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GENERA OF SUBFAMILY LINDENIINAE (GOMPHIDAE ANISOPTERA : ODONATA) WITH DESCRIPTIONS OF TWO NEW SPECIES FROM PAKISTAN

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Abstract. The distribution and amended characters of the genera *Ictinogomphus* Cowley and *Gomphidia* Selys are included in this paper. Detailed description of two new species, viz. *Ictinogomphus alaquopterus* and *Ictinogomphus pugnovittatus* and modified characters and new record of distribution of *Gomphidia t-nigrum* Selys are given.

Genus *Ictinogomphus* Cowley

This genus is found in the eastern region of southern Asia, Australia, and the tropical and subtropical Ethiopia. Specimens of two species of this genus have been collected from Pakistan, both of which are new. These specimens agree with Fraser's description of 1934 of this genus except the following characters: primary antenodal nervures 1st and any of the 6th to 8th; arc situated between 1st and 2nd antenodal nervures, or rarely opposite the 2nd; 6-8 transverse nervures between sectors of arc from arc to the point of bifurcation of Rs in hind wing; a distinct anal loop made up of 4-5 cells present or not defined; anal triangle 5-7 celled; subtrigone in fore wing 2 (rarely 3) celled.

Ictinogomphus alaquopterus sp. nov.
(Figs. 1-5)

Male

Head. Labium greenish-yellow with its anterior margin brownish; labrum, clypeus and frons yellowish-green, the former broadly black on its anterior border, very narrowly on lateral borders, and also with a blackish-brown, narrow basal line; postclypeus with a minute, slightly elongated, black spot on each side of its middle; frons with a transverse black stripe at the lower part of the front rising up rather broadly from the middle almost to the crest to separate two lateral areas and with a broad triangular black basal spot; vertex and vesicle black; occiput greenish-yellow, narrowly bordered with brownish-black and with a fringe of small yellow hair on its hind border; eyes olivaceous.

Prothorax. Black; posterior lobe with a transverse yellow stripe in the middle.

Pterothorax. Black, marked with yellowish-green as follows: mesothoracic collar completely, 2 short and narrower oblique dorsal stripes with their pointed anterior-ends separated from the mesothoracic collar; a humeral stripe represented by an upper minute triangular spot and a lower narrow stripe covering

lower half of humeral suture and slightly broadening on lower end; The tergal spots; sides, except two broad black bands, one at the level of anterolateral suture which is narrowed below spiracle, another on posterolateral suture; spiracle cuts the anterior border of the broad complete mid-lateral yellowish-green stripe, another large yellow spot separated just below the lower end of this stripe; posterior border of metepimeron black separating a small triangular yellow area; metepimeron obliquely furrowed just below hind-wing bases, this furrow with a minute black spot in its middle.

Legs. Black; coxae and trochanters spotted with yellow; hind femur with a short and very fine basal yellow streak on posterior surface and with two rows of spines, those of the outer row closely-set and small near the base, followed by 6 or 7 long and robust gradually shortening towards the distal end.

Wings. Hyaline blackish-brown, limited to extreme bases in inferior costal and cubital spaces in all wings; costa olivaceous up to pterostigma; nodal index $\frac{12-23}{12-16}$ $\frac{22-13}{16-11}$; bridge 7-8 celled; trigone

3-4 celled in fore wing, always 3-celled in hind wing; anal triangle normally 5-celled (very rarely 6); cubital space traversed by 3 nervures (excluding the base of subtrigone) in fore wing, 2 in hind wing; pterostigma black covering 5-6 cells; membrane blackish-brown at base otherwise whitish.

Abdomen. Black, marked with yellow as follows: segment 1 with a broad, dorsal stripe not reaching anterior base, this stripe extends narrowly along apical borders of segment on sides, and ends in a minute rounded black spot near ventral border of segment and continues back with a broad lateral spot on segment 2 which covers but does not extend beyond oreillet; segment 2 with a large triangular dorsal basal marking extending back as a short tongue-like prolongation not reaching apical border; segment 3 yellow in basal half; segments 4-6 marked with yellow-like segment 3 but this marking not reaching down on sides up to ventral borders of segments, and traversed by a short black prolongation at mid-dorsal carina;

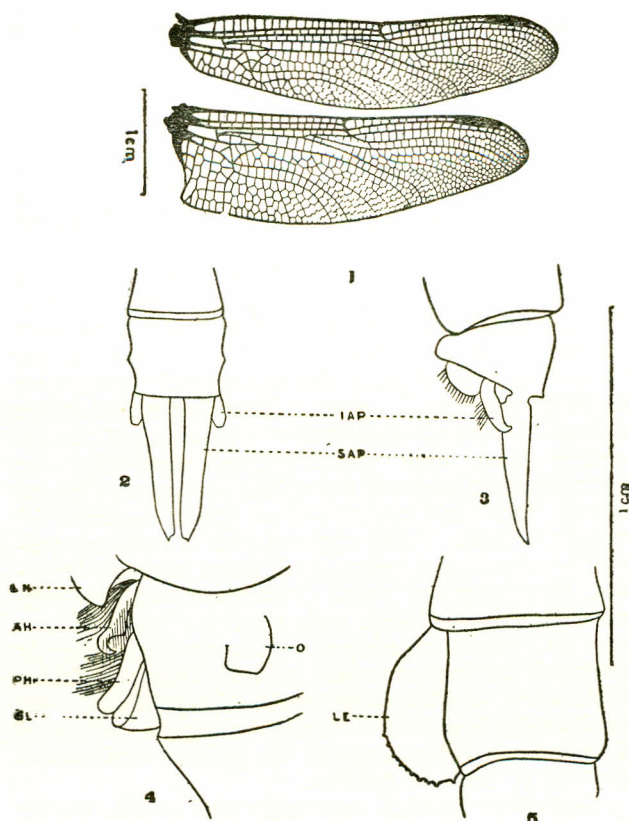


Fig. 1. Fore and hind wings of male *Ictinogomphus alaquopterus* sp. nov.

Fig. 2. Superior and inferior anal appendages of male *Ictinogomphus alaquopterus* sp. nov. Dorsal view.

Fig. 3. Same. lateral view.

Fig. 4. Secondary genitalia of male *Ictinogomphus alaquopterus* sp. nov. Lateral view.

Fig. 5. Lateral expansion of 8th abdominal segment of male *Ictinogomphus alaquopterus* sp. nov. showing spines. Lateral view.

segments 7 and 8 with more than basal halves yellow, with black indenting the yellow on dorsum; large, ventral semicircular expansions of segment 8 black; segment 9 with two broad, basal lateral spots, broadly separated on dorsum by black and two small apical lateral spots, one on each side; segment 10 with a bow-like stripe of yellow on the dorsum and sides; anal appendages black; superiors very long, almost as long as the last two segments taken together, cylindrical, slightly narrowed at apices, each with an outer minute spine; inferior nearly one-third the length of superiors, very deeply and broadly bifid into diverging processes (if seen in profile).

Genitalia. Lamina very large and tumid, having a basal row of 5 minute spines on either end, its free border greatly depressed and sunk, shallowly and very broadly notched from the middle (if seen from below); anterior hamule robust, strongly hooked; posterior hamule rather long, robust, tongue-like process (if seen in profile); anterior hamule not clearly visible and hidden beneath long, stout yellow hair (lesser

than *I. pugnovittatus* sp. nov.) directed inwards and covering the genital orifice.

Female. Not known.

Measurements of Male. Abdomen 50 mm. Hind wing 39 mm. Pterostigma 5 mm. Superior anal appendages 4 mm.

Holotype. One male collected from Rawal lake (Rawalpindi) on August 11, 1966 and deposited in the Entomological Museum, University of Agriculture, Lyallpur.

This species closely resembles *I. rapax* from which it can be separated very easily by the following characters: anal loop in hind wings not defined; a third complete mediolateral broad yellow stripe is present on the mediolateral broad black band instead of 1-3 yellow spots on pterothorax in *I. rapax*; labrum without a median black basal prolongation; segment 7 yellow with a broad apical black ring.

Ictinogomphus pugnovittatus sp. nov.

(Figs. 6-10)

Male

Head. Labium pale greenish-yellow, with the anterior margin brown; mandibles red with greenish-yellow bases and reddish-brown inner borders; labrum, clypeus and frons pale greenish-yellow, the former with its anterior border very broadly black, its base with a very narrow brownish stripe; postclypeus with two minute submedial obsolete brownish spots; a narrow blackish-brown stripe on transverse sulcus between frons and clypeus; frons with a broad, basal, triangular brownish-black marking; vertex and vesicle entirely black; occiput greenish-yellow, narrowly bordered with blackish-brown, its hind border with a fringe of short brown hair; back of eyes black, yellowish-brown above, blackish-brown on sides.

Prothorax. Anterior and middle lobes blackish-brown, the latter with lateral ends broadly yellow; posterior lobe yellow with its hind border broadly brownish-black.

Pterothorax. Brownish-black, marked with greenish-yellow as follows: A complete mesothoracic collar, a broad dorsal oblique stripe on either side with its base on the antealar sinus, pointed below and very slightly separated from the mesothoracic collar; broad humeral stripe, slightly penetrated by the brownish-black band on humeral suture near its upper end which is knobbed near antealar sinus, the latter with a large elongated central spot, giving back two short lateral arms from its posterior end, and sending a very fine line to mid-dorsal thoracic carina from its anterior end; the tergum spotted with yellow; sides greenish-yellow, with brownish-black broader stripes, one on anterolateral suture, and the other on posterolateral suture; this latter gives out an anterior, curved, very narrow line below the spiracle from near its lower end which separates below a broad yellow area.

Legs. Black; coxae and trochanters greenish yellow; outer and posterior surfaces of all femora reddish-brown and this colour not reaching quite up to distal ends; inner surface of anterior femora broadly yellowish-green; a fine reddish-brown obs-

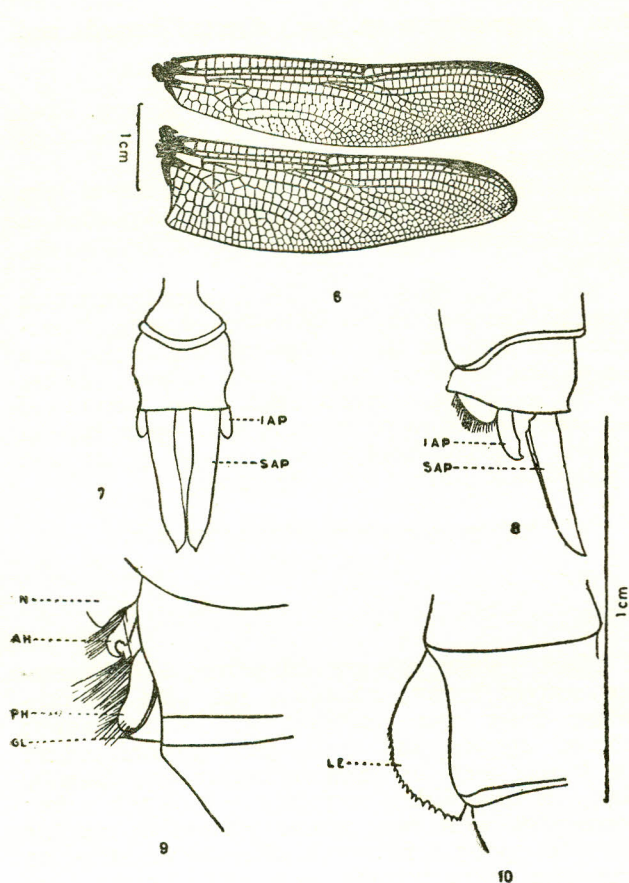


Fig. 6. Fore and hind wings of male *Ictinogomphus pugnovittatus* sp. nov.

Fig. 7. Superior and inferior anal appendages of male *Ictinogomphus pugnovittatus* sp. nov. Dorsal view.

Fig. 8. Same. Lateral view.

Fig. 9. Secondary genitalia of male *Ictinogomphus pugnovittatus* sp. nov. Lateral view.

Fig. 10. Lateral expansion of 8th abdominal segment of male *Ictinogomphus pugnovittatus* sp. nov. showing spines. Lateral view.

AH, anterior hamule; GL, genital lobe; IAP, inferior anal appendage; LE, lateral expansion; LN, lamina; O, oreillet; PH, posterior hamule; and SAP superior anal appendage.

cure line on the outer sides of tibiae; hind femur with an outer and inner row of short, stout, closely-set spines at base, then 4-5 very long and robust widely-spaced spines, again shorter ones near distal end.

Wings. Hyaline, a yellowish-brown basal marking extending as far as 1st antenodal nerve, 1st cubital nerve in all wings, and in addition 1-2 basal postanal cells in fore wing and 2-3 of the anal triangle along the membrane in hind wing; extreme apices frosted with milk-white colour; costa olivaceous up to pterostigma; anal triangle with 6-7 cells in 2 rows; arc very slightly proximal to 2nd antenodal nerve or opposite to it; hypertrigones and trigones 3-celled; subtrigone in fore wing 2-3 celled, in hind wing entire; cubital nervures 3 in fore wing, 2 in hind wing; nodal in-

	12-20	23-12	
dex	-----	-----	;bridge 7-8 celled; pterostigma
	13-15	17-13	

black reddish-brown, covering 5-6 cells; membrane with basal half blackish-brown, apical half white.

Abdomen. Compressed, brownish-black, marked with yellow as follows: segments 1 and 2 with sides very broadly yellowish, the former with basal half on dorsum, the latter not reaching back to apical border; segments 3-6 with basal halves and this colour not extending to ventral borders on sides except on segment 3; segment 7 yellow with a diffused basal and a very narrow apical ring, these rings giving some black colouration on sides; segment 8 yellow with a fine apical stripe of blackish-brown; semicircular expansions of ventral borders black with well-developed stout denticles along borders; segment 9 blackish-brown with lateral narrow basal and apical yellow spots; segment 10 entirely yellow. Anal appendages: Superiors yellowish-white, their apices and bases slightly brownish, very long and stout, double the length of segment 10, subcylindrical, with a narrow space in between and almost meeting at apices, the latter slightly narrowed having an outer minute spine; inferior black, about one-third the length of superiors, deeply and broadly bifid into diverging triangular processes (if seen from below), apices are pointed and turned upwards (if seen in profile).

Genitalia. Lamina very large and tumid, having a basal row of 3 minute spines on either end, its free border greatly depressed and sunk, and broadly and deeply notched from the middle (if seen from below); anterior hamule short robust, strongly hooked; posterior hamule short and broad tongue-like process (if seen in profile); all the parts not clearly visible, and hidden beneath long, stout, yellow hair directed inwards and covering the genital orifice; genital lobe short, funnel-shaped.

Female. Not known.

Measurements of Male. Abdomen 51 mm. Hind wing 40 mm. Pterostigma 5.50 mm. Superior anal appendages 3.75 mm.

Holotype. One male collected from Balloki Head (Sheikhupura) on July 23, 1966 and deposited in the Entomological Museum, University of Agriculture, Layllpur.

This species runs very close to *I. angulosus* from which it can be separated very easily by the following characters: labrum yellow with its anterior border and heavily black; vertex black; an additional broad yellow humeral strips parallel to the broad dorsal oblique stripe is present on each side, this humeral stripe narrows near its upper end and then becomes abruptly knobbed, the knob rests on the border of the antearlar sinus; triangle 6-7 celled; the large leaf-like expansions on segment 8 with numerous stout denticles on free borders; abdominal markings differ very greatly from *I. angulosus*, especially segment 10 which is entirely yellow; anal appendages are yellowish-white and double the length of segment 10.

Genus *Gomphidia* Selys

This genus is found in oriental region to east Asia and tropical continental Africa. Following amendments in Fraser's description of 1934 of this genus are suggested on the basis of characters of male from Pakistan: primary antenodal nervures the 1st and any of 5th-7th; position of the arc variable, between 1st and 2nd or 2nd and 3rd antenodal nervures or opposite the 2nd.

***Gomphidia t-nigrum* Selys**

A single male of this species from Pakistan agrees with Fraser's description of 1934 except the following:

Male. Pterothorax with two minute rounded greenish-yellow spots just outer to bases of oblique dorsal stripes on either side. Legs according to Fraser's description, but posterior side of extreme distal ends of femora marked with yellow and with a narrow streak of yellow colour not reaching distal end; fore femora with flexor surface very broadly greenish-yellow, this colour not reaching distal end. Wings

hyaline with a yellow colouration at the extreme bases in cubital spaces; membrane dirty white. Abdominal segments 3-7 with basal half yellow; from posterior half of segment 7-9 with slight black colour diffusely spread, each of these segments with a large distinct lateral black marking on either side along ventral borders; segment 10 yellow on dorsum, this colour extending diffusely on sides; anal appendages brownish black.

Measurements of Male. Abdomen 53 mm. Hind wing 39 mm. Anal appendages, superior 3.50 mm, inferior 1.50 mm. Pterostigma 4.75-5 mm.

Distribution. Lahore 1, May 10, 1964; Rawalpindi 2, June 7, 1963; Peshawar 1, June 2, 1964.

New Record. Peshawar.

Type. From northern India (locality unknown) is in the Selys collection.¹

Reference

1. F.C. Fraser, *Fauna of British India* (Taylor and Francis, London, 1934), vol. II.