

THE SUBGENUS *ODAGMIA* ENDERLEIN (DIPTERA : SIMULIIDAE) WITH
A NEW SPECIES FROM HIMACHAL PRADESH, INDIA*

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ABSTRACT

Simulium (Odagmia) adventicium, sp. nov. is described and illustrated with due consideration on its taxonomy and zoogeography.

Himachal Pradesh is a part of the Lesser Himalaya, a massive mountainous tract with definite orographical features of the Himalayan range. It lies approximately between 30°23' N and 33°12' N latitudes and between 75°36' E and 79°05' E longitudes and rises nearly to 5000 m in the north from the uneven valleys clothed with dense tropical forests to the high residual hills with subtropical and temperate forest assemblage. There are innumerable fast-running streams and several sluggish streams, pools and side pockets besides the riverine system. The climatic condition, broadly speaking, is monsoonal: it refers to high annual range of temperature and varying humidity in different seasons of the year accompanied by moderate to heavy rainfall. Owing to its location and environment in juxtaposition, Himachal Pradesh enjoys unique Oriental fauna with the Palaearctic bias. The present paper thus clarifies the occurrence of the subgenus *Odagmia* Enderlein, a Palaearctic subgenus also in the Oriental part of Himachal Pradesh.

The type-specimens are deposited in the National Collections of the Zoological Survey of India, Calcutta.

Subfamily SIMULIINAE Newman

Tribe SIMULIINI Newman

Genus *Simulium* Latreille

Simulium (Odagmia) adventicium sp. nov.

Material available : ♂♂, ♀♀, pupa and larva (on slides and in alcohol).

Male : Length about 4.0 mm.

Head : Width more than that of thorax; eyes holoptic and divided; vertex black, with long dark erect hairs; clypeus dark grey, with a coating of silvery pollinosity and dark erect hairs. Antenna (Fig. 1) 11-segmented, dark grey, with pale base of flagellomere 1; latter longer than other flagellomeres. Palpus (Fig. 3) dark grey.

Thorax : Scutum velvety black, with golden recumbent hairs; scutum with a pair of bright silvery shoulder patches (Fig. 7). Scutellum dark grey, nonshiny, with golden recumbent hairs and dark erect hairs. Postnotum dark grey, nonshiny, silvery pollinose. Pleuron greyish; pleural membrane with rather long golden hairs; pleural tuft dark; katepisternum dark grey, shiny, bare. Knob of haltere off-white, stem and base brown to

* Dedicated to the memory of my venerable parents.

dark. *Wing-length* about 3.0 mm. Veins brownish; costa with heavy stout black spinules intermixed with erect black hairs; hair-tuft on base of costa brown but that on stem vein black; basal section of radius bare; subcosta with two or three hairs proximally; radial sector simple, with erect black hairs and R_1 with spinules as well. *Legs* (Fig. 9). Fore coxa grey; basal half of trochanter brownish and distal half grey; femur brown with greyish tip; tibia brownish with greyish distal end and a greyish patch at base, yellowish along anterior margin before greyish distal end; tarsus greyish black; tarsomere 1 rather slender, nearly 7.5 times as long as its greatest width. Middle coxa dark grey; trochanter greyish with pale base; femur brown with greyish tip; tibia brownish with greyish distal end and yellowish basally and greyish distally along anterior margin; tarsomere 1 yellowish basally; rest of tarsus greyish black. Hind coxa dark grey; trochanter grey; femur brown with dark tip; tibia brownish with dark tip and dark tinge along anterior surface; tarsomere 1 subparallel-sided, somewhat expanded, pale yellow, a little darkened towards tip; tarsomere 2 basally brown and distally greyish; rest of tarsus nearly greyish black. Calcipala (Fig. 11) much enlarged; pedisulcus deep.

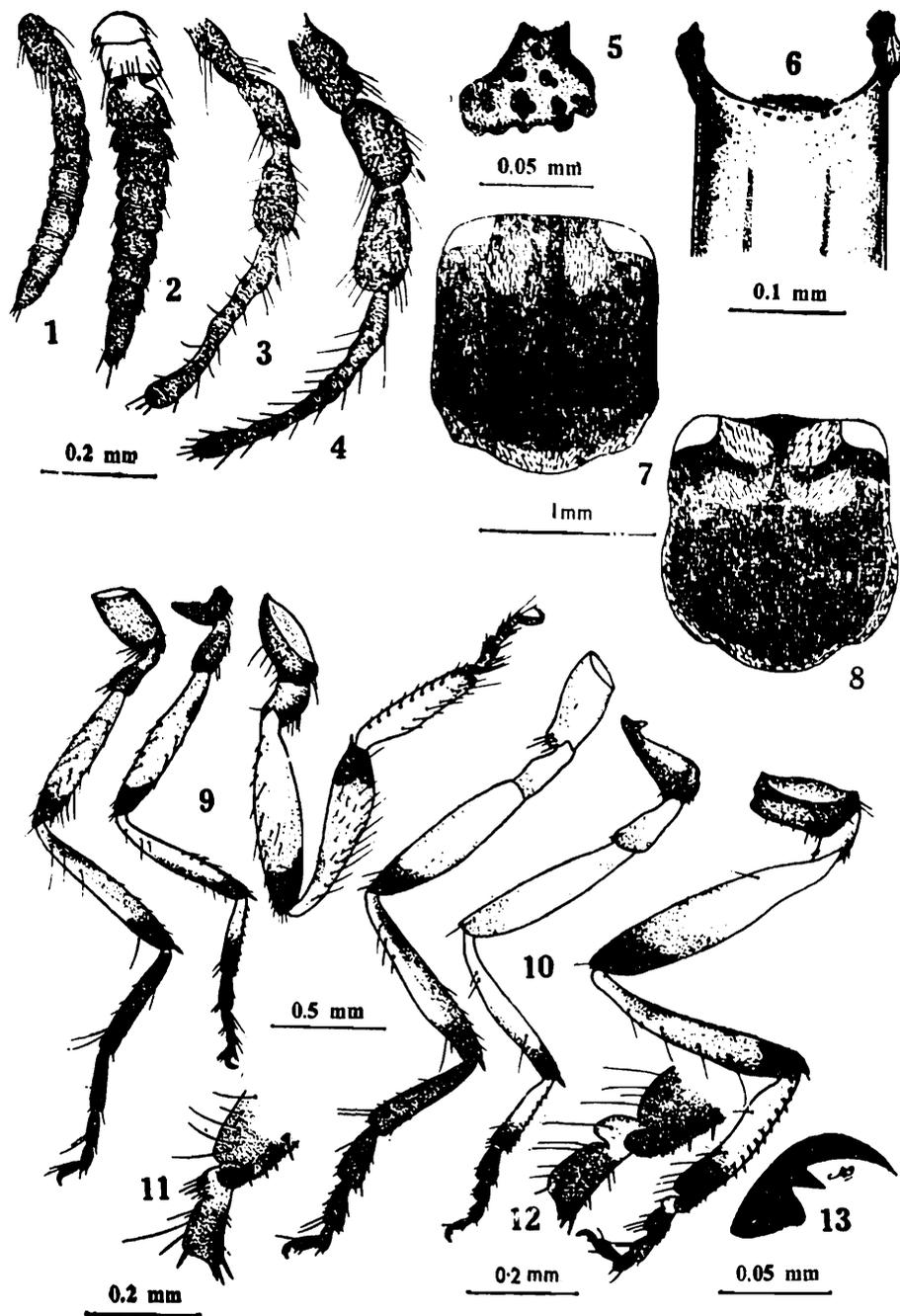
Abdomen: Abdominal scale dark grey; marginal hairs golden. Dorsum greyish black; venter brownish to greyish. Segment 2 with a large silvery spot laterally and, segments 6 and 7 each with a comparatively small spot laterally. Genitalia (Fig. 14) with large, elongate and subparallel-sided distimere, nearly twice as long as basimere; basimere not noticeably produced beyond base of distimere; distimere with a single apical spinule; body of ventral plate (Fig. 15) narrow and heavily toothed apically, with

a coarsely haired anteroventral process; basal arms widely divergent; median sclerite large, with deep apical cleft making it prong-shaped and with serrated edges; endoparameral organ broad basally; endoparameral hooks numerous.

Female: Length about 4.0 mm.

Head: Width more or less equal to that of thorax; vertex greyish black, with many golden recumbent hairs and a few dark erect hairs; frons dark grey, shiny, narrower anteriorly, with many recumbent golden hairs and a few dark erect hairs laterally; clypeus greyish, nonshiny, with golden hairs. Antenna (Fig. 2) 11-segmented, greyish black except yellowish scape, pedicel and base of flagellomere 1. Palpus (Fig. 4) as in male; sensory vesicle (Fig. 5) of segment 3 less than twice as long as wide, many pits present, mostly in clusters. Base of cibarium (Fig. 6) with some very minute denticles.

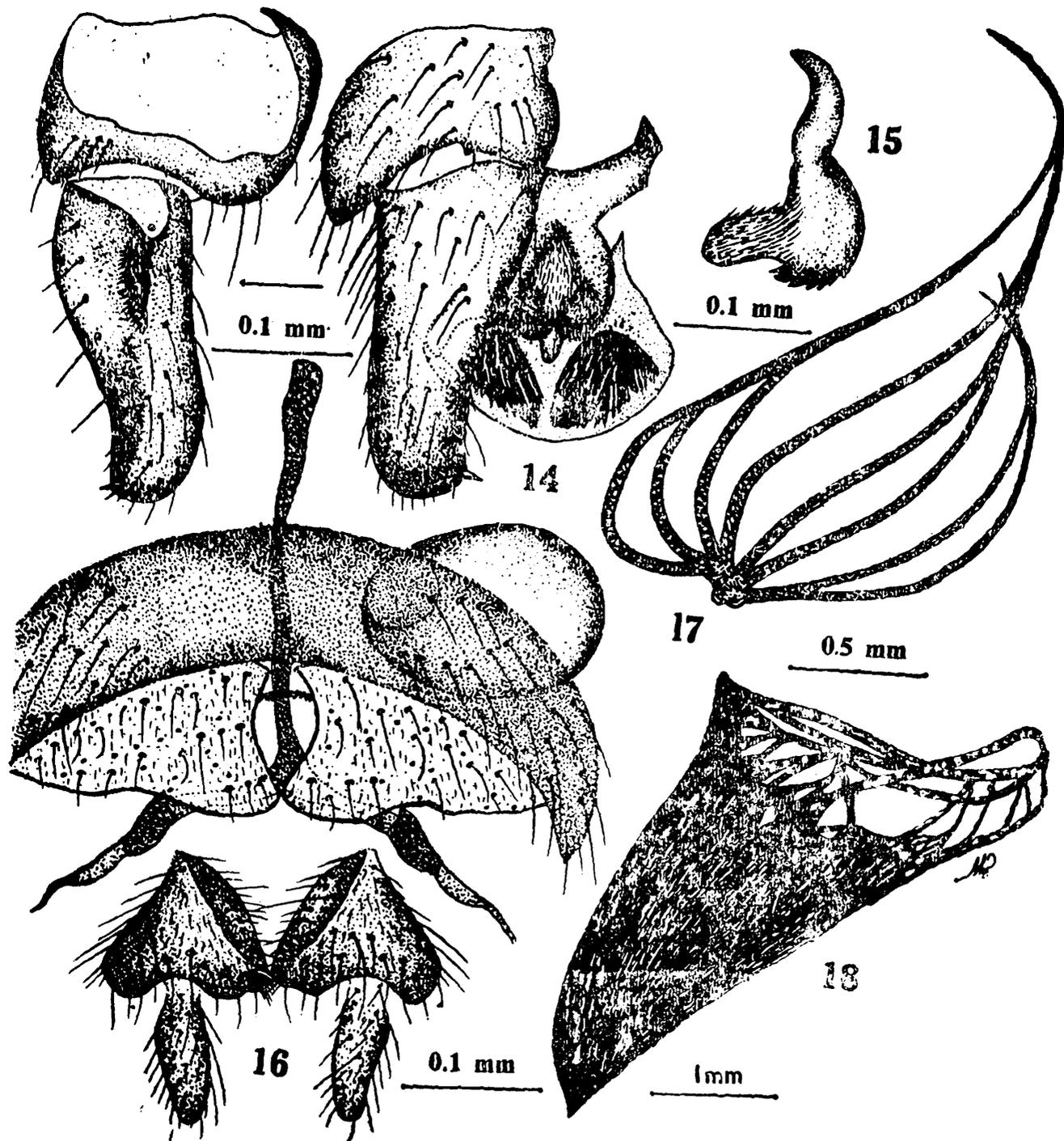
Thorax: Scutum velvety black, with golden recumbent hairs; scutum with boldly marked shiny pale grey pattern anteriorly in form of a pair of horse-shoes meeting towards mid-line and open ends directed outwards (Fig. 8). Scutellum dark grey with golden recumbent hairs and a few dark erect hairs. Postnotum dark grey, nonshiny, silvery pollinose. Pleuron greyish; pleural membrane almost entirely with rather short golden hairs; pleural tuft golden; katepisternum dark grey, shiny, bare. Knob of haltere off-white, stem and base brown to dark. *Wing-length* about 3.5 mm. Veins brownish; costa with heavy stout black spinules intermixed with erect black hairs; hair-tufts on base of costa and stem vein brown; subcosta hairy at least up to level of origin of radial sector; basal section of radius bare; radial sector simple, with erect



Figs. 1-13. *Simulium (Odagnia) adventicium* sp. nov.: 1, ♂ antenna; 2, ♀ antenna; 3, ♂ maxillary palpus; 4, ♀ maxillary palpus; 5, ♀ sensory vesicle; 6, base of ♀ cibarium; 7, ♂ scutal pattern; 8, ♀ scutal pattern; 9, ♂ legs; 10, ♀ legs; 11, calcipala and pedisulcus of ♂ hind leg; 12, calcipala and pedisulcus of ♀ hind leg; 13, ♀ tarsal claw

black hairs and R_1 with spinules as well. *Legs* (Fig. 10). Fore coxa, trochanter and femur golden yellow except greyish tip of last; tibia golden yellow, with a greyish patch basally, leaving pale yellow anterior margin before

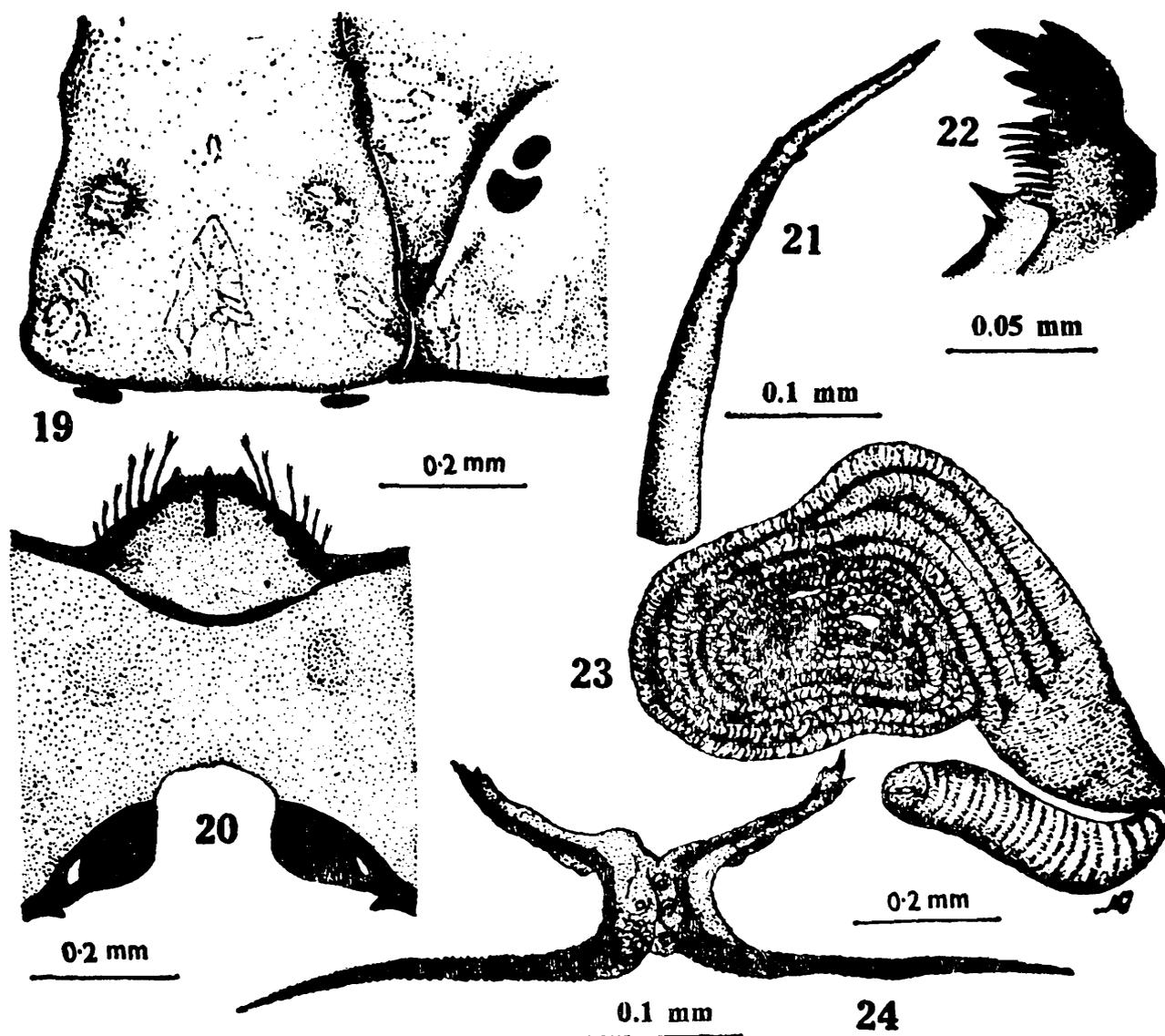
greyish tip; tarsus entirely greyish black; tarsomere 1 dilated, nearly 5.5 times as long as its greatest width. Middle coxa greyish; trochanter brownish; femur golden yellow, with somewhat darkened end; tibia golden



Figs. 14-18. *Simulium (Odagmia) adventicium* sp. nov.: 14. ♂ genitalia; 15, ventral plate (in profile); 16, ♀ genitalia; 17, pupal gill; 18, cocoon;

yellow, with dark tip and a dark tinge on posterior half of anterior margin; nearly basal two-thirds of tarsomere 1 golden yellow and rest of tarsus greyish black. Hind coxa greyish black; trochanter pale brown; femur golden yellow, gradually darkened to tip; tibia golden yellow proximally with a greyish patch on posterior margin and gradually

darkened to greyish tip distally; tarsomere 1 subparallel-sided, narrow, golden yellow with darkened distal one-third; tarsomere 2 golden yellow on basal one-third and greyish black on distal two-thirds, rest of tarsus greyish black. Calcipala (Fig. 12) much enlarged; pedisulcus highly deep; claw (Fig. 13) with a small basal tooth.



Figs. 19-24. *Simulium (Odagmia) adventicium* sp. nov.: 19, larval cephalic apotome; 20, hypostomium and postgenal cleft; 21, antenna; 22, tip of mandible; 23, respiratory histoblast; 24, anal sclerite.

Abdomen : Abdominal scale greyish; marginal hairs golden. Dorsum greyish black; venter greyish. Segments 2-5 with yellow-white posterior edges; distal segments yellow-white further laterally due to shining terga 6-8. Anal cerci of genitalia (Fig. 16) simple bluntly rounded lobes; spermatheca without reticulate pattern.

Pupa : Body-length about 6.0 mm. Dorsum of head and thorax with disc-like tubercles scattered all over. Head and thoracic

trichomes moderately long and simple. Gill (Fig. 17) 8-filamented, arranged in four pairs, each with a short common stalk; gill filaments spreading basally but tips nearly approximated; gill shorter than pupal body. Tergum 1 with 2 or 3 setae on each side; tergum 2 with a row of 3 spinous hooklets and a few accessory setae on each side; terga 3 and 4 each with 4 hooks and a few setae on each side; terga 7 and 8 approximately with 6 and 8 spines respectively on

each side of mid-dorsal line. Sternum 4 with a pair of setae on each side; sternum 5 with a pair of hooks, close together, on each side near posterior margin; sterna 6 and 7 each with same number of hooks on each side but widely spaced. A pair of minute tail-hooks present. Cocoon (Fig. 18) with a short neck, loosely woven and a little fenestrate antero-ventrally, with a definite margin of thick strands, but without antero-dorsal median projection.

Larva: Length about 8.0 mm. Head (Fig. 19) with brownish cephalic apotome; head-spots pale and not at all boldly marked. Antenna (Fig. 21) basically 4-segmented, with a secondary annulation; last two segments above apical level of cephalic fan stem; entirely brownish with pale joints. Postgenal cleft (Fig. 20) small, unevenly rounded, shorter than postgenal bridge. Hypostomium (Fig. 20) with 9 pointed teeth apically; corner and median teeth moderately prominent; 7 or 8 hypostomial setae on each side; hypostomial rows divergent posteriorly from lateral margins of hypostomium. Tip of mandible (Fig. 22) with first 3 comb-teeth evenly decreasing in size, other comb-teeth very long and fine; two mandibular serrations. Respiratory histoblast (Fig. 23) with 8 filaments as in pupa. Thoracic cuticle bare. Abdomen broadest at sixth segment; abdominal cuticle bare. Ventral papillae inconspicuous. Rectal "gills" 3, without secondary lobules. Rectal scales present. Anal sclerite (Fig. 24) with anterior arms united with posterior arms individually. Accessory sclerite absent.

Material examined: Holotype ♂ (reared from pupa), INDIA: Himachal Pradesh, Vashisht, a large stream flowing down the Chandigarh-Manali Road, 1850 m., 10.x.1979. Coll. M. Datta. Allotype ♀ (reared from

pupa), same data as holotype. *Paratypes* 4 ♂♂, 3 ♀♀ (reared from pupae), 12 pupae and 18 larvae, same data as above; 1 pupa and 2 larvae, Patlikuhl, a small stream, 1800 m., 11.x.1979, Coll. M. Datta.

Discussion: *Odagmia* Enderlein is a small, Palaearctic subgenus, occurring widely from Europe to Japan through Siberia and Central Asia to the east and, North Africa and the Mediterranean islands to the west. It is a main component of the *Simulium* Latreille (*s. l.*) fauna, particularly in the mediterranean area, including the Canary islands, Morocco and the Middle East. With reference to the dubious record of *Simulium (Odagmia) ornatum* Meigen by Puri (1932) from South India, Crosskey (1969) opines that this segregate in the Old World does not extend into the Oriental Region. However, the Palaearctic subgenera *Wilhelmia* Enderlein and *Tetisimulium* Rubtzov extend eastwards to the fringes of the Oriental Region (Puri, 1933; Crosskey, 1967); both these groups are characteristic to the semi-arid areas of south-west and central Asia and of Mediterranean Europe and North Africa. Thus, on zoogeographical grounds the occurrence of *Odagmia* in Himachal Pradesh and/or in the other semi-arid parts of India is not unlikely. In the light of the definition of this subgenus (see Crosskey, 1967; 1969) the species under consideration belongs to *Odagmia* despite its certain atypical characteristics which might have eventually come up due to its abode in the Oriental-Palaearctic transitional zone. Thus, the characteristics of the cocoon and of the larva incline more to *Tetisimulium* than to *Odagmia*. The cocoon of this species is necked and fenestrate anteriorly. The head-spots of the larva are not at all boldly marked and are essentially negative as in *Tetisimulium* and in several *Simulium (s. str.)* species.

Simulium (Odagmia) adventicium sp. nov. in having shining female frons is closer to *S. (O.) nitidifrons* Edwards, 1920, a widespread Palearctic species, and the three supposed species, viz., *S. (O.) intermedium* Roubaud, 1906; *S. (O.) H-nigrum* (Abreu, 1922) and *S. (O.) insolitum* (Abreu, 1922) described from the Canary islands, than to *S. (O.) ornatum* Meigen, 1818, with non-shining female frons, but obviously belongs to the *ornatum*-group. These Canary species and also *S. egregium* Séguy described from Morocco are all based on female holotype specimens. According to Crosskey (1967; 1969), these are seemingly conspecific with each other or even with *nitidifrons*. *S. (O.) adventicium* sp. nov. has very largely reddish yellow legs unlike "*intermedium* / *nitidifrons* complex"; the latter species also differing in the following characters: flattened male fore tarsus; marginal extension of distimere dorsally at base; ventral plate in profile more sloped up from beak and bilaterally expanded median sclerite; poorly developed female calcipala; ventral pair of pupal gill filaments with comparatively large stalk; non-necked and non-fenestrate cocoon; and the rather boldly marked larval head-spots and the thorny anal sclerite among certain other differences. In fact, it is difficult to distinguish males of *adventicium* and *ornatum* since the ventral plates are extremely alike but the latter species differs in having dilated fore tarsus and broad uncleft median sclerite. The male of *S. (S.) spinosum* Doby and Deblock, 1957, a British species (see Davies, 1966) which is very close to *ornatum*, has narrow fore tarsus as in *adventicium* but a close examination reveals that the angle of the ventral plate with the beak in the latter species is much shorter. Dr. R. W. Crosskey (*in litt.*) informs the author that there are no stable distinctive characters by which larvae

and pupae of "*intermedium* / *nitidifrons* complex" can be isolated from those of *ornatum* (*s. l.*). *S. (O.) adventicium* can, however, be readily recognized among all these species by its necked and anteriorly fenestrate cocoon and essentially negative larval head-spots.

The establishment of *adventicium* as a new *Odagmia* species, therefore, rests on the combination of certain unique characteristics: shining frons, extensively reddish yellow legs, much enlarged calcipala and highly deep pedisulcus in females; slender fore tarsomere 1, lateral spots on abdominal segments 2, 6 and 7, acute angle of ventral plate, prong-shaped median sclerite with deep cleft in males; necked and fenestrate cocoon; and essentially negative larval head-spots.

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