Fig. 10) two, subequal, elongate oval, pigmented with long developed necks, 67 by 35 and 62 by 35, long rudimentary spermatheca and mushroom-shaped ring present.

*Holotype.* 1F, 12 August 1987, Dir. S. Shinonaga.

*Discussion.* Culicoides kohistanensis sp. n. is very similar to *C. azerbajdzhanicus* Dzhafarov, 1962 which it resembles in wing pattern, but the latter has a shallow palpal pit.

14. **Culicoides morishitai** Tokunaga, 1940 Tnetherdo, 3: 149.

*Specimens examined.* 1F, 4 August, Mingora; 3F, 5 August, Chilas; 1F, 9 August, Kalam; 5F, 12 August, Dir.

*Distribution.* Iran, China, Taiwan, Japan, and Pakistan.


*Specimens examined.* 1F, 31 July, Hunza; 2M, 5 August, Chilas; 2F, 2M, 12 August, Dir.

*Distribution.* Central Asia, and Pakistan.

*Specimens examined.* 1F, 31 July, Hunza; 37F, 17M, 4 August, Mingora; 5F, 3M, 9 August, Kalam.

*Distribution.* Southern Asia from Israel, east to India, S.E. Asia, New Guinea, northern Australia, and Japan.

17. **Culicoides pakistanensis sp. n.**

*Female* (Figs. 2, 6 and 9). Body: Medium-sized, brown.

Head: Eyes separated about 1.5 facets, bare. Antennal segments in lengths of 47-25-30-32-32-32-32-55-55-56-55-80, AR 1.15 (1.12-1.18, n=4); sensilla on segments 3-15, mean number of sensilla 4.0, 1.0, 1.0, 1.0, 0.7, 0.7, 1.0, 1.0, 1.0, 1.0, 1.0, 1.0. Palpal segments (Fig. 6) in lengths of 35-85-87-27-30, PR 2.7; third segment moderately swollen, with a shallow large pit on distal portion. Mouthparts with 13 to 15 teeth.

Thorax: Brown; scutum without prominent pattern, scutellum with each a pair of mid-scutellar and lateral bristles.

Legs: Brown, apices of all femora pale, tibiae with subbasal pale rings; hind tibial comb with 4 bristles, the first longest.

Wing (Fig. 2): Length 1.14 (1.12-1.18, n=4), CR 0.56. Pattern as figured; pale markings extensive; pale spot over r-m crossvein large, extending broadly from costal margin to cell M₃, broader than the dark area on either side; stigmal spot moderately prominent, tip of second radial cell included in the poststigmal pale spot; the dark area distal to it; distal pale spot broadly meeting wing margin; cell M₄, filling with a large spot, anal cell with three coalescing pale spots, vein M₁, M₂, and M₃₊₊ each with extensive streak. Microtrichia scanty on distal half of wing and anal cell. Halter pale.

Abdomen: Brown, spermathecae (Fig. 9) two, subspherical, with short necks, unequal, 55 by 40 and 40 by 30; rudimentary spermatheca and ring present.

*Male* (Figs. 3 and 11). Body: Medium-sized, brown. Similar to female with usual sexual differences.

Wing (Fig. 3): Length: 1.14 and 1.21 mm, CR 0.55. Macrotrichia distributed sparsely on distal thirds of wing.

Genitalia (Fig. 11): Sternum 9 with moderately deep and broad caudmedian excavation, ventral membrane not spiculated; tergum 9 moderately broad distad, with large triangular apicolateral processes, caudal margin between them deeply notched. Basistyle with ventral root very slender, long, dorsal root stout with pointed tip. Aedeagus with basal arms, arch low and rounded, extending to a thirds of total length, basal arms slender and distal process tapering to moderately slender, simple pointed, bent ventrad and mesad.


*Discussion.* *C. pakistanensis* sp. n. is apparently belong to the *ornatus* group and the wing pattern is generally similar to that of *C. niphanae* Wirth and Hubert, 1989 from Thailand, but the later lacks prominent pale streaks on vein M₁, M₂ and M₃₊₊.


*Specimen examined.* 1F, 31 July, Hunza.

*Distribution.* Europe to Siberia and Pakistan.
19. **Culicoides pamiricus** Zhogolev, 1973  
*Parazit.*, 7: 185.  
*Specimen examined.* 1F, 31 July, Hunza.  
*Distribution.* Pamirs and Pakistan.

20. **Culicoides turanicus** Gutzevich et Sumatov, 1966  
*Specimens examined.* 2F, 1M, 31 July, Hunza; 1F, 4 August, Mingora; 5F, 5 August, Chilas; 2F, 1M, 12 August, Dir.  
*Distribution.* Central Asia and Pakistan.

Subgenus **Ponticulicoides** Remm, 1958

21. **Culicoides sejfadinei** Dzhafarov, 1958  
*Specimens examined.* 12F, 31 August, Hunza; 1F, 1M, 3 August, Gulmit; 23F, 4 August, Mingora; 1F, 12 August, Dir.  
*Distribution.* Morocco to Iran, Central Asia, China, and Pakistan.

**References**


**要 記**

巴基斯坦北部のヌカと3新種の記載（双翅目：ヌカ科）

巴基斯坦北部のヌカについては断片的な記録があるのみで、今回の調査で3新種を含む21種を記載した。大部分は中央アジアに分布するものであった。新種は、*C. papillatus, C. pakistanensis, C. kohistanensis* と命名し記載した。