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DESCRIPTIONS OF THE ADULTS AND PUPA OF *CULICOIDES HILDAE* N. SP. FROM THE REPUBLIC OF SOUTH AFRICA (DIPTERA: CERATOPOGONIDAE)

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ABSTRACT

CORNET, M. & NEVILL, E. M., 1979. Descriptions of the adults and pupa of *Culicoides hildae* n. sp. from the Republic of South Africa (Diptera: Ceratopogonidae). *Onderstepoort Journal of Veterinary Research*, 46, 179–184 (1979).

A new species of biting midge, *Culicoides hildae*, is described from males, females and pupal exuviae collected in the Orange Free State, Republic of South Africa.

Résumé

DESCRIPTION DES STADES ADULTES ET NYMPHAL DE CULICOIDES HILDAE *N. SP., DE LA RÉPUBLIQUE D'AFRIQUE DU SUD (DIPTERA: CERATOPOGONIDAE)*

Une nouvelle espèce de cousin piquant Culicoides hildae, *est décrite à partir de mâles, de femelles et de mues nymphales récoltés dans l'Etat Libre d'Orange de la République d'Afrique du Sud.*

INTRODUCTION

During an arbovirus survey conducted near the area that was soon to be flooded by the giant H. F. Verwoerd dam on the Orange River, light traps were operated in early 1969 and 1970 by Drs B. M. McIntosh and P. G. Jupp of the National Institute for Virology. The *Culicoides* midges that were collected were submitted to the junior author (E.M.N.) and amongst them were a few specimens of an unusual species with a wing pattern which superficially resembled those of *Culicoides pycnostictus* Ingram & Macfie, 1925 and *Culicoides distinctipennis* Austen, 1912 (Fig. 3). To locate the breeding places of this species, the junior author visited the farm on which the light traps had been operating and successfully sampled all likely breeding places for *Culicoides* pupae.

The terminology and morphological characters used in the description of the adults follow those of Cornet (1974). The terminology used to describe the pupa follows that given by Kettle & Elson (1975).

MATERIAL EXAMINED

Two females and 5 males emerged from pupae collected on 29 October 1969 from mud bordering a small pool created by the overflow and leakage from a windmill-fed reservoir and a stock drinking-trough on the farm "Soetvlei" (30°38'S 25°53'E) near Bethulie, Orange Free State, Republic of South Africa. One of these males is the designated holotype. A further 8 males and 2 females were collected with a light trap on the same farm by B. M. McIntosh and P. G. Jupp in January and March 1969 and in March 1970.

The holotype (♂ No. 3769/69290), 3 paratypes (♂ No. 3768/69288, ♀ No. 3767/69286, ♀ No. 3766/69287) and their separately mounted pupal exuviae are deposited at Services Scientifiques Centraux de l'O.R.S.T.O.M., 70–74 Route d'Aulnay, 93140 BONDY, France. The remaining paratypes, deposited at the Veterinary Research Institute, Onderstepoort 0110, Republic of South Africa, include slide-mounted ♂ No. 3765/69277, ♂ No. 3770/69291, ♂ No. 3763/69292 and their separately mounted pupal exuviae, slide-mounted female ♀ No. 3764/7050, and 8 males and 1 female in alcohol.

This species is named after Hilda Nevill who, from 1969–1971, painstakingly mounted most of the *Culicoides* specimens in the Onderstepoort collection, identified the *Culicoides* species of the Orange River Survey and discovered the new species described here.

DESCRIPTION

All measurements are in microns (μm)

Female: (Fig. 1A, B, C, D)

Head.—Eyes bare, widely separated (Fig. 1C); interocular seta in a cell delimited by 2 internal thickenings, the posterior one thick, and the anterior one weak.

Antenna: torus dark brown, flagellum lighter. Basal segments ovoid, terminal ones long and cylindrical.

Total length: 692; IA=0,80; XI/X=1,97.

Palpus (Fig. 1B): longer than the proboscis, with the 3rd segment considerably swollen; sensory pit very wide, but shallow.

Proboscis: shorter than head in the ratio 0,73:1; mouthparts with the usual teeth; cibarium unarmed.

Thorax.—Colour not observed on dry specimens; in alcohol it is dark brown, with lighter scutellum.

Antennal segments: ♀	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV
Length	57	34	34	34	33	33	33	33	65	70	76	78	94
Width	39	27	26	26	26	25	25	26	25	25	25	26	26
Sensilla coeloconica	14/12	0	0	0	0/1	0	0	1/2	3	4	3	6	0
Long sensilla trichodea	2	2	2	2	2	2	2	2	—	—	—	—	—
Short sensilla trichodea	0	2	2	2	2	2	2	2	—	—	—	—	—

Palpal segments: ♀	I+II	III	IV	V
Length	70	99	31	37
Width	26	26	26	

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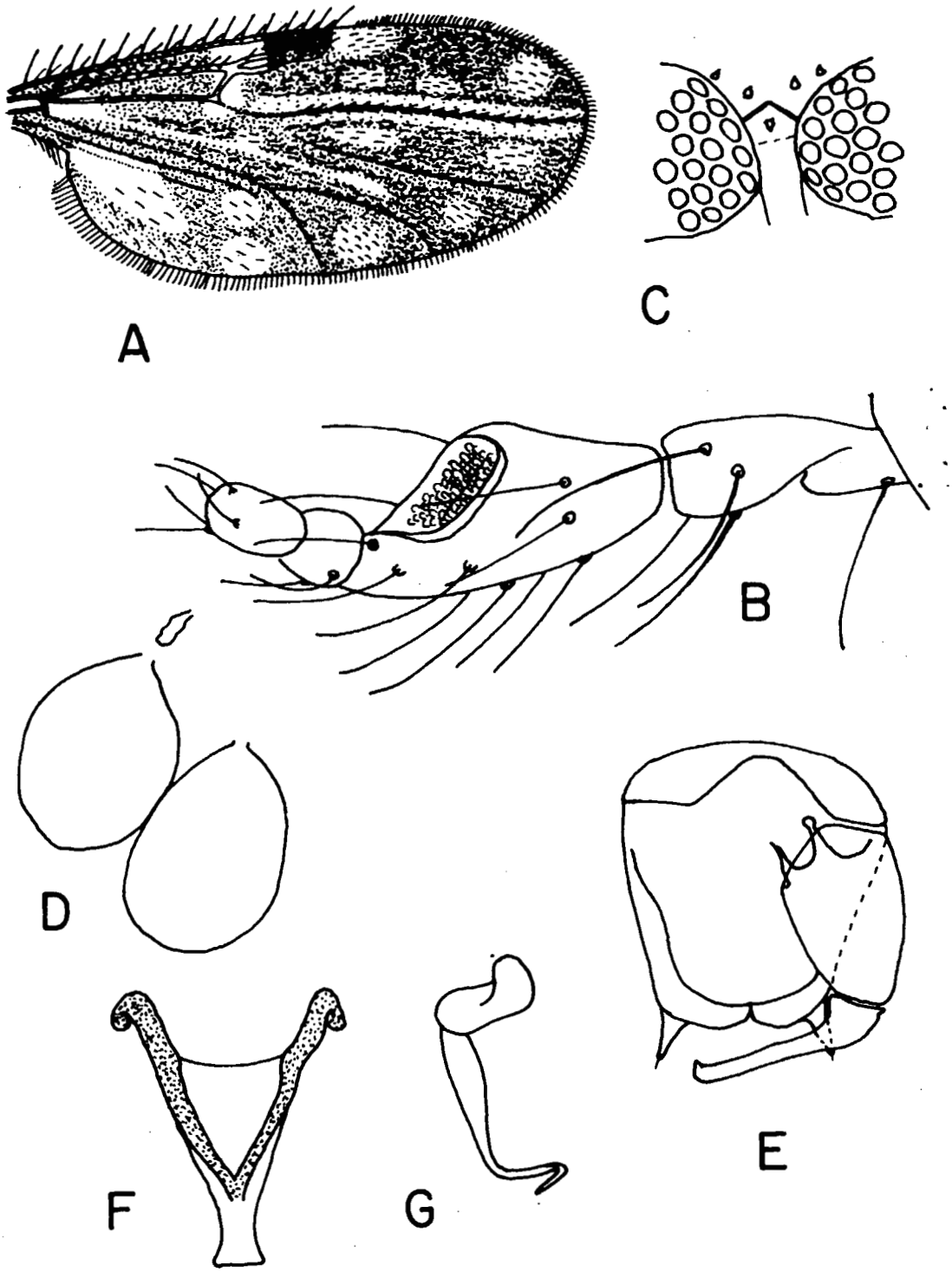

FIG. 1 *Culicoides hildae* n. sp., female: A—wing, B—palpus, C—eyes, D—spermathecae; male terminalia: E—clasper, 9th sternite and tergite, F—aedeagus, G—paramere

Scutellum bearing 4 large setae, 2 central and 2 lateral, and 5 short hairs, the outer of them being outside the large lateral seta.

Wing: pattern as shown in Fig. 1A and 3A; the most conspicuous feature is the arrangement of white spots in cell r5: 2 spots immediately after the end of the costa, 1 at the apex of the cell and a 4th in the middle of the cell, near vein M1; a 5th spot, just below the radial cells, is shown by 2 of the 4 females. Venation normal, with cells r1 and r2 complete. Macrotrichiae dense and widely distributed, covering the whole wing except its base and the basal cell. Trunk of vein R with 10 or 12 setae.

L: 1607; l: 731; T: 512; C: 856; Cu: 637.

C/L=0,53.

Legs without well-defined pale rings, lighter at base than at apex. Hind tibia with a comb of 4 spines, the 2nd the longest (69, 73, 68, 57). Tarsal segments with apical spines: 1 on the first 3 segments of fore and hind legs, 2 on the first 4 segments of mid-leg; 4th segment cylindrical. Claws short, equal and simple, empodium rudimentary.

Abdomen.—Colour in alcohol, light brown. Eighth sternite divided into 2 parts on each side of the genital aperture, as is usual in the genus. Two large spermathecae (Fig. 1D), ovoid, without neck (63 by 44 and 60 by 44) and a 3rd rudimentary. The ring on the duct of the spermathecae is present but, being weakly sclerotized is difficult to see.

Male

Head.—Antenna: total length: 752 and 767; IA= 1,36 and 1,45; XIII/XII=2,87 and 3,00.

Palpi reduced, the 3rd segment not inflated; sensory pit small.

Palpal segments: ♂	I+II	III	IV	V
Length.....	60	70	31	37
Width.....	21	23	20	16

Thorax.—Scutellum, with 4 large setae and 4 short hairs, the outer of them being inside the large lateral seta. Wings narrower than in females, with light spots a little more expanded. Macrotrichiae less dense, with the same wide distribution. Trunk of vein R with 6 or 7 setae.

L: 1343; l: 522; T: 454; C: 679; Cu: 658

C/L=0,51.

Legs as in females except that the claws are weakly toothed at apex and apical spines of the tarsal segments are less numerous: 1 on the 2 proximal segments on forelegs, 1 on the 3 proximal segments on hind leg, 2 on the first 2 segments of mid-leg and 1 on the 3rd.

Male terminalia (Fig. 1E, F, G): Ninth sternite deeply excavated centrally; the membrane connecting it with the aedeagus devoid of spicules.

Ninth tergite trapezoidal with 2 short, triangular apicolateral processes ending in a short seta, and a deep median notch.

Coxites ovoid with 2 well-developed apodemes, the anterior slender, the posterior rounded at its apex.

Styles the usual shape.

Aedeagus with 2 sclerotized basal arms curved up at their base and united by a hyaline membrane; terminal part cylindrical with slightly curved lateral edges and the apex truncated.

Parameres inflated at base, the terminal portion slender and twisted such that it surrounds the apex of the aedeagus.

Variations.—Variations in measurements and the number of sensilla coeloconica are given in Tables 1 and 2.

The wing pattern of white spots can be either expanded or reduced; the spot at the middle of cell r5 is often reduced in females; the spot below the radial cells is present on the 5 slide-mounted males, but only on 2 of the 4 females.

Pupa

Head (Fig. 2B).—Ventromedian setae (vm) paired, inner seta long, outer seta slightly more than half as long; ventrolateral setae (vl) similar to vm but slightly longer; anterodorsal tubercle (ad) rounded, bearing a stout terminal seta and a short lateral seta; anteromarginal tubercle (am) (Fig. 2E) with a long, broad seta terminally and a sensillum near the base.

Operculum (Fig. 2E).—Short, strong thorns arranged in an irregular row along the lateral margins and scattered over the surface except for the area anterior to the lateral angles and the posterior 1/4, both of which are bare.

Antennal segments: ♂	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV
Length.....	89	38	37	34	30	31	31	31	31	39	112	97	104
Width.....	39	31	31	29	27	26	26	25	23	21	21	22	26
Sensilla coeloconica.....	2/3	0	0	0	0	0	0	1	0	0	1	3/4	0
Long sensilla trichodea.....	2	2	2	2	1	0	1	0	0	0	—	—	—
Short sensilla trichodea.....	0	1	1	1	1	1	1	1	0	0	—	—	—

Leg segments	Femur	Tibia	Tarsus I	II	III	IV	V
Foreleg.....	454	449	224	104	70	52	65
Mid-leg.....	585	585	282	115	78	52	65
Hind leg.....	559	574	266	151	91	63	68

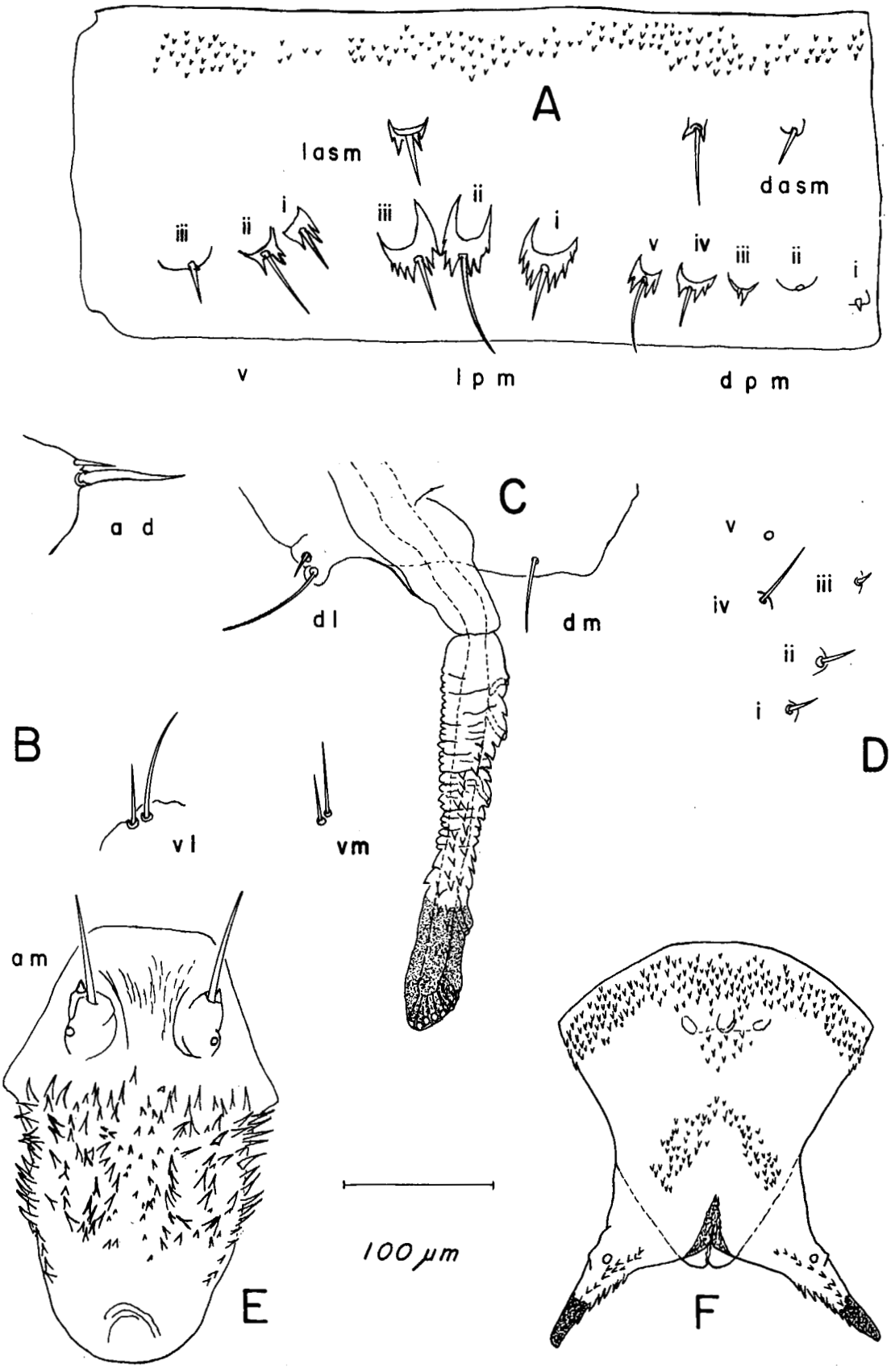

FIG. 2 *Culicoides hildae* n. sp., pupa: A—lateral view of 4th abdominal segment, B—head tubercles, C—prothoracic horn, D—dorsal thoracic tubercles, E—operculum, F—dorsal view of caudal segment

TABLE 1 Variations in measurements

	Female						Male				
	Antenna			Palp	Wing		Antenna			Wing	
	L	IA	XI/X	PIII	L	SR*	L	IA	XIII/XII	L	SR*
Number measured	6	6	6	6	5	5	8	8	8	10	10
Maximum	726	0,80	2,00	103	1 607	12	791	1,46	3,03	1 396	10
Minimum	637	0,74	1,81	91	1 462	9	720	1,30	2,83	1 304	6
Mean	683	0,77	1,89	98	1 578	10,8	757	1,39	2,97	1 345	8,3

* Number of setae on the trunk of radial vein

TABLE 2 Variations in number of sensilla coeloconica

	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV
Females (6 antennae):													
Maximum	14	0	0	0	1	1	0	2	6	4	4	7	0
Minimum	7	0	0	0	0	0	0	0	3	3	3	5	0
Mean	12,2	0	0	0	0,2	0,2	0	1,2	4	3,8	3,3	5,8	0
Males (10 antennae):													
Maximum	3	0	0	0	0	0	0	1	0	0	2	5	0
Minimum	2	0	0	0	0	0	0	0	0	0	1	3	0
Mean	2,4	0	0	0	0	0	0	0,6	0	0	1,3	3,9	0

Thorax Dorsals (Fig. 2D).—Tubercles *i* and *ii* bearing short, sharp setae of equal length; tubercle *iii* with a very short, stout seta; tubercle *iv* with a long, thin seta; *v*—a sensillum. Dorsomedian seta (dm) single; dorsolateral protuberance (dl) with 1 long terminal seta and 1 small lateral seta (Fig. 2C).

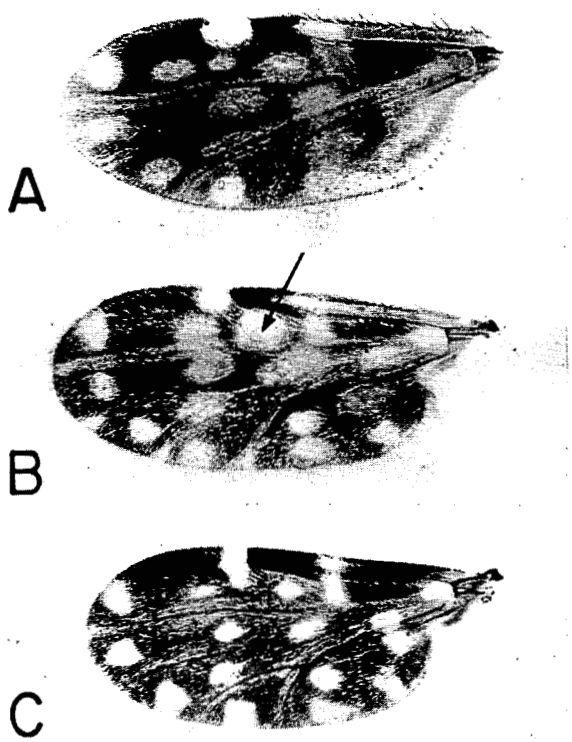

FIG. 3 Photographs of wings of: A—*Culicoides hildae* n. sp., B—*C. pycnostictus*. C—*C. distinctipennis*. The arrow indicates a pale spot below the radial cells that is common to these 3 species

Prothoracic horn (Fig. 2C).—Apical 1/4 darkly pigmented; folds extend from the base to the central area; scales extend from near the base to the start of the pigmented apical section; 1–3 lateral papillae usually open on tubercles; 6–10 terminal papillae.

Abdomen Segment IV (Fig. 2A).—Dorsal posteromarginals (dpm);—*i*–ridge with small, stout seta, *ii*–ridge with no seta, *iii*–tubercle with 2 spurs, no seta, *iv*–tubercle with 2 spurs and strong seta, *v*–tubercle with 4 spurs, seta longer and thinner than *iv*. Lateral posteromarginals (lpm);—tubercles *i–iii* similar with numerous lateral spurs; long, thin seta on *ii*, shorter, stouter setae on *i* and *iii*. Ventrals (v);—tubercles *i* and *ii* with 1 or 2 lateral spurs; tubercle *iii* ridge-like. Seta on *ii* long and thin; setae on *i* and *iii* shorter and stouter. Dorsal anterosubmarginals (dasm);—tubercle *i* with a strong seta; tubercle *ii* with a long, thin seta flanked by 2 lateral spurs. Lateral anterosubmarginal (lasm) tubercle well-developed with lateral spurs and a strong seta. Spicules;—an almost continuous anteromedian band.

Caudal segment (Fig. 2F).—A broad, continuous anterior band of spicules sometimes connects up with an arc of spicules in the central area of the dorsum; 3 smooth dorsomedian tubercles occur immediately posterior to the anterior band of spicules. Terminal 1/3 of caudal spines darkly pigmented; large spicules present on dorsal and inner aspects of caudal spines.

Discussion

The light spot immediately below the dark area at the end of the costa is a distinctive feature of *Culicoides distinctipennis*, *C. pycnostictus* and *C. hildae* n. sp. (Fig. 3). However, the peculiar pattern of spots in wing cell r5 differentiates *C. hildae* from all the known species from the Ethiopian Region. *C. hildae* also differs radically from the other species mentioned

above in that it has 3 spermathecae as opposed to their single spermatheca.

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