

THE NYMPHS OF NEW SPECIES OF GENUS EPHEMERELLA
(ORDER: EPHEMEROPTERA)

by

Syed Rashid Ali,

Zoology Department, Gordon College, Rawalpindi

According to Burks (1953) both adults and nymphs of mayflies are used by fishes as food, Meehan and Ali (1967), Ali and Hussain (1968) found mayfly nymphs in the guts of six different species of fishes in some parts of West Pakistan. Little is known about the mayfly fauna of Pakistan. No record was available about the taxonomy of mayflies of Pakistan before 1967. The author (1967) described the nymphs of *Ephemera soanica*, *Ecdyonurus islamabadicus*, *Baetis Macanis*, *Baetis meeheanis*, *Cloeon gillican*, *Choroterpes hadricus*, and *Caenis kimminis* as new species. Later on he described *Ephemera striatus*, *Heptagenia hazarensis*, *Eatonia khyberensis*, *Cloeon karachiensis*, *Oligoneura kashmirensis*, *Ephemerella swatensis* and *Rhithorogena basiri* as new species in 1970-71.

Nymphs of *Ephemerella* described by Ueno (1955) from Nepal and Kapur and Kripalani (1961) from N.W. Himalayas (India) are different from the specimens dealt with in this paper.

Methods

Surber one square foot sampler was used for the collection of mayfly nymphs. Nymphs were preserved in formalin. Temporary glycerine mounts were used for the study. For permanent mounts, specimens were treated with 10 percent KOH solution (cold) for varying length of time depending upon the size and after usual process of dehydration and clearing, mounted in Canada balsam. Mount parts, legs and gills were dissected in clove oil. Sketches were drawn with the help of Camera lucida.

Family: Ephemerellidae

Ephemerella wahensis sp. nov. (Plate I & II).

Body length (Fig. 1) 7mm. and caudal filaments 3.5 mm. Head, thorax and legs conspicuously hairy. General colour reddish brown with dark markings on head, thorax and abdomen; dark bands on legs: wing pads blackish.

Head hypognathous (Fig. 1) flattened, frontal margin rounded; antennae well developed with setae; eyes lateral; a pair of occipital tubercles towards posterior end of the head. Labrum (Fig. 7) wider than long, slightly notched in the middle of anterior margin, long bristles along antero-lateral margins. Mandibles (Figs. 8, 9) elongated, left with 4 teeth on outer and 2 on inner canine; right with 3 teeth on outer and 2 on inner

canine; protheca well developed. Maxillae (Fig. 10) without maxillary palpi 2 blunt teeth along apical margin of galea-lacinia, a few long bristles posterior to the teeth. Labium (Fig. 11) broad, glossae smaller than paraglossae, both covered with bristles, labial palpi 3 jointed, terminal joint not rudimentary, long bristles on first and second joints. Median lobe of hypopharynx (Fig. 12) round and lateral lobes expanded.

Pronotum (Fig. 1) large, rectangular, arched above with straight lateral margins, meso and meta thoracic tergites covered with wing pads; a pair of tubercles each on pro, meso and meta thoracic tergites. Legs not equal in size (Fig. 2), hind legs longest; femora flattened; fore femur broader; tarsi long; long spines present along the outer margin of femora and tibiae; hairs along the outer margin of tarsi; tarsal claws (Fig. 3.) with 9 denticles.

Abdomen with lateral extensions on 4-9 segments, bearing postero-lateral processes with bristle like structures on segments 3-9 paired dorsal spines present, directed backwards. Ninth sternum prolonged backwards into a tongue like plate without a notch in the middle, the tip of which extends beyond the end of 10th tergum. Five pairs of gills (Figs. 4-6) from 3-7 segments; gills broad at the proximal end and narrow towards distal end, gills bilamellate, each posterior lamella cut into many lobelets; tracheation not distinct; the first pair of gills biggest in size and cover the second pair, the size of gills decrease from anterior to posterior side; the last being smallest.

Caudal filaments nearly equal in length; joints long; whorls of long setae at the joints; a black band at the base of each caudal filament.

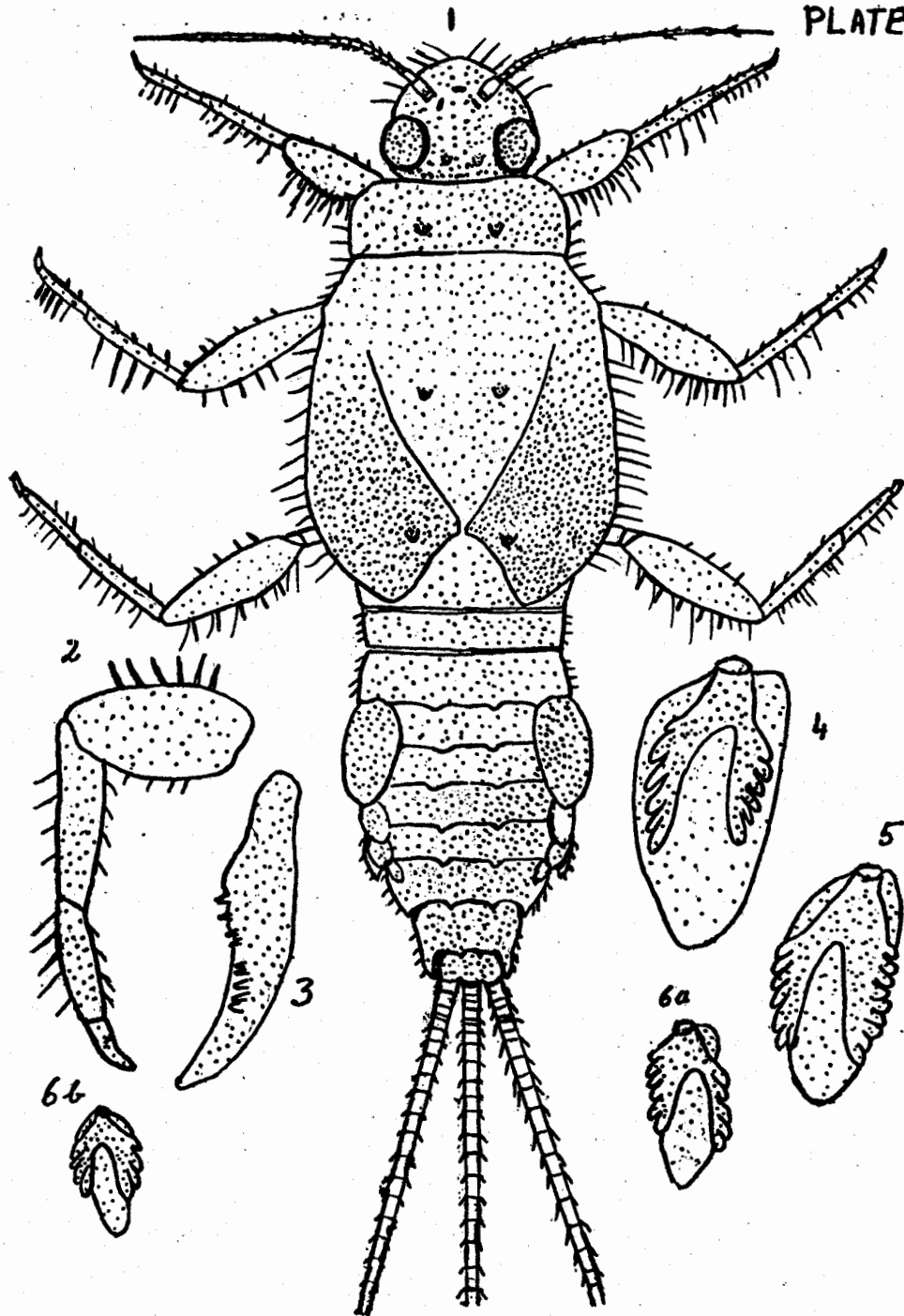
Locality: Wah streams, Kotli (Azad Kashmir) collected by the author on March, 21, 1971 and April 15, 1969.

Remarks: In *Ephemerella swatensis* (Ali) no black spots or bands on the body, legs or caudal filaments; tubercles absent on thorax; 3 denticles on fore and mid tarsal claws and 4 on hind tarsal claw. Setae on caudal filaments short.

Ephemerella nasiri sp. nov. (Plates III and VI)

Length of the body 7.25 mm. median caudal filaments 5.5 mm. and lateral filaments 5 mm. The colour brown, darker on ventral side, head blackish.

Anterior end of the head (Fig. 13) prolonged into a truncated structure notched in the middle, a spine at the anterior side of the base of each antenna, a large median occipital tubercle and small lateral tubercles. Antennae short and thin. Labrum (Fig. 18) much broad, long bristles along antero-lateral margins. Mandibles long, narrow towards posterior end: left mandible with 4 teeth on outer canine and 2 on inner canine; right mandible with 3 teeth on outer canine and 2 on inner canine; long hair on posterior outer margin of each mandible. Maxillae (Figs. 23, 24) with 3 jointed maxillary palpi without

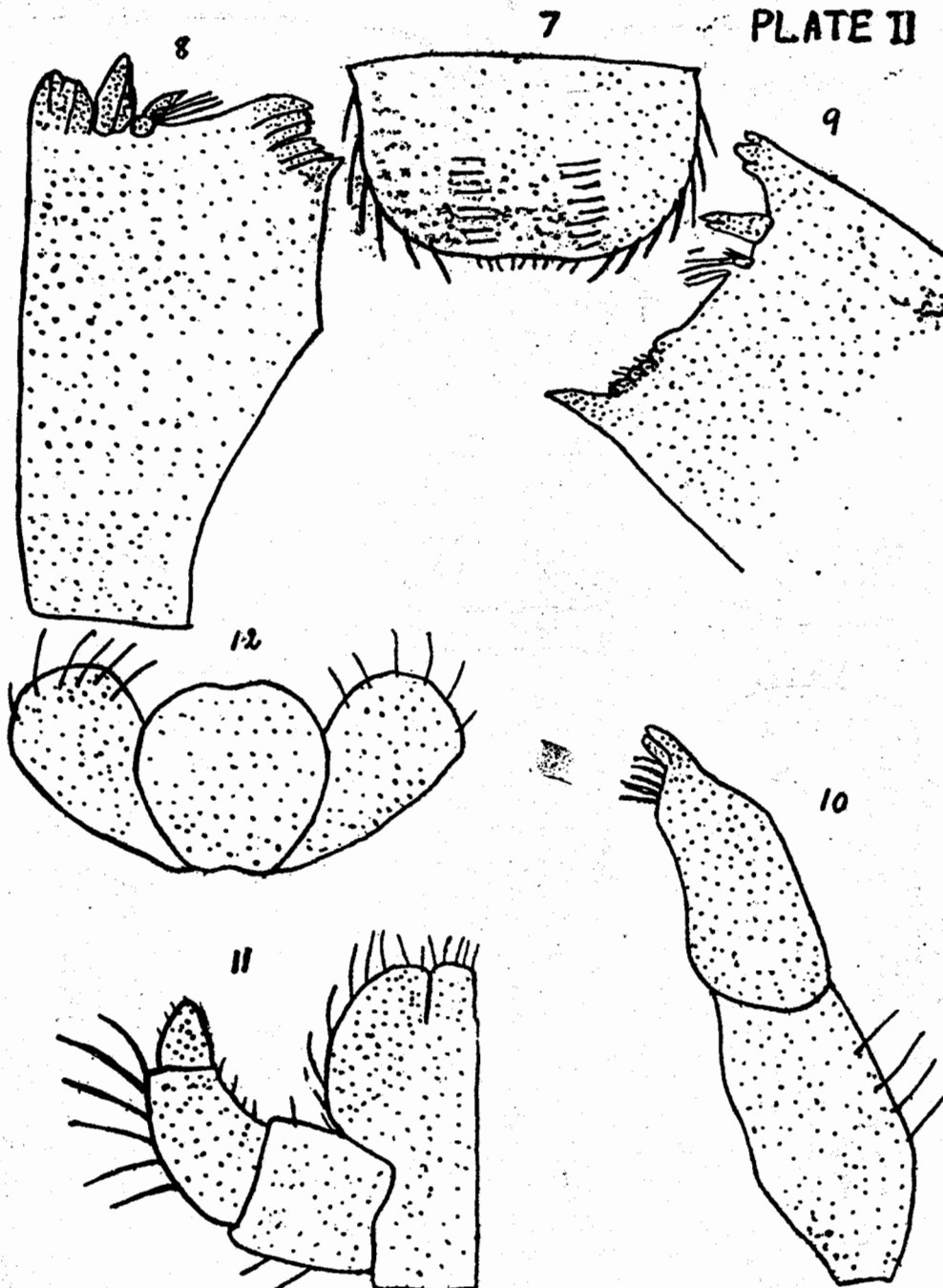


Ephemerella wahensis. sp. nov.

Fig. 1 Dorsal view of nymph
Fig. 2 Hind leg
Fig. 3 Tarsal claw

Fig. 4 2nd. gill
Fig. 5 3rd gill
Fig. 6a 4th gill
Fig. 6b Last gill

PLATE II



Ephemerella wahensis sp. nov.

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|---------|----------------|----------|--------------|
| Fig. 7. | Labrum | Fig. 10. | Maxilla |
| Fig. 8. | Left mandible | Fig. 11. | Labium. |
| Fig. 9. | Right mandible | Fig. 12. | Hypopharynx. |

setae and hair; 3 well developed teeth along the inner apical margin on galea-lacinia, and bristles posterior to teeth. The glossae of labium small (Fig. 25) labial palpi 3-jointed; bristles on glossae and paraglossae. The median lobes of hypopharynx (Fig. 26) rounded; bristles present on both median and lateral lobes.

Pronotum (Fig 13) nearly as wide as head. Wing pads extend over the third abdominal segment; tubercles not present on thorax. Fore femur short and broad, with a notch towards anterior proximal region which encircles the outer margin of the eye; large tubercles along inner margin and minute blackish tubercles on dorsal side and hair along outer margin; a few hair on tibia and tarsus; tarsal claw (Fig. 14) with 3 denticles near the base. Mid and hind femora narrow and long without tubercles; short and thick spines and hair towards outer side; hair on both sides of tibiae and outer side of tarsi of mid and hind legs; tarsal claws (Fig. 15) with one denticle.

Abdomen arched above, depressions on sides from 4-8 tergites for gills; 2-9 abdominal tergites with paired submedian spines directed backwards. Gills arising from 3-7 tergites; gills (Figs 16 & 17) subrotundate, bilamellate, last gill smallest. Ninth sternum prolonged into tongue like structure with 2 lateral projections.

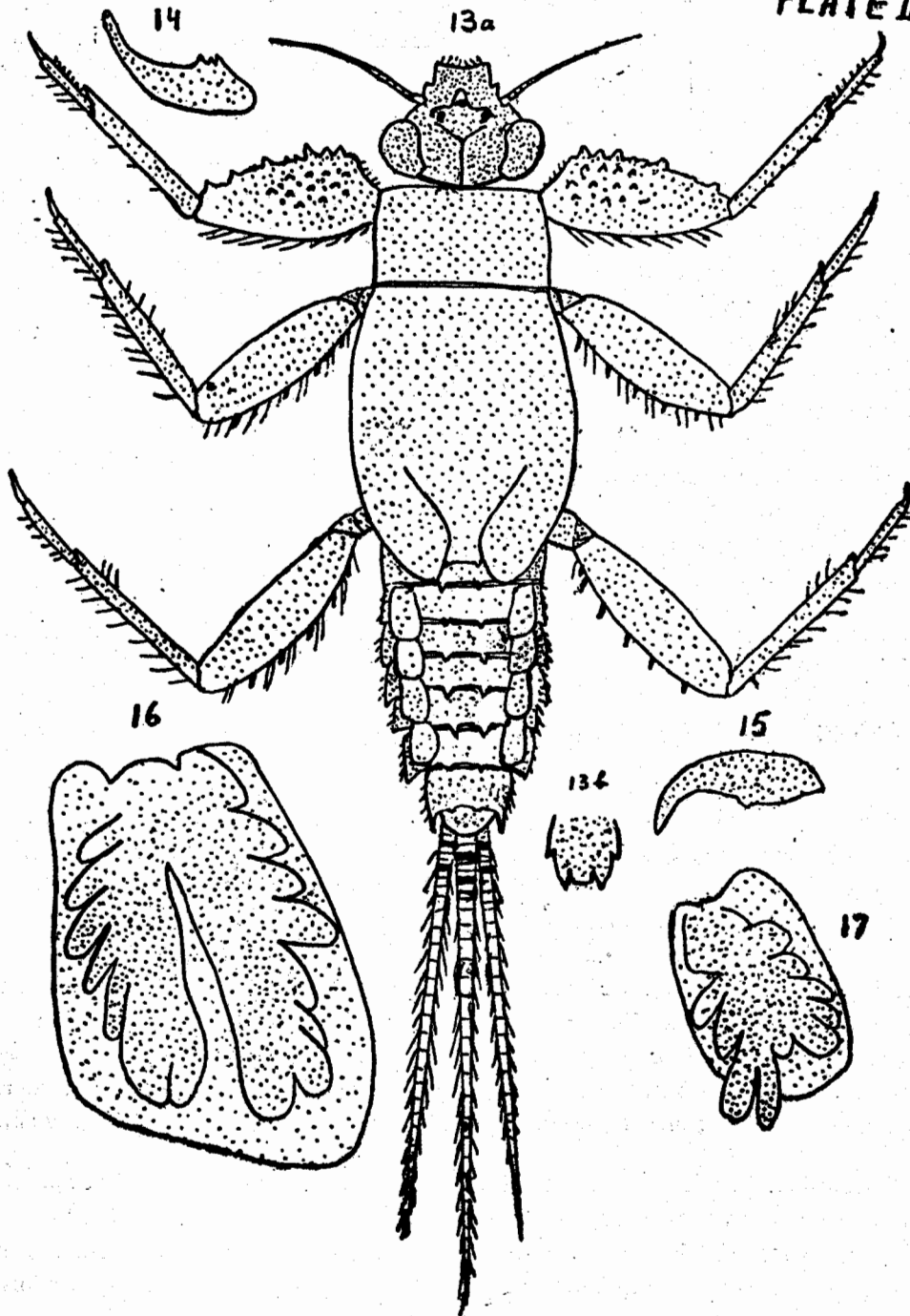
Caudal filaments with hair on both sides; each with 32 dark bands at the base; basal joints short while the rest long.

Locality. The Poonch River Tributary, Kotli (Azad Kashmir), collected by the author, April, 15, 1969.

Remarks. Ueno (1955) described the nymph of *Ephemerella* sp. of Nepal. The head consists of rounded anterior margin without frontal shelf; fore and mid tarsal claws with 3 teeth and hind with 4 teeth; caudal filaments equal in length: hair on both sides of median filament and inner sides of lateral filaments. In *Ephemerella* sp. nymphs of N.W. Himalayas (India) described by Kapur and Kripalani (1961), length of the body 9 mm., caudal filaments 6 mm; colour lighter on ventral side; a notch on each side of the frontal shelf of head; occipital tubercles very small; paired submedian spines on tergites 2-9. In *Ephemerella nasiri* colour is darker ventrally; median occipital tubercles large; a lateral notch along the anterior margin of fore femur; minute black tubercles on antero-dorsal surface of femur; median caudal filament slightly longer than lateral filaments.

Conclusion. Three species of *Ephemerella* are recorded by the author in Pakistan; *Ephemerella swatensis* (1971) described in "Certain mayfly nymphs of Azad Kashmir and Swat," from Swat, *Ephemerella wahensis* from Wah and Kotli (Azad Kashmir) and *Ephemerella nasiri* from Kotli. These nymphs are found only in fast running streams.

PLATE III



Ephemerella nasiri. sp. nov.

Fig. 13. Dorsal view of nymph.
Fig. 14. Fore claw
Fig. 15. Hind claw

Fig. 16. 1st gill
Fig. 17. Last gill

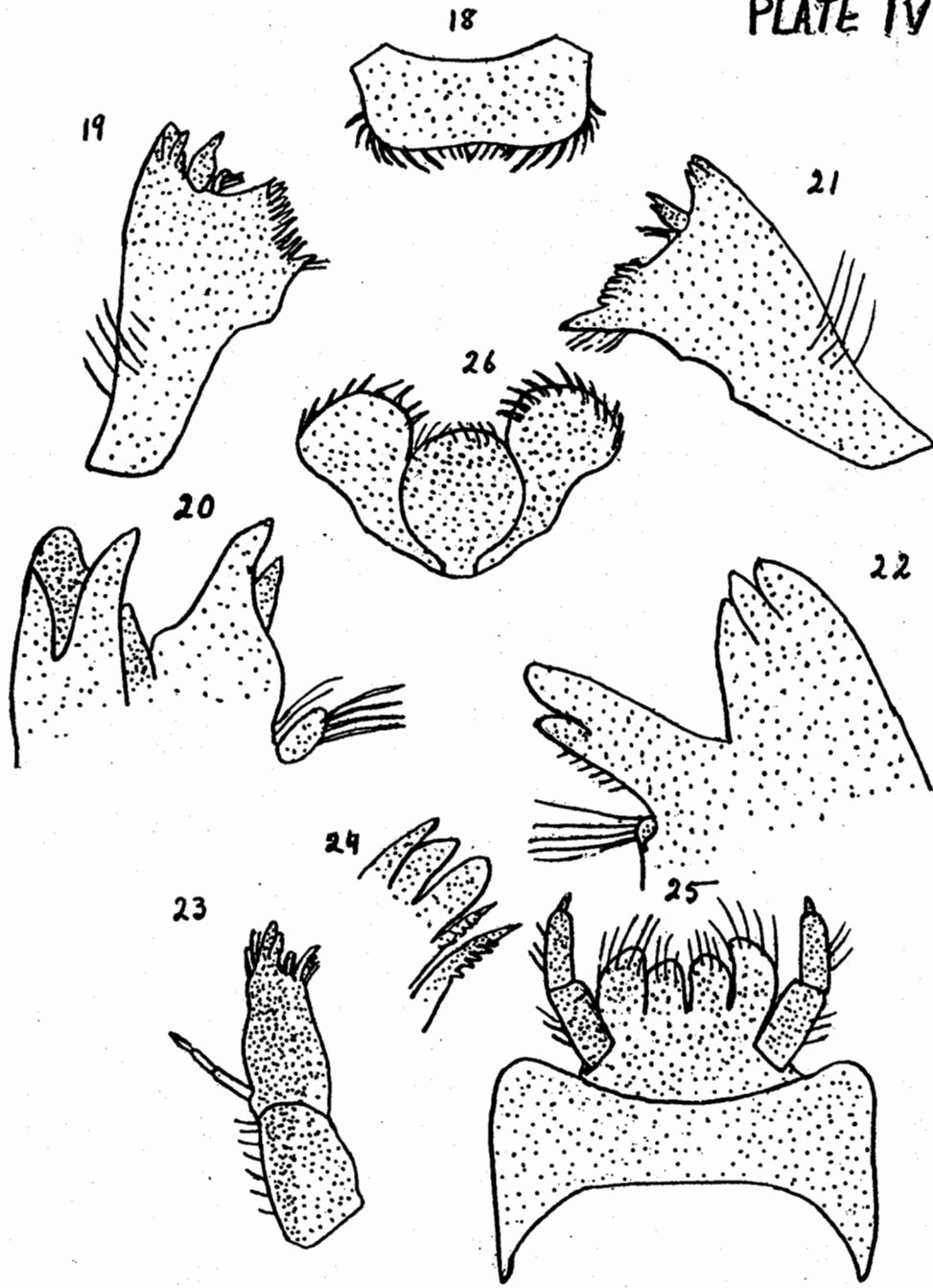


Fig. 18. Labrum
 Fig. 19. Left mandible
 Fig. 20. Canines and Prosotheca.
 Fig. 21. Right mandible.
 Fig. 22. Canines and prosotheca.

Ephemerella nasiri. sp. nov.

Fig. 23. Maxilla.
 Fig. 24. Apical margin of lacinia.
 Fig. 25. Labium.
 Fig. 26. Hypopharynx.

REFERENCES

1. ALI, S.R.—The Mayfly Nymphs (Order: Ephemeroptera) of Rawalpindi Distt., *Pakistan J. Sci.* 19 (3): 73-86 (1967).
2. ————Certain Mayflies (Order: Ephemeroptera) of West Pakistan, *Pakistan J. Sci.* 22 (3 & 4) (1970).
3. ————Certain Mayfly Nymphs (Order: Ephemeroptera) of Azad Kashmir and Swat. Submitted for publication (1971).
4. ————& S.I. HUSSAIN,—Aquatic organisms used as food by fish. *J. Agriculture Pakistan*, 19, 114-120 (1968).
5. BERNER, L.—Mayflies of Florida. *Univ. Florida Press Gainesville* (1950).
6. BURKS, B.D.—The Mayflies or Ephemeroptera of Illinois. *Bull' Illinois Nat. Hist.* 26: 1-216 Figs. 1-395 (1953).
7. EATON, A.E.—A Revisional Monograph of Recent Ephermeridae or Mayflies, *Trans, Linn. Soc. London (Zool.) London* (2) 3: 1-352 (1883).
8. KAPUR, A.P. and M.B. KRIPALANI,—The Mayflies (Ephemeroptera) from North-Western Himalayas. *Red. Ind. Mus.* 59 (Parts I and 2): 1983-230 (1963).
9. MEEHEAN, O.L. & S.R. Ali,—Bottom Fauna of streams in vicinity of Rawalpindi as related to utilization of Fish. *Pakistan J. Sci. & Ind. Res.* Vol. 10, No. 1: pp. 45-53. (1967).
10. TRAVER, J.K.—Himalayan Mayflies, *Ann. Mag.. Nat. Hist. Lond.* (II) 4: pp. 49-56 (1939).
11. UENO, M.—*Fauna and Flora of Nepal Himalayas.* Mayfly nymphs: pp. 310-316. Kyoto (Kyoto University) (1965).
12. ————Some Japanese Mayfly Nymphs, *Mem. Coll. Sci. Kyoto. Imp. Univ.* Ser. B, Vol. IV (I); 19-57 (1928).