

Catfishes of the genus *Glyptothorax* Blyth (Pisces: Sisoridae) from Pakistan

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ABSTRACT

Sisorid catfish genus *Glyptothorax* Blyth is represented in Pakistan by six species, viz., *Glyptothorax sufii* Bashir & Mirza, *Glyptothorax cavia* (Hamilton), *Glyptothorax pectinopterus* (McClelland), *Glyptothorax stocki* Mirza & Nijssen, *Glyptothorax kashmirensis* Hora, *Glyptothorax punjabensis* Mirza & Kashmiri. These are recorded from different foot hill streams and adjoining plains. After detailed analysis *G. naziri* is found to be a synonym of *G. kashmirensis* Hora; *G. telchitta sufii* Bashir and Mirza has been validated as full species *G. sufii*. Presently recognized species are easily identifiable on the basis of general body shape, sucker shape, length of barbels, fin structure, number of serrations on dorsal and pectoral spines and number of gill rakers.

Keywords: Sisoridae, *Glyptothorax*, Catfishes, Pakistan

INTRODUCTION

The fishes of the genus *Glyptothorax* Blyth are of great importance from the ecological and evolutionary point of view because they show great adaptations for rapidly flowing streams.

Day (1877 and 1889) recorded two species viz., *Glyptothorax telchitta* (Hamilton) and *G. pectinopterus* (McClelland) from Punjab and Sind. Hora (1923) and Menon (1954) excluded the areas of Pakistan from the range of *G. pectinopterus*. Hora & Menon (1948) and Menon (1954) considered the occurrence of *G. telchitta* in Punjab doubtful.

Sufi (1957) recorded two species *G. cavia* (Hamilton) and *G. telchitta* (Hamilton) from Peshawar and Hyderabad divisions respectively. In 1963 he reported three species from Pakistan (then West Pakistan) adding *G. platypogonoides* (Bleeker) from Peshawar in the list. Ahmad (1963) recorded same three species from Pakistan.

A new species *G. naziri* was described by Mirza & Naik (1969) from the river Zhob, Baluchistan. Later on it was collected from the river Kurram by Mirza *et al.* (1993). Mirza (1970) reported *G. conirostris* (Steindachner) from the Punjab. It was subsequently recognized as a new subspecies viz., *G. conirostris punjabensis* by Mirza & Kashmiri (1971) on the basis of mainly shorter head, longer nasal barbels, broader thoracic adhesive apparatus, shorter pectoral fins and fewer serrations on pectoral spine. Mirza & Hameed (1974) elevated it to the full species rank as *G. punjabensis*. They elaborated many inter populational variations in *Glyptothorax naziri*, like shape of thoracic sucker, body depth, shape

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of pectoral fin, length of barbels and colour pattern. They described seven species of *Glyptothorax* Blyth from Pakistan namely,

Glyptothorax cavia (Hamilton)

Glyptothorax kashmirensis Hora

Glyptothorax naziri Mirza & Naik

Glyptothorax pectinopterus (McClelland)

Glyptothorax platypogonoides (Bleeker)

Glyptothorax punjabensis Mirza & Kashmiri

Glyptothorax telchitta (Hamilton)

Mirza & Nijssen (1978) pointed out that the record of *Glyptothorax platypogonoides* (Bleeker) from Pakistan was based on wrong identification and described it as *G. stocki*.

Bashir & Mirza (1975) described a new subspecies, *G. telchitta sufii* from Sutlej river, near Lahore and differentiated it from *G. telchitta* s. st. on the basis of mainly having longer snout, longer outer mandibular barbels and narrow caudal peduncle. It was treated as full species by some authors like Mirza (1990), Rafique (2000), Thomas & Page (2006) and Jayaram 2010, but maintained as subspecies by Mirza (2003). *G. pectinopterus* was recorded by Mirza and Waheed ud Din (1976) from Mandher nullah, a tributary of Punch river. Later, Butt (2006) recorded *G. pectinopterus* from the river Kunhar.

Rashida *et al.* (1996) discussed the sucker shape and serrations on dorsal and pectoral spines of *G. naziri*, *G. kashmirensis* and *G. punjabensis*. Kullander *et al.* (1999), suggested that it is the synonym of *G. kashmirensis*. Jayaram (2010) and Eschmeyer (2013) described seven valid species of this genus from Pakistan. The taxonomic status of various species of the genus *Glyptothorax* Blyth is reviewed in this report because of the fact that certain features like colour, size and certain other morphological characters vary with age, locality and even after preservation. Moreover there was much overlapping in morphological aspects of *G. naziri* and *G. kashmirensis*. So there was a need to confirm the taxonomic status of various species of the genus *Glyptothorax* found in Pakistan.

MATERIALS AND METHODS

The present report is based mainly upon the collections from the river Chenab, Zhob, Indus, Jhelum, Kurram, Haro, Punch and Kunhar etc. and material in Natural History Museum, Department of Zoology, Govt. College University Lahore, was also examined. Measurements were made with vernier calipers with accuracy of 0.05 mm (1/20th mm). Minute features like fin rays and pleats of suckers were observed under magnifying glass (2X and 4X) and Kyowa (Tokyo) binocular dissecting microscope (20 X). Pattern of collection, preservation and measurements mostly followed Ng (2005) and Jayaram (2010).

SYSTEMATIC ACCOUNT

Genus *Glyptothorax* Blyth

Sisorid catfishes of the genus *Glyptothorax* Blyth mainly inhabit foot hill rivers and swift running mountain streams. They are benthic; a prominent thoracic sucker as an adaptive structure, is formed by longitudinal muscular skin folds or pleats sometimes with a depression in the centre. Body laterally

compressed; head depressed; eyes small, directed upwards, covered with a skin membrane. Mouth inferior, transverse and narrow; lips thick, fleshy and papillated. Barbels four pairs; maxillary barbels are the longest, with broad skin at the base. Last simple ray of dorsal fin forms a spine; posterior margin of the spine variably denticulated. Pectoral fin with a strong spine having sharp serrations along its internal margin. Caudal fin deeply forked.

Key to species:

- 1a: Nasal barbels not reaching the eye2
 b: Nasal barbels reaching the eye3
 2a: Maxillary barbels reaching origin of pectoral fin, gill rakers 4..... *G. cavia*
 b: Maxillary barbels not reaching origin of pectoral fin, gill rakers 7 *G. suffii*
 3a: Outer rays of paired fins ventrally plaited..... *G. pectinopterus*
 b: Outer rays of paired fins not plaited ventrally4
 4a: Thoracic adhesive apparatus V shaped, broader than long, extending on to throat anteriorly *G. punjabensis*
 b: Thoracic adhesive apparatus longer than broad, not extending on to throat anteriorly, depression not V shaped..... 5
 5a: Sucker more or less oval in shape with almost slit like depression ... *G. stocki*
 b: Sucker not oval, with rounded or U shaped depression in the centre *G. kashmirensis*

***Glyptothorax cavia* (Hamilton)**

Pimelodus cavia Hamilton, 1822.

Euglyptosternum lineatum Day, 1877.

Glyptothorax lineatus, Hora, 1923.

Glyptothorax cavia Hora & Menon, 1948

Fin formula: D. I,6; P. I, 10; V. I,5; A.III, 10; C. 17; G.r. 4

A medium sized fish with dorsal profile rising from the tip of snout to the origin of dorsal fin beyond which it tapers towards caudal base. Very small, rounded tubercles present on head region and in the vicinity of pectoral base up to sucker. Occipital process and basal bone of dorsal are widely separate. Body depth maximum at the origin of dorsal fin and is 18.4 – 19.8 (m: 19.1) % of SL; body is broadest just behind the operculum; its breadth 19.9 - 21.98 (m: 20.9) % of SL.

Head long and depressed, flat on ventral side, broader than high; its length 27.2 – 31.45 (m: 29.33) %, height 16.8 – 17.34 (m: 17.07) % and breadth 21.6 – 25.81 (m: 23.7) % of SL. Snout is rounded, broad and depressed; its length 12.8 – 14.32 (m: 13.56) % of SL, 45.51 - 47 (m: 46.26) % of HL and 76.2 – 82.56 (m: 79.38) % of head height. Nostrils of a side are close together and nearer to the tip of snout than to eye. Mouth inferior and wide, transverse and crescentic; cleft of mouth shallow and present close to the tip of snout; upper jaw slightly longer than lower jaw; lips are thick and papillated. Eyes small, rounded, subcutaneous, dorsally located, nearer to the posterior margin of operculum than to the tip of snout, smaller than the interorbital width; its diameter 1.6 – 1.7 (m: 1.65) % of SL, 5.8 – 6.1 (m: 5.95) % of HL, 26.7 – 27.0 (m: 26.85) % of interorbital width and 12.5 – 13.0 (m: 12.75) % of snout length; interorbital width smaller than snout length and is 6 – 7.66 (m: 6.83) % of SL.

Barbels four pairs, nasal not reaching the eye, smaller than outer mandibular and longer than inner mandibular; its length 5.65 - 7.2 (m: 6.42) % of SL. Maxillary longest of all, broader at the base due to the presence of a skin flap, reaching up to the origin of pectoral spine; its length 18.95 - 20.8 (m: 19.88) % of SL. Inner mandibular arising just behind the anterior edges of lower jaw; its length 4.03 - 6 (m: 5.02) % of SL. Outer mandibular longer than inner one and originating slightly behind it; its length 11.2 – 12.10 (m: 11.65) % of SL.

Origin of rayed dorsal before pelvic origin, nearer to the tip of snout than to caudal base. Predorsal distance 34.8 – 41.53 (m: 38.17) % of SL. Dorsal spine strong with 8 small blunt serrations. Adipose dorsal long and low; its origin nearer to the base of caudal than to the posterior end of rayed dorsal almost opposite to anal fin; its length greater than the base of dorsal and is 15.2 – 17.74 (m: 16.47) % of SL; inter dorsal space 24.0 – 24.4 (m: 24.2) % of SL. Pectoral spine longer and stronger than dorsal spine; 8 serrations along its posterior margin which are sharp, elongated and pointed. Pelvic originating slightly behind the origin of last ray of dorsal fin, reaching beyond the genital opening; prepelvic distance 49.6 - 56.0 (m: 52.8) % of SL. Anal nonconfluent with caudal; its base smaller than adipose dorsal but longer than pelvic and pectoral. Caudal deeply forked, lower lobe is slightly longer than the upper one; first complete caudal ray longer and curved inward.

Caudal peduncle strong and muscular; its length 15.32 - 18.4 (m: 16.86) % of SL; its least height 6.4 - 7.06 (m: 6.73)% of SL and 34.8 - 46.05 (m: 39.05) % of its length.

Sucker oval, forming 3/4th of a circle, slightly longer than broad. Small rounded clear depression is present in the centre; ridges or pleats are not very thick and diffuse gently towards inner and outer margins; its length 11.11 - 11.16 (m: 11.14) % and breadth 8.73 – 8.77 (m: 8.75) % of SL.

Very small, sharp and pointed cardiform teeth are present on two differently shaped bands, upper is semicircular and broader extending up to the palate which is a distinguishing character of this fish. Lower band is crescent shaped and is divided into two pieces.

Colour of dorsal side is greyish black, lateral side is light grey and ventral side is pale white.

Localities: Khatki & Abazai (KPK), Kalabagh, Chashma, Jhelum, Bajwat, Shadiwal, Qadirabad & D. G. Khan (Punjab).

Distribution: Pakistan: Punjab, KPK, Azad Kashmir; India: Eastern Himalayas, Assam; Nepal; Bangladesh & Myanmar.

Fishery Value: It grows to a relatively larger size and has a reasonable food value. A specimen from Chashma is 305 mm long (TL)

***Glyptothorax kashmirensis* Hora**

Glyptothorax kashmirensis Hora, 1923.

Glyptothorax naziri Mirza & Naik, 1969., Mirza & Hameed, 1974

Fin Formula: D. I,6; P. I, 8-9; V. I,5; A.III, 7-8; C. 17

Small to medium sized fish. We have 31.75 mm to 145.0 mm long specimens from different localities of Pakistan including Kurram, Zhob, Haro and Indus rivers. Body elongate; dorsal profile rising from the tip of snout to the commencement of dorsal fin and then becoming gradually straight. Ventral profile

almost straight; head depressed, slightly longer than broad. Occipital process very close but not fused to the basal bone of dorsal fin. Mouth inferior, lips papillated; barbels four pairs, maxillary being the longest, extends posteriorly beyond the pectoral fin base. Adhesive apparatus present in the thorax is well developed, longer than broad and with a rounded or oval central pit. Sucker horse shoe shaped in smaller specimens but gets more prominent and elongated in larger specimens. Caudal fin deeply forked. Skin rough due to large number of tubercles.

Body depth maximum at the origin of dorsal fin; its depth greater than breadth, body depth 20.5 – 25.2 (m: 23.01) % of SL. Body breadth maximum just behind the operculum. Head long and depressed, flat on the ventral side, broader than high; its length 24 – 30 (m: 27.02) %, height 14.5 – 17.5 (m: 15.8) % and breadth 18 – 25 (m: 21.2) % of SL.

Snout rounded, broad and depressed, its length 12.9 – 15.6 (m: 13.8) % of SL, 46.6 – 53.8 (m: 50.1) % of HL and 80.2 – 95 (m: 91.4) % of head height. Nostrils of a side close to each other and nearer to the tip of snout than to eyes. Mouth inferior, wide and crescent shaped; upper jaw slightly longer than the lower jaw; lips papillated

Eyes very small, rounded in shape, subcutaneous; located on the dorsal side in the posterior half of the head, smaller than the interorbital width; its diameter 1.8 – 2.9 (m: 2.2) % of SL, 6.6 – 9.8 (m: 8.02) % of HL, 31.1 – 42.8 (m: 37.8) % of interorbital width and 14.2 – 20.3 (m: 16.8) % of snout length. Interorbital width smaller than snout length and is 6.3 – 8.1 (m: 7.06) % of SL.

Barbels four pair, nasal smaller than outer mandibular and longer than inner mandibular, reaching beyond the posterior margin of eye, its length 11.8 – 14 (m: 12.9) % of SL. Maxillary longest of all, reaching beyond the pectoral base, its length 32.2 – 42.5 (m: 37.0) % of SL. Inner mandibular originating just behind the edge of lower jaw, its length 11.1 – 15 (m: 13.2) % of SL. Outer mandibular longer than and originating slightly behind the inner one, its length 17.7 – 23.1 (m: 20.5) % of SL.

Origin of rayed dorsal before pelvic origin, nearer to the tip of snout than to the caudal base, predorsal distance 35.1 – 39.7 (m: 37.1) % of SL; its base 11.7 – 15.4 (m: 13.6) % of SL. Last simple ray forms a spine having 4 – 7 serrations along its posterior edge. Serrations are prominent, sharp and pointed in smaller specimens but smaller and blunt in larger specimens. Adipose dorsal long and low; its origin almost opposite to the anal origin; nearer to the base of caudal fin than to the posterior end of rayed dorsal; its length greater than the base of rayed dorsal and is 16.6 – 21.4 (m: 19.6) % of SL. Length of space between rayed and adipose dorsal 11.1 – 17.0 (m: 13.2) % of SL.

Pectoral spine longer and stronger than dorsal spine; 10 – 13 serrations along its posterior margin are sharp and pointed. Pelvic origin almost in the middle of SL, slightly behind the last ray of dorsal fin reaching beyond the genital opening; prepelvic distance 49 – 53.7 (m: 51.31) % of SL.

Anal fin nonconfluent with caudal; its base smaller than the base of adipose dorsal but longer than the base of pelvic and pectoral. Caudal deeply forked, its lower lobe slightly longer than upper one.

Caudal peduncle strong and muscular; its length 17.2 – 20.9 (m: 19.4) % of SL; its least height 48 – 58 (m: 50.8) % of its length and 8.5 – 11.2 (m: 9.8) % of SL.

Sucker longer than broad, its shape changes slightly with the age; in smaller specimens it is horse shoe shaped but as the fish grows it gradually changes shape and becomes elongated with a rounded, oval or U shaped clear area in the centre. Ridges grow from centre to periphery. Length of sucker 14 – 15.6 (m: 14.6) % of SL; its breadth 12.5 – 13.7 (m: 13.2) % of SL.

A large number of very small cardiform teeth are present on jaws in the form of crescent shaped bands, upper band is in one piece and lower is divided into two. Colour dark brown or greyish on the dorsal and lateral sides lighter beneath, light yellow on the base of fins.

Localities: Neelam river (Azad Kashmir), Kurram river (KPK), Zhob river (Baluchistan), Haro and Chenab river (Punjab).

Distribution: Pakistan: Indus river system; India: Kashmir, Himachal Pradesh.

Fishery Value: It has minor fishery value because it does not grow to a large size. The longest specimen from Kashmir is 149 mm long and from Kurram is 141mm long.

***Glyptothorax pectinopterus* (McClelland)**

Glyptosternon pectinopterus McClelland, 1942.

Glyptothorax pectinopterus Hora, 1923.

Fin formula: D. I,6; P. I, 8; V. I,5; A.II, 6; C. 17.

A small sized fish with greatly depressed head and compressed posterior part especially behind the dorsal fin origin. Dorsal profile rises from the tip of snout to the origin of dorsal fin beyond which it slopes down towards caudal base. Very small, rounded tubercles present on head region and in the vicinity of pectoral base up to sucker. Occipital process and basal bone of dorsal are separate. Body depth maximum at the origin of dorsal fin and is 18.31 – 18.87 (m: 18.59) % of SL; body is broadest just behind the operculum; its breadth 16.9 - 20.76 (m: 18.83) % Of SL.

Head long and depressed, flat on ventral side, broader than high; its length 22.64 - 23.94 (m: 23.29) %, height 12.33 – 14.15 (m: 13.24) % and breadth 20.76 - 21.13 (m: 20.94) % of SL. Snout is rounded and broad when viewed dorsally; greatly depressed when viewed laterally; its length 11.27 – 13.21 (m: 12.24) % of SL and 47.06 – 58.33 (m: 52.7) % of HL. Nostrils of a side are close together and nearer to the tip of snout than to eye. Mouth inferior and wide, transverse and crescent; cleft of mouth shallow and present close to the tip of snout; upper jaw slightly longer than lower jaw; lips are thick and papillated. Eyes small, rounded, subcutaneous, dorsally located, nearer to the posterior margin of operculum than to the tip of snout, smaller than the interorbital width; its diameter 2.81 – 3.77 (m: 3.29) % of SL and 11.77 – 16.67 (m: 14.22) % of HL. Interorbital width smaller than snout length and is 8.45 – 8.49 (m: 8.47) % of SL and 35.29 – 37.5 (36.40) % of HL.

Barbels four pairs, nasal reaching the eye, smaller than outer mandibular and longer than inner mandibular; its length 5.66 – 6.34 (m: 6.00) % of SL and 25.00 – 26.47 (m: 25.74) % of HL. Maxillary longest of all, broader at the base due to the presence of a skin flap, reaching up to the 1/3rd of the pectoral spine,

almost equal to head length; its length 22.54 - 26.42 (m: 24.48) % of SL. Inner mandibular arising just behind the anterior edges of lower jaw; its length 7.75 – 8.49 (m: 8.12) % of SL and 32.35 – 37.5 (m: 34.9) % of HL. Outer mandibular longer than inner one and originating slightly behind it, reaching to the origin of pectoral fin; its length 11.97 – 13.21 (m: 12.59) % of SL and 50.00 – 58.33 (m: 54.16) % of HL.

Origin of rayed dorsal before pelvic origin, nearer to the tip of snout than to caudal base. Predorsal distance 30.99 – 35.85 (m: 36.40) % of SL. Dorsal spine strong without serrations. Adipose dorsal long and low; its origin nearer to the base of caudal than to the posterior end of rayed dorsal, almost opposite to anal fin; its length greater than the base of dorsal and is 19.72 – 21.7 (m: 20.71) % of SL; inter dorsal space 24.37 – 26.42 (m: 25.39) % of SL. Paired fins have ventrally plaited first ray which extends on the first branched ray of pelvic. Pectoral spine longer and stronger than dorsal spine; 9 serrations along its posterior margin which are sharp, elongated and pointed. Pelvic originating slightly behind the origin of last ray of dorsal fin, reaching beyond the genital opening; prepelvic distance 46.48 - 49.06 (m: 47.77) % of SL. Anal nonconfluent with caudal; its base smaller than adipose dorsal but longer than pelvic and pectoral. Caudal deeply forked, both the lobes almost equal; its length almost equal to the pelvic.

Caudal peduncle strong and muscular; its length 19.51 - 19.25 (m: 19.38) % of SL; its least height 9.43 - 9.86 (m: 9.65) % of SL and 50.54 - 49.02 (m: 49.78) % of its length.

Sucker longer than broad, somewhat oval depression is present in the centre; its length 6.6 - 7.18 (m: 6.89) % and breadth 9.65 – 10.19 (m: 10.02) % of SL.

Very small, sharp and pointed cardiform teeth are present on two differently shaped bands, upper is semicircular and lower is crescent shaped is divided into two pieces.

Colour of dorsal side is greyish black, lateral side is light grey and ventral side is pale white.

Localities: Azad Kashmir: Mandher Nullah, a tributary of Punch River, Jhelum River (Mirza *et al.*, 1997) Pakistan: Kunhar River near Balakot (KPK).

Distribution: Pakistan: KPK, Azad Kashmir; India: Kashmir, East Punjab & UP; Nepal

Fishery Value: It seems to have no fishery value because it remains small sized. We have a maximum of 86 mm (TL) long specimen. Talwar & Jhingran (1991) has reported a maximum length of 178 mm (SL).

***Glyptothorax punjabensis* Mirza & Kashmiri**

Glyptothorax conirostris (non Steindachner) Mirza 1970.

Glyptothorax conirostris punjabensis Mirza & Kashmiri, 1971.

Glyptothorax punjabensis Mirza & Hameed, 1974., Jayaram, 1979.

Fin formula: D. I,6; P. I, 8; V. I,5; A.I, 8; C. 17; G.r. 9 – 11

A medium sized fish with dorsal profile rising from tip of snout to the origin of dorsal fin, beyond which it tapers towards caudal base, almost straight in males and slightly convex in females. Scattered tubercles on head region large and rounded on the snout, operculum has long and more elongated on adipose

fin. Occipital process and basal bone of dorsal are not opposed to each other. Body depth maximum at the origin of dorsal fin; 15.15 - 23.6 (m: 18.57) % of SL, body breadth maximum at the level of operculum.

Head long and depressed, flat on the ventral side; its length 27.5 – 30.5 (m: 28.4) % of SL; its height 12.3 – 18.5 (m: 14.18) % of SL; its width greater than height and is 18.18 – 22.2 (m: 19.2) % of SL. Snout rounded, broad and depressed; its length 13.8 – 15.7 (m: 14.5) % of SL, 50 – 53 (m: 51.14) % of HL and 113 – 120 (m: 115) % of head height. Nostrils of a side are close together and nearer to the tip of snout than to the eye.

Mouth wide and crescentic in shape; cleft of mouth shallow, present close to the tip of snout; upper jaw slightly longer than lower jaw; lips are thick and papillated. Eyes very small, rounded, subcutaneous, located dorsally, in the posterior half of head; its diameter smaller than the interorbital width; 1.4 – 2.2 (m: 1.86) % of SL, 5.1 – 8.1 (m: 6.3) % of HL, 22.2 – 37.5 (m: 31.6) % of interorbital width and 10.0 – 15.7 (m: 13.04) % of snout length. Interorbital width smaller than snout length; 6.0 – 6.4 (m: 6.24) % of SL.

Barbels four pairs, nasal reaching beyond the posterior margin of eye; its length 10.9 – 12.9 (m: 12.2) % of SL. Maxillary longest of all, broader at the base, reaching up to 3/4th or the end of the pectoral spine; its length 26.8 – 32.4 (m: 30.0) % of SL. Inner mandibular originating just behind the anterior edge of lower jaw; its length 9.1 – 10.9 (m: 10.16) % of SL. Outer mandibular longer than inner one, originating slightly behind it; its length 18 – 22.2 (m: 19.3) % of SL.

Origin of rayed dorsal before the pelvic origin, nearer to the tip of snout than to the caudal base. Predorsal distance 36 – 40.9 (m: 37.6) % of SL; its base 10.6 – 12.9 (m: 12.2) % of SL. Spine of dorsal fin poorly serrated, having 1 to 2 serrations along its posterior margin. Adipose dorsal long and low; its origin nearer to the base of caudal than to the posterior end of dorsal fin and opposite to anal fin; its length greater than the base of rayed dorsal; 17.5 – 19.0 (m: 18.6) % of SL. Space between rayed and adipose dorsal 14.4 – 18.18 (m: 16.03) % of SL. Pectoral spine longer and stronger than dorsal spine; its posterior margin has 8 – 10 serrations which are more prominent in number and size than the dorsal spine. Pelvic originating slightly behind the origin of rayed dorsal; prepelvic distance 47.4 – 53 (m: 48.91) % of SL. Anal nonconfluent with caudal, longer than pelvic. Caudal deeply forked, lower lobe slightly longer than upper lobe.

Caudal peduncle strong and muscular; its length 20.4 – 23.3 (m: 21.9) % of SL; its least height 8.3 – 9.2 (m: 8.36) % of SL and 36 – 42 (m: 38.2) % of its own length.

Sucker extends up to the chin in the form of series of longitudinal pleats of skin. Its thoracic part is broader than long; ridges run anteroposteriorly giving it V – shape; its length 11.3 – 11.4 (m: 11.34) % and breadth 12.5 – 13.6 (m: 13.13) % of SL. A large number of very small cardiform teeth are present on jaws in the form of crescent shaped bands; upper band is in one piece and lower is divided into two.

Colour is variable. Dorsal and lateral sides are from grey through dark and light brown to yellowish brown; ventral side is light pale.

Localities: Lahore - Bhed nullah; Rawalpindi - river Soan; Shadiwal - Upper Jhelum canal; Barotha - river Indus (Punjab); Khatki village - Kabul drainage; the river Siran near Ghazi (KPK); Kotli (Azad Kashmir).

Distribution: Pakistan: Punjab, Baluchistan, KPK, Azad Kashmir.

Fishery value: It may grow up to 300mm and has some food value for the local inhabitants.

***Glyptothorax stocki* Mirza & Nijssen**

Glyptothorax platypogonoides (non Bleeker, 1855), Sufi, 1963.

Glyptothorax stocki Mirza & Nijssen, 1978.

Fin formula: D. I,6; P. I, 9; V. I,5; A.III, 9 - 10; C. 17; G.r. 7 - 9

A medium sized fish with dorsal profile rising from the tip of snout to the origin of dorsal fin beyond which it tapers towards caudal base; almost straight in males and slightly convex in females. Body is covered with minute tubercles all over; long tubercles are present between nasal openings, interorbital portion and occipital process; rounded tubercles are present in all other parts, a combination of long and short tubercles on adipose dorsal. Occipital process and basal bone of dorsal are separate.

Body depth maximum at the origin of dorsal fin and is 18.18 - 22.9 (m: 20.7) % of SL. Body breadth is maximum just behind the posterior edge of operculum.

Head long and depressed, wider than high, flat on ventral side; its length 23.8 - 26.4 (m: 22.55) % , height 11.3 - 16 (m: 14.4) % and width 24.4 - 21.6 (m: 20.9) % of SL. Snout rounded broad and depressed; its length 11.3 - 13.6 (m: 12.7) %, of SL, 47.6 - 52.1 (m: 49.6) % of HL and 88.4 - 91.6 (m: 90) % of head height. Mouth inferior and wide, transverse and crescentic; cleft of mouth shallow and present close to the tip of snout; upper jaw slightly longer than lower jaw; lips are thick and papillated. Eyes small, rounded, subcutaneous, dorsally placed, in the posterior half of the head, smaller than the interorbital width; its diameter 2.8 - 3.4 (m: 3.15) % of SL, 11.3 - 13.6 (m: 12.16) % of HL, 50 - 54.5 (m: 52.25) % of interorbital width and 11.6 - 13 (m: 12.3) % of snout length. Interorbital width smaller than snout length; 5.6 - 6.3 (m: 6.02) % of SL.

Barbels four pairs; nasal smaller than outer mandibular and larger than inner mandibular, reaching beyond the posterior margin of eye; its length 10.2 - 10.8 (m: 10.4) % of SL. Maxillary longest of all barbels and are broader at the base, reaching up to the end or at least 3/4th of pectoral spine; its length 28.4 - 30.6 (m: 29.9) % of SL. Inner mandibular originating just behind the anterior edges of lower jaw; its length 6.8 - 7.2 (m: 6.9) % of SL. Outer mandibular longer than inner one originating slightly behind it; its length 12.6 - 13.66 (m: 13.25) % of SL.

All fins have a white spot close to the base; rayed dorsal has a spade like white spot; its origin is before pelvic origin; it is nearer to the tip of snout than to caudal base. Predorsal distance 34.0 - 37.3 (m: 36.0) % of SL; length of its base 13.2 - 14.9 (m: 14.1) % of SL; spine serrated, number of serrations is 5 - 7. Adipose dorsal long and low; its origin nearer to the base of caudal than to the posterior end of rayed dorsal and opposite to anal fin; its length greater than the base of dorsal and is 13 - 13.8 (m: 13.52) % of SL; inter dorsal space 12.52 - 13.2 (m: 12.7) % of SL. Pectoral spine longer and stronger than dorsal spine; 12 serrations along its posterior margin which are sharp, elongated and pointed. Pelvic originating slightly behind the origin of last ray of dorsal fin, reaching beyond the genital opening; prepelvic distance 46.5 - 50.5 (m: 47.9) % of SL.

Anal nonconfluent with caudal; its base smaller than adipose dorsal but longer than pelvic and pectoral. Caudal deeply forked, lower lobe is slightly longer than the upper one; first complete caudal ray longer and curved inward.

Caudal peduncle strong and muscular; its length 21.5 – 22.8 (m: 22.4) % of SL; its least height 8.4 – 9.1 (8.9) % of SL and 36.8 – 42.1 (m: 40.25) % of its length.

Thoracic adhesive apparatus (Sucker) is oval, slightly longer than broad; its length 13 – 14.4 (m: 13.6) % of SL; its breadth 10.2 – 12 (m: 11.3) % of SL; a longitudinal slit like depression may be present in the central region; most of the ridges and grooves move obliquely but anterior ones are vertical.

Very small, sharp and pointed cardiform teeth are present on crescent shaped bands. Upper band is in one piece and lower is divided into two.

Colour of dorsal side is greyish black, lateral side is light grey and ventral side is pale white.

Localities: Chela Bundi (river Jhelum); Sirka near Attock (river Indus); Haro river near Attock; Qadirabad, Chiniot, Trimmu, Multan (river Chenab), Swat river (KPK).

Distribution: Pakistan: Punjab, KPK; Azad Kashmir.

Fishery Value: It remains small in size and has no food value. The longest specimen we have is 112 mm (TL).

***Glyptothorax sufii* Bashir & Mirza**

Glyptothorax telchitta, Hora & Menon, 1948.

Glyptothorax telchitta sufii Bashir & Mirza, 1975.

Glyptothorax sufii Mirza, 1990.

Fin formula: D. I,6; P. I, 8; V. I,5; A.III, 11; C. 17; G.r. 7

A medium sized fish with a slender, slightly compressed body; dorsal profile rising from the tip of snout to the origin of dorsal fin beyond which it tapers towards caudal base. Ventral profile almost flat or slightly convex at the belly up to the anal base; head somewhat rounded when viewed laterally. Body is extensively tuberculated. Elongated, rod shaped tubercles present all over the body including head, dorsal, lateral sides and adipose dorsal; small rounded tubercles on the ventral surface. Such type of tuberculation is very characteristic of this fish. Occipital process and basal bone of dorsal are not fused to each other.

Body depth maximum at the origin of dorsal fin and is 16.22 – 23.0 (m: 18.09) % and at anus it is 13.33 – 14.25 (m: 13.94) % of SL; body is broadest just behind the operculum.

Head long and depressed, flat on ventral side, somewhat rounded laterally, broader than high; its length 21.23 – 23.33 (m: 22.5) % and breadth 14.62 – 17.88 (m: 16.67) % of SL; its height 14.62 – 15.41 (m: 14.94) % of SL and 62.64 – 69.63 (m: 66.48) % of HL. Snout is rounded, broad and depressed, almost equal or a little less than half the length of head; its length 10.58 – 13.29 (m: 11.85) % of SL and 49.86 – 57.95 (m: 52.60) % of HL. Nostrils of a side are close together and nearer to the tip of snout than to eye. Mouth inferior and wide, transverse and crescentic; cleft of mouth shallow and present close to the tip of snout; upper jaw slightly longer than lower jaw; lips are thick and papillated. Eyes small, rounded, subcutaneous, dorsally located, nearer to the posterior margin of

operculum than to the tip of snout, smaller than the interorbital width; its diameter 2.06 – 2.24 (m: 2.15) % of SL, 8.97 – 10.03 (m: 9.45) % of HL and 15.49 – 19.23 (m: 18.28) % of snout length; interorbital width smaller than snout length and is 26.37 – 48.21 (m: 35.94) % of HL.

Barbels four pairs, nasal not reaching the eye, smaller than outer mandibular and longer than inner mandibular; its length 17.86 – 22.06 (m: 19.96) % of HL and 4.7 – 4.17 (m: 4.44) % of SL. Maxillary longest of all, broader at the base due to the present of a skin flap, not reaching the origin of pectoral fin; its length 35.38 – 46.70 (m: 41.97) % of HL.

Inner mandibular arising just behind the anterior edges of lower jaw; its length 21.15 – 25.22 (m: 23.75) % of HL and 4.94 – 5.71 (m: 5.33) % of SL. Outer mandibular longer than inner one and originating slightly behind it; its length 30.26 – 36.39 (m: 34.03) % of HL.

Origin of rayed dorsal before pelvic origin, nearer to the tip of snout than to caudal base. Predorsal distance 34.61 – 39.10 (m: 36.59) % of SL. Dorsal spine strong having 5 minute serrations, its length 10.83 – 14.10 (m: 12.72) % of SL, base of dorsal fin 10.00 – 10.38 (m: 10.15) % of SL. Adipose dorsal long and low; its origin nearer to the base of caudal than to the posterior end of rayed dorsal, almost opposite to anal fin; adipose fin length 11.88 – 14.36 (m: 12.80) % of SL; length of its base greater than the base of dorsal and is 10.71 – 11.41 (m: 11.14) % of SL; inter dorsal space 23.11 – 24.62 (m: 23.75) % of SL; postadipose distance 23.08 – 23.53 (m: 23.24) % of SL. Pectoral fin length 17.52 – 20.58 (m: 18.74) % of SL; Pectoral spine longer and stronger than dorsal spine; its length 13.08 – 16.92 (m: 15.31) % of SL, 11 serrations along its posterior margin which are sharply pointed and elongated; prepectoral length 17.76 – 20.76 (m: 19.29) % of SL. Pelvic originating slightly behind the origin of last ray of dorsal fin, reaching beyond the genital opening; prepelvic distance 42.58 – 48.40 (m: 45.80) % of SL. Anal nonconfluent with caudal; its base smaller than adipose dorsal but longer than pelvic and pectoral; anal base 15.15 – 22.18 (m: 18.67) % and preanal fin distance 60.40 – 65.88 (m: 62.95) % of SL. Caudal deeply forked, lower lobe is slightly longer than the upper one.

Caudal peduncle strong and muscular; its length 16.67 – 18.41 (m: 17.63) % of SL, its least height 5.78 – 6.18 (m: 6.04) % of SL and 33.55 – 34.67 (m: 34.25) % of its length.

Sucker longer than broad, its length 14.23 – 15.41 (m: 14.86) % and breadth 9.06 – 9.87 (m: 9.37) % of SL; no depression or clear area in the centre. Most pleats start from the base and run almost parallel to the anterior part.

Very small, sharp and pointed cardiform teeth are present on two differently shaped bands, upper is semicircular and lower crescent shaped is divided into two pieces.

Colour of dorsal side is greyish black, lateral side is light grey and ventral side is pale white.

Localities: Trimmu, Qadirabad, D. G. Khan (Punjab), Sind.

Distribution: Pakistan: Indus river and its tributaries in Punjab & Sind; India (East Punjab).

Fishery Value: It is of minor fishery value due to its small size. Maximum size in our collection is 105 mm (TL).

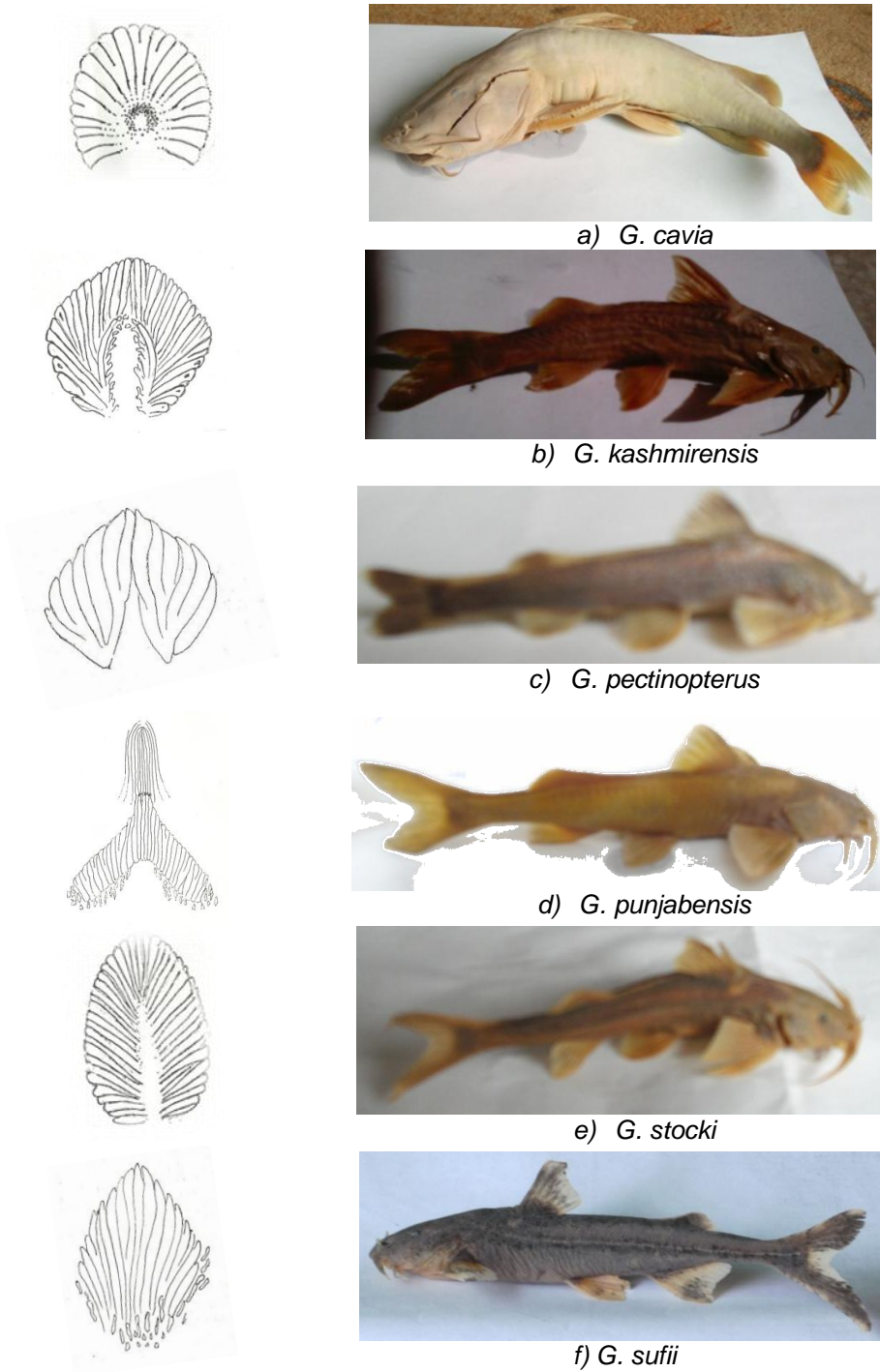


Fig., 1: Lateral view and suckers of different *Glyptothorax* species.

DISCUSSION

Six species of sisorid genus *Glyptothorax* are found to occur in different regions of Pakistan. They are mainly recorded from rapids of foothills but their distribution is extended upto the plains.

G. pectinopterus was previously reported from Kashmir but later recorded also from the river Kunhar in Kaghan Valley by M. Z. Butt (2002). It is the only fish in Pakistan with ventrally plaited pectoral and pelvic fins. *G. cavia* is identifiable on the basis of shorter nasal barbel, not reaching the eye, maxillary reaching the pectoral, rounded sucker with a central pit, position of teeth on the upper jaw and palate and a wide gap between occipital process and basal bone of dorsal. *G. stocki* can be distinguished on the basis of sucker shape, and barbel length.

G. sufii was earlier described as a subspecies *G. telchitta sufii* by Basir and Mirza (1975), on the basis of mainly having longer snout, longer outer mandibular barbels and narrower caudal peduncle as compared to *G. telchitta* s. st. Moreover it varies from *G. telchitta* which is elaborately discussed by Ng (2005), in terms of having shorter and higher caudal peduncle, deeper body, greater head depth, wider interorbital width, 12 serrations of pectoral spine as compared to 8 – 10 in *G. telchitta* and shorter maxillary barbels. As Indus river system is geographically completely isolated from the Ganges River system, its full species rank seems valid to us.

Detailed analysis of reasonable number of specimens of *G. naziri* Mirza & Naik and *G. kashmirensis* Hora show much overlapping in various morphological features. It appears as the distinction between the two was due to the insufficient available material. Now when specimens of different sizes from different localities like the river Haro, Zhob, Kurram, Indus etc. are available, a gradual change in many variables is observed e.g., snout shape, number and form of serrations on dorsal spine and shape of sucker. Serrations on dorsal spine are more prominent and sharply pointed in younger specimens, while in larger specimens, serrations are reduced in size and number. Sucker in younger specimens 34 - 40 mm is regular horse shoe shaped, but in medium sized and larger specimens, it becomes longer than broad and attain U – shape; fin ray count is similar; number, distribution and intensity of tubercles on the body is similar in both the types. Occipital process although very close but not fused to the basal bone of the dorsal fin, although in smaller specimens there is a minute gap between the two which disappears in larger specimens. Thick papillae are present on ventral side of upper lip, on lower lip and on the throat. In younger specimens, these are few in number but they increase in number as the fish grows in size. Moreover there is clear overlapping in other commonly described morphometric parameters. All these observations necessitated the reconsideration of the taxonomic status of *G. naziri* and *G. kashmirensis*. After thoroughly examining specimens of various sizes from various localities, we are very much convinced that earlier description of *G. naziri* might have been based on some young ones of *G. kashmirensis* and we conclude that *G. naziri* is the synonym of previously described fish *G. kashmirensis*.

Kullander *et al.* (1999) suggested *G. punjabensis* as the synonym of *G. kashmirensis*. We disagree with them as the sucker in *G. punjabensis* clearly

extends on the chin up to the lower lip. Taking into account the anterior part of the sucker, its shape becomes like inverted – Y. And this shape is consistent in various size groups. We are of the view that *G. punjabensis* is the valid species as recognized by Talwar & Jhingran (1991), Jayaram (2010) and Eschmeyer (2013).

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REFERENCES

- Ahmad, N., 1963. *Fish fauna of West Pakistan*. Lahore: Government Printing Press, West Pakistan.
- Bashir, K. A. & Mirza, M. R., 1975. Fishes of the river Sutlej in Lahore District, Pakistan, with the description of a new subspecies. *Bull. Hydrobiol. Res. Gordon College*. **1**: 91 – 104.
- Bleeker, P., 1855. Nalenzinger op de vischfauna von Sumatra. Visschen van Lahat en sibogha. *Nat. Tijdschi. Nederl – India*. **9**: 275 – 280.
- Butt, M. Z., 2002. Fishes of river Kunhar. M. Phil thesis, Department of Zoology, Govt. College University, Lahore.
- Day, F., 1877. *Fishes of India being a natural history of fishes known to inhabit the seas and freshwaters of of India, Burma and Ceylon*. Text and Atlas in 4 parts, London. pp. 778, pls. 195.
- Day, F. 1889. *The fauna of British India, including Ceylon and Burma. Fishes*, 1, 548 pp; **2**, 509 pp. London, Tailor and Francis.
- Eschmeyer, W., 2013. *Catalog of Fishes*, California Academy of Sciences, San Francisco, Online Version, Updated 10 June, 2013, accessed on June, 12 2013.
- Hamilton, F., 1822. An Account of Fishes found in the river Ganges and its branches: Edinburgh and London. 405 pp, 39 pls.
- Hora, S. L., 1923. Notes on Fishes in the Indian Museum. V: On the composite genus *Glyptosternon* McClelland. *Rec. Indian. Mus.*, **25**: 1 – 44.
- Hora, S. L. & Menon, M. A. S., 1948. Systematic position of three Glyptosternoid fishes described by Hamilton. *Rec. Indian. Mus.*, **46**: 55 – 62.
- Jayaram, K. C., 1979. Aid to the identification of Siluroid fishes of India, Burma, Sri Lanka, Pakistan and Bangladesh. Sisoridae, occ. Papers. *Zool. Surv. India*. **14**: 1 – 62.
- Jayaram, K. C., 2010. *The freshwater fishes of the Indian region*. Delhi: 2nd Ed. Narendra Publishing House, India, pp. 616, plt. 39.
- Kullander, S. O., Fang, F., Delling, B. & Ahlander, E., 1999. The fishes of the Kashmir Valley. 98 – 167. In *River Jhelum, Kashmir Valley. Impacts on the aquatic environment*. Swedmar, Goteborg, 198 pp.
- McClelland, J., 1842. On the freshwater fishes collected by William Griffith during his travels from 1835 – 1842. *J. Nat. Hist. Calcutta*. **2**: 560 – 589.
- Menon, M. A. S., 1954. Notes on the fishes of the genus *Glyptothorax* Blyth. *Rec. Indian. Mus.*, **52**: 27 – 54.

- Mirza, M. R., 1970. A contribution to the fishes of Lahore including revision of classification and addition of new records. *Biologia* (Pakistan), **16**: 71 – 118.
- Mirza, M. R., 1990. *Freshwater fishes in Pakistan*. Urdu Science Board, Lahore, Pakistan. pp.128.
- Mirza, M. R., 2003. Checklist of freshwater fishes of Pakistan. *Pak. J. Zool. Suppl. Ser.* **3**: 1 – 30.
- Mirza, M. R., Ali, I. & Javed, M. N., 1993. A contribution to the fishes of the Kurram Agency Pakistan. *Punj. Uni. J. Zool.*, **8**: 37 – 40.
- Mirza, M. R. & Hameed, K., 1974. Sisorid Fishes (Osteichthyes, Sisoridae) of Pakistan and Azad Kashmir. *Biologia* (Pakistan), **20** (1): 83 – 97.
- Mirza, M. R. & Kashmiri, K. M., 1971. A note on the fishes of the genus *Glyptothorax* Blyth (Osteichthyes, Sisoridae) from West Pakistan with the description of a new subspecies. *Biologia* (Pakistan), **17**: 67 – 93.
- Mirza, M. R. & Naik, I. U., 1969. Fishes of Zhob District with the description of a new species. *Pak. J. Sci.*, **21**: 121 – 125.
- Mirza, M. R. & Nijssen, H., 1978. *Glyptothorax stocki*, a new sisorid catfish from Pakistan and Azad Kashmir (Siluriformes, Sisoridae). *Bull. Zool. Mus.* (Amsterdam), **6**: 79 – 85.
- Mirza, M. R., Saleem, M., Adil, S. F. and Waheed, B., 1997. Fish and fisheries of the rive Neelam in Azad Kashmir. *Biologia* (Pakistan), **43**: 27 – 40.
- Mirza, M. R. & Waheed ud Din, 1976. A note on the fishes of the river Punch in Azad Kashmir. *Pak. J. Zool.*, **8** (1): 98 – 99.
- Ng, H. H., 2005. *Glyptothorax botius* (Hamilton, 1822), a valid species of catfish (Teleostei: Sisoridae) from northeast India, with notes on the identity of *G. telchitta* (Hamilton, 1822). *Zootaxa* **930**: 1 - 19.
- Rafique, 2000. Fish diversity and distribution in Indus river and its drainage system. *Pakistan J. Zool.*, **32** (4): 301 – 332.
- Rashida, Mirza, M. R. & Saleem, M., 1996. A contribution to the systematic and biology of *Glyptothorax kashmirensis* Hora (Pisces: Sisoridae) from Pakistan Azad Kashmir. *Biologia*, **42**: 59 – 60.
- Sufi, S. M. K., 1957. Occurrence of the fishes of the genus *Glyptothorax* in Peshawar and Hyderabad Divisions of Pakistan. *Pakistan j. Sci.*, **9**: 170 – 172.
- Sufi, S. M. K., 1963. Checklist of the fishes of the genus *Glyptothorax* of West Pakistan with records of *Glyptothorax platypogonoides* (Bleeker) from Peshawar Division (West Pakistan) *Biologia*, **9** (1): 25 – 27.
- Talwar, P. K. & Jhingran, A. G., 1991. *Inland Fishes of India and Adjacent Countries*, Vol I & II, Oxford and IBH Publishing Company, Pvt. Ltd. New Dehli, Bombay and Calcutta. pp. 1158.
- Thomson, A. W. & Page, L. M., 2006. Genera of the Asian catfish families Sisoridae and Erithistidae (Teleostei: Siluriformes) *Zootaxa*, **1345**: 1 – 96