

Color: Vertex russet brown except for white marginal band and white irregular basal spots. Eyes black. Pronotum russet brown with irregular white spots along anterior margin. Scutellum russet brown with two longitudinal white lines and irregular white spots. Elytra uniformly golden yellow with just a suggestion of a lighter line along claval suture. Underside russet brown or yellow, with tip of beak, tarsal claws and ovipositor black. Sometimes dorsum and venter of abdomen are darkened.

Described from a female and a male, holotype and allotype respectively and five paratypes. All types taken in Cameron County, Texas, 8/3/28, by Dr. R. H. Beamer.

Types deposited in Snow Entomological Collection.

Dikraneura debilis McAtee.

A specimen of what seems to be this species is at hand from Cameron County, Texas, taken 8/3/28, by Dr. R. H. Beamer. This specimen was sent to Mr. McAtee who kindly compared it with a type specimen and reported that it agreed very well. This, therefore, records this species from the United States.

Dikraneura rufula Gillette.

A number of specimens of this species are before the writer from Marin County, California, and from the Giant Forest, California, and in addition, two specimens from Provo, Utah. The writer agrees with Ball and DeLong that this is a distinct species rather than a variety of *D. abnormis*.

Dikraneura kunzei Gillette.

A series of specimens of this species are at hand from Valentine, Texas, and from Gila County and the Huachuca Mountains, Arizona.

Dikraneura maculata Gillette.

A very large series of this species is at hand from the following localities: Iola, Kansas, and Douglas County, Kansas; Pinal and Gila counties, Arizona; Sutton, Cameron and Menard counties, Texas; Zion National Park, Utah. Dr. R. H. Beamer, who collected all these specimens, reports that they were taken on hackberry. McAtee has already reported this to be the host in North Carolina. In most of these specimens the face is not marked with dark spots as called for in the original description. However, in some specimens from Kansas the dark facial markings are all present and the gradual shading off to the unmarked face can easily be traced in a series of specimens. A study of this series convinces the writer that *Dikraneura celtidis* Osborn, is a synonym of this species.

THE NYMPH OF THE MAYFLY GENUS CINYGMA EATON.

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In early June of the summer of 1928 an immature nymph of the genus *Cinygma* was dredged from the sedges along the edge of a mill pond at Horning's Mills, Ontario. All attempts to get more material here were unsuccessful. Next year, however, on June 7, I met with some full-grown nymphs in a deep rock-pool by the edge of a stream which flows into Lake Nipissing, Ontario from the south. About fifteen individuals were reared between the 10th and the 20th of June and the species proved to be *Cinygma bipunctata* McD.¹ The description of the type fits these individuals very well.

1.—McDunnough, 1924. Occ. Papers Boston Soc. Nat. Hist., vol. 5.

In 1927 Dr. J. G. Needham described the nymph of *Cinygma minus* Eat. under the name *Rhithrogena minus*². He found the nymph of this species to be so very similar to that of *Rhithrogena* that he decided to discard the name *Cinygma* altogether and apply the name *Rhithrogena* to the species of this genus. In the following description it will be noted that there are good characters on which to separate *Cinygma bipunctata* McD. from *Rhithrogena* and therefore it seems advisable to retain the name *Cinygma* for this species and others having similar characters.

I wish to thank Dr. E. M. Walker of the Department of Biology, University of Toronto and Dr. J. H. McDunnough of the Entomological Branch at Ottawa for advice and helpful criticism in connection with this paper.

NYMPH. Length of body 7.5-9.5 mm., caudal setae 7 mm.

Majority of individuals rather dark reddish brown; occasional specimens pale.

Head:—Depressed; eyes dorsally placed; anterior border of head somewhat emarginate towards the mid-line, exposing the tip of the labrum. Colour brown with pale markings on edge of frons in front of eyes, a median pale spot on anterior edge of frons, a median narrow pale line on the vertex reaching anteriorly to a narrow transverse pale line following the frontal suture to the eyes; pale areas over the three ocelli; first two joints of antennae white, the remainder brown in the proximal fourth, paler distally. Labrum hairy. Mandible as in fig. 3; protheca more highly developed than in most genera of the Heptageniidae. Maxilla as in fig. 4, differing greatly from that of any other known mayfly nymph; maxillary palpus more than six times the length of the lacinia and composed of two segments, the first segment about twice the length of the lacinia and extending dorsally and posteriorly between the head and the pronotum (see fig. 1), second joint more than four times the length of the lacinia, curved and provided with long moveable setae arranged in two rows, thus forming a basket-like apparatus; bristles on the lateral border of the lacinia not pectinated. Labium as in fig. 5; glossae and paraglossae not modified as they are in most genera of the Heptageniidae; labial palpus of two segments, proximal segment about as long as the paraglossa, distal segment about 1.5 times the proximal one; distal segment concave along its medial surface and armed with long moveable bristles.

Thorax:—Prothorax brown with narrow median pale line and broader pale lateral borders. Mesothorax brown with narrow pale median line which expands slightly in the anterior half of the segment and also on the scutellum. Wing pads attaining middle of 4th abdominal segment, brown with pale areas on the shoulders and between the main veins. Metathorax brown with a median pale line. Legs pale; femora with a broad brown irregular band near proximal end and a somewhat narrower one near distal end; tibiae with a brown band proximally and another brown band extending from middle to distal fourth; tarsi with brown bands at proximal and distal ends. Femora with weak spines along anterior and posterior edges.

Abdomen:—Brown dorsally with a median pale line expanding towards the posterior border on each of segments 3-10. Posterolateral spines visible from

2.—Needham, J. G., 1927, The Canadian Entomologist, vol. LIX, No. 6, pp. 133-136.

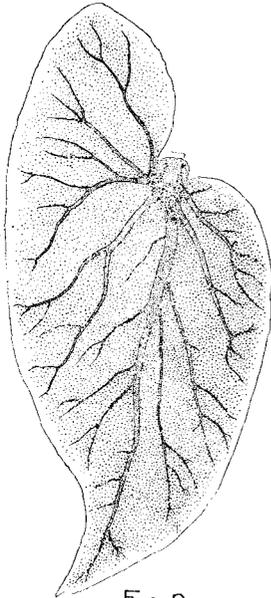


Fig. 2

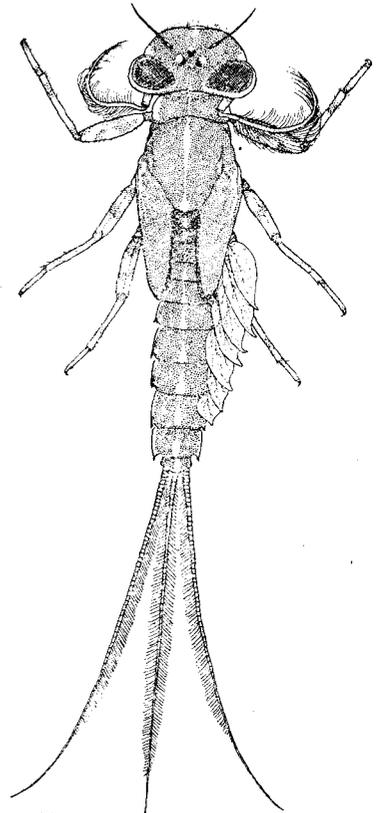


Fig. 1.



Fig. 3

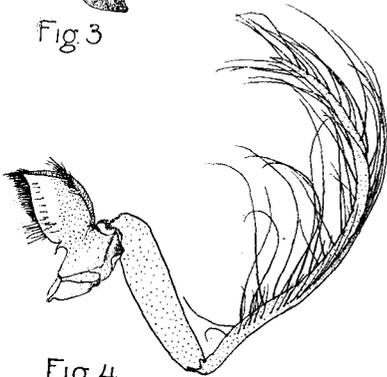


Fig. 4

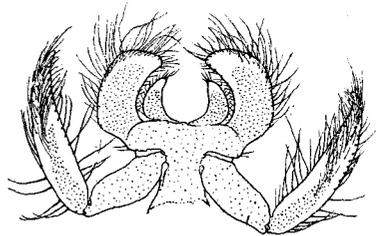


Fig. 5

Fig. 1. *Cinygma bipunctata* McD. Nymph with gill lamellae of left side removed. Fig. 2. Third gill lamella of left side. Fig. 3. Left mandible, ventral aspect. Fig. 4. Left maxilla. Fig. 5. Labium.

above on segments 5-9; longest on segment 9 where they equal two-thirds the length of segment 10. Lateral edges of segments pale with a dark brown band traversing the pale area diagonally from the inner anterior corner to the attachment of the gills; on segment 8 dark band is not pronounced and is absent from segment 9. Gill lamellae single and produced in an anterior lobe as shown for the left lamella of segment 3 in Fig. 2; anterior lobe less extensive in the gill of the first segment; tracheae of gills palmately branched, but one trachea, the one to the apex, much more prominent than the others and pinnately branched. Caudal setae brown, the median one darker brown than the others when viewed with reflected light; joints of setae marked with darker brown; lateral setae fringed on inner side only.

In discussing Eaton's genus *Cinygma* Dr. McDunnough says, "It is possible that the generic name *Cinygma* may fall to *Iron* Eaton, but for the present I am retaining it in Eaton's sense for those species in which the first tarsal joint in the male anterior legs is long but yet noticeably shorter than the second joint³.

A consideration of nymphal characters seems amply to warrant this separation of the genus *Cinygma* from *Iron*. The fact that the nymph of *Iron* has but two caudal setae and *Cinygma* three well developed caudal setae seems in itself enough to separate the two. The mouth parts of this nymph combine characters of several genera of the family Heptageniidae (Ulmer's suborder Heptagenioidea) a point which indicates that this genus is an ancestral type within the group. A well developed prostheca of the mandible, a structure which is characteristic of the Baetidae and found in *Metretopus* and *Siphloplecton* of the Heptageniidae, is present in this nymph. Further, the maxilla is very like that of *Siphloplecton* except that the palpus consists of two joints instead of three. The two-jointed condition of the maxillary palpus shows an affinity with *Rhithrogena*, *Iron* and *Epeorus*, the three-tailed condition indicating a closer affinity with *Rhithrogena* than with *Iron* or *Epeorus*. The genus *Cinygma*, it would seem, has its origin near the base of the Ecdyonurine (Ulmer's Ecdyonuridae) branch of the family Heptageniidae and is most closely related to the genus *Rhithrogena*. These two genera show many minor differences correlated with the vastly different nature of the habitats.

This nymph would appear to be an offshoot from a stock adapted to life in rapid water. It reveals this in the more fundamental features of its structure, especially in the depressed head capsule and dorsal position of the eyes, also, perhaps, in the fact that it has but two segments in the maxillary palpus. In the present habitat, quiet waters, it shows retrogression in the loss of the pronounced limpet-like form of body and in the simpler form of the terminal lobes of the labium. The nymphs were seen crawling around on the vegetation in the manner of some of the Baetidae. Just what function the peculiarly modified labial palpi take on in this new environment is not known but it is conceivable that they might be used as rakes to stir up the surface of the substratum and entrap food organisms.

3.—McDunnough, 1924, Can. Ent., vol. 56, p. 130.