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Glyptothorax chavomensis sp. nov. (Teleostei: Sisoridae) with its congeners from Manipur, North-Eastern India

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Abstract
The systematic accounts of striped chest sisorid catfishes of Manipur are given in this paper. *Glyptothorax chavomensis*, a new species is described from the Chindwin basin of Manipur and can distinguished from its congeners in having the following characters: tubercles consisting of elongate ridges particularly prominent on dorsal surface of head; 5-7 and 2-3 dorso-neural spines in between the inter-dorsal and post-adipose to the origin of procurrent rays of caudal-fin; 10-12 horizontally linear tile like ridges from the latero-posterior end of anus onto the last origin of anal-fin ray; head depth at occiput 70.1-76.8%HL; inter-orbital width 27.9-33.6%HL; internarial width 19.2-19.3%HL; thoracic adhesive apparatus length 69.6-71.6%HL; body depth at anus 17.0-18.2%SL and at dorsal-fin origin 22.2-22.8%SL; dorsal-fin length 18.6-19.0%SL; adipose-fin length 15.6-16.3%SL and dorsal-fin spine length 13.2-14.3%SL.

Keywords: *glyptothorax*, new species, chindwin basin, Manipur

1. Introduction
Glyptothorax Blyth, 1860 [5], are among the most species rich and widely distributed members of the family Sisoridae. They occur from Asia (in the Tigris and Euphrates river drainages) eastward to the Yangtze River drainage and Southward to Sundaic South-East Asia (Ferraris, 2007 [9]; Ng & Kottelat, 2008 [30]). They are typically inhabited in fast flowing hill streams or faster flowing reaches of larger rivers and are distinguished by their thoracic adhesive apparatus with grooves parallel or oblique to the longitudinal axis of the body (Thomson & Page, 2006 [47]).

The taxonomy of the Indian *Glyptothorax* is poorly understand (Ng, 2005 [29]). Ferraris (2007 [9]) and Kottelat (2013 [22]) reported 70 species of *Glyptothorax* in his checklist of catfishes and 52 species of this genus in the fishes of the inland waters of Southeast Asia respectively. Ng & Kottelat (2016 [33], 2017 [34]) described *Glyptothorax amnestus, G. decussatus, G. famelicus, G. keluk, G. pictus* and *G. stibaros* from Sundaland*; G. forabilis* and *G. porrectus* from the Bolaven Plateau, Laos, Mekong River drainage respectively.

Manipur ($23^0 83'$-$25^0 68'$N and $93^0 03'$ E-$94^0 78'$E), the north-eastern state of India belongs to the Indo-Burma, one of the biodiversity hot-spot or Indochina bioregion, have two main river drainages viz., the Barak and the Chindwin. The Yu-River with its head-waters drains the eastern parts of Manipur and then flows south meeting in the Chindwin River of Myanmar finally. Chiva, Chavom, Dutah, Kana, Lokchao, Maklang, Namya, Sanalok and Tuyangbi are the major rivers and head-waters of the Yu-River.

Important contributions on the sisorid catfish genus *Glyptothorax* from the northeastern India have appeared in the past viz., Anganthoibi & Vishwanath (2010 [1], 2013 [2]), Arunkumar (2016 [3]), Lalramliana & Vanlalhriata (2010 [23]), Ng (2005 [29]), Ng & Lalramliana (2013 [37]), Rameshori & Vishwanath (2012 [42]), Tamang & Chaudhry (2011 [46]). Hora (1921 [13]), Menon (1954 [25]), Kosygin & Vishwanath (2005 [21]), Vishwanath & Linthoingambi (2005 [49], 2007 [50]), Rameshori & Vishwanath (2014 [43]), Premananda *et al.* (2015 [41]) reported about this genus *Glyptothorax* from Manipur. So far, the only ten (10) species of this genus was recorded viz., three species like *Glyptothorax cavia* (Hamilton -Buchanan, 1822 [12]), *G. clavatus* Rameshori & Vishwanath, 2014 [43] and *G. manipurensis* Menon, 1954 [25] from the Barak-River basin and seven species like *G. burmanicus* Prashad & Mukerji, 1929 [40]; *G. dorsalis* Vinciguerra, 1890 [48], *G. granulus* Vishwanath & Linthoingambi, 2007 [50]; *G. igniculus* Ng & Kullander, 2013 [34]; *G. ngapang* Vishwanath & Linthoingambi, 2007 [50]; *G. senapatiensis* Premananda *et al.*, 2015 [41] and *G. trilineatus* Blyth, 1860 [5] from the Chindwin-River basin of Manipur.

In a recent collection of fishes from the Chavom River, Chandel District of Manipur, two specimens belonging to the genus *Glyptothorax* have been found interesting and differ from its congeners. Further research and comparison of this material with congeners from Manipur, its neighbouring states and countries revealed that it belongs to an unnamed and undescribed species, which is described here as a new species, *Glyptothorax chavomensis*.

2. Materials and Methods
All specimens were preserved in 10% buffered formalin and deposited in the Manipur University Central Museum (MUCM) with accession no.85/NH/MUM. General measurements were made point to point with dial callipers and data recorded to nearest 0.1mm. Counts and measurements were carried out on the left side of specimens whenever

possible. Subunits of the head are presented as percentages of head length (%HL). Head length itself and measurements of body parts are given as percentages of standard length (%SL). The measurement methods largely follow Ng & Kottelat (1998 [31]), with some modifications following Ng and Lim (1995 [38]) & Jiang *et al.* (2010 [19]). The thoracic adhesive apparatus was measured following Vishwanath & Linthoingambi (2007 [48]).

3. Results

3.1 Taxonomy

Systematic accounts of the *Glyptothorax* catfishes of Manipur and a new species, *G. chavomensis* along with their local name, distribution, remarks are given below:

Order : Siluriformes Cuvier, 1816.
Family : Sisoridae Bleeker, 1858.
Sub-family : Glypstoterninae Gill, 1872.
Tribe : Glyptothoracini de Pinna 1996.

3.1.1 *Glyptothorax burmanicus* Prashad & Mukerji, 1929. (Fig. 1).

Glyptothorax burmanicus Prashad & Mukerji, 1929: 184, pl.7 (fig.3): fig.5. Type locality: Sankha, a large hill stream, midway between Kamaing and Mogaung, Myitkyina district, Burma, Holotype: ZSI: F108771, Menon & Yazdani, 1968: 128.
Glyptothorax burmanicus Thompson & Page, 2006: 1345: 43 (valid).
Glyptothorax chindwinica Vishwanath & Linthoingambi, 2007: 2622 [+ image 6 in "web supplement"] (Type locality: India: Manipur: Iril River, Urup, Chindwin drainage) holotype: MUMI 6366.
Glyptothorax burmanicus Ferraris, 2007: 388 (valid).
Glyptothorax burmanicus Kottelat, 2013: 224 (valid).

Fig 1: *Glyptothorax burmanicus*

3.1.1.1 Local name

Ngapang, Nga-sana.

3.1.1.2 Distribution

Manipur: Chinwin drainage: Imphal River at Sekamijin, Ithai; Iril River at Urup; Thoubal River at Nongpok-Keithelmanbi; Lokchao River at Lokchao; Chavom River at Moyon Khullen.

3.1.1.3 Remarks

Glyptothorax chindwinica has been considered to be a valid species (Ng *et al.*; 2012 [30]) or a junior synonym of *G. burmanicus* (Ng & Lalramliana, 2012 [35]). Ng & Kullander (2013 [34]) can find no significant differences of them. It is the only species found in Manipur which having ridges of thoracic adhesive apparatus organised into double rows i.e. inner row converging towards and outer row radiating away from the median depression. It differs from *G. chavomensis* sp. nov. in having a longer head (27.9-30.8%SL vs. 22.4-24.3).

3.1.1.4 IUCN status

Least concern.

3.1.2 *Glyptothorax cavia* Hamilton, 1822.

Pimelodus cavia Hamilton, 1822: 188, 378. Type locality: Northern Rivers of Bengal.
Glyptothorax cavia Vishwanath & Linthoingambi, 2007: 2618 2622 [+ image 1 in "web supplement"] (Redescription).
Glyptothorax cavia Ferraris, 2007: 1418, 388 (valid).

3.1.2.1 Local name

Ngapang.

3.1.2.2 Distribution:

Manipur: Brahmaputra drainage: Barak River, Makru River, Irang River, Barak River basin.

3.1.2.3 Remarks

Glyptothorax burmanicus is often considered to be a junior synonym of *G. cavia* (Chu & Mo, 1999 [6]) and Jayaram (1999 [17]) but distinguished and treated a distinctly separate species, resurrected from synonymy with *G. cavia* (Vishwanath & Linthoingambi, 2007 [50] and Ng & Kottelat 2008 [32]). Thomson & Page (2006 [47]) and Vishwanath & Linthoingambi (2007 [50]) reported it was a Ganga-Brahmaputra species. It is a distinctive ichthyofaunal of the Barak drainage of Manipur, having a deep thoracic adhesive pit.

3.1.2.4 IUCN Status

Threatened.

3.1.3 *Glyptothorax clavatus* Rameshori & Vishwanath, 2014.

Glyptothorax clavatus Rameshori & Vishwanath, 2014: 186, (fig. 1-3), Type locality: India: Manipur; head waters of Barak River at Maram Khullen, $25^0$23′N, 94^0 04′E, Manipur. 982m above the mean sea level.

3.1.3.1 Local name

Ngapang.

3.1.3.2 Distribution

Manipur: Barak drainage.

3.1.3.3 Remarks

It is the only species of *Glyptothorax* which having striae on the ventral surface of pectoral-fin spine in Manipur.

3.1.3.4 IUCN Status

Least concern.

3.1.4 *Glyptothorax dorsalis* Vinciguerra, 1890.
Glyptothorax dorsalis Vinciguerra, 1890: 246 pl. 7 (fig. 4) type locality: Burma, Meetan (Salween drainage, Upper Burma), Mitan Chaung, rivulet flowing South from Summit of Mulayet Taung, $16^0$11′N, $98^0$32′E.
Glyptothorax minutes Hora, 1921: 180 (fig.1). Type locality: India: Manipur, Imphal stream near Karong [=Kameng], Irrawaddy drainage.
Glyptothorax dorsalis Thompson & Page, 2006: 1345, 45 (valid).
Glyptothorax dorsalis Kottelat, 2013: 27, 225 (valid).

3.1.4.1 Local name
Ngapang.

3.1.4.2 Distribution
Manipur: Chandel district: Chakpi River at Dujang, Kana River at Sajik Tampak, Chindwin drainage: Yu River basin.

3.1.4.3 Remarks
Glyptothorax dorsalis can distinguished from *G. chavomensis* sp.nov. in having longer dorsal-fin spine (16.3-22.2%SL vs. 13.2-14.3) and (75.0-105% depth of body at dorsal-fin origin vs. 59.7-64.2), a shorter interorbital (25.4-30.4%HL vs. 27.9-33.6) and a shorter caudal-peduncle (16.7-19.3%SL vs. 20.4-22.4) respectively. Hora (1921 [13]) reported the species, *G. dorsalis* from Manipur while describing *G. minutus*. Menon (1954 [25]), Menon (1974 [26]), Misra (1976 [28]) and Talwar & Jhingran (1991 [45]) considered *G. dorsalis* and *G. minutus* junior synonyms of *G. playtypogonoides*, a species of Sundaland region. *G.dorsalis* was firstly recorded in China (Tainpei & Xinluo, 1986 [44]). It is known from the Salween and the Irrawaddy river drainages in Myanmar. Although, it has been recorded from the Salween river drainage in China (Chu & Mo, 1999 [6]), this record is questionable according to Ng (2010, website) as it likely refers to *G. ngapang* and required verification. Hora's (1921 [13] and 1923 [14]) description of *G. dorsalis* from Manipur may belongs to *G. ngapang* according to Vishwanath and Linthoingambi (2007 [50]).

3.1.4.4 IUCN Status
Vulnerable.

3.1.5 *Glyptothorax granulus* Vishwanath & Linthoingambi 2007. (Fig. 2).
Glyptothorax granulus Vishwanath & Linthoingambi 2007: 2620 [+ image 5 in "web supplement]. Type locality: India: Manipur, Ukhrul district: Iril River at Phungdhar, Chindwin drainage, holotype: MUMF 6151.
Glyptothorax granulus Kottelat, 2013: 27, 225 (valid).

Fig 2: *Glyptothorax granulus*

3.1.5.1 Local name
Ngapang.

3.1.5.2 Distribution
Manipur: Litan River at Litan, Chingjaroi stream at Ukhrul; Maklang River, Lokchao River, Lairok Maru Stream at Kwatha, Streams of Moyon Khullen at Chavom, Chandel district, Chindwin drainage, Yu River basin.

3.1.5.3 Remarks
Glyptothorax granulus is the only species of Chindwin basin of Manipur in having granulated skin, a pitless thoracic adhesive apparatus with width of 78.9-85.0% in its length, absence of dorso-neuro-spines or bumps or ridges in front of adipose dorsal-fin and without mid-dorsal and mid-lateral stripes. It differs from *G. chavomensis* sp.nov. In having a narrower thoracic adhesive apparatus (1.17-1.26 times in its length vs. 1.35-1.37) and a shorter inter-dorsal (19.7-22.8%SL vs. 23.2-27.5).

3.1.5.4 IUCN Status
Least concern.

3.1.6 *Glyptothorax igniculus* Ng & Kullander, 2013.
Glyptothorax igniculus Ng & Kullander, 2013: 553, fig. 1. Type locality: Myanmar: Sagaing Region, Left bank of Myittha River approximately 8 km NE by E of Kalaymyo, $23^0$23′41″ N $94^0$7′59″E; holotype: NRM 64520.
Glyptothorax igniculus Kottelat, 2013: 27,225 (valid).

3.1.6.1 Local name
Ngapang.

3.1.6.2 Distribution
Manipur: Chandel district: Kana River at Sajik Tampak, Chiva River at Khongjom. Chindwin drainage, Yu River basin.

3.1.6.3 Remarks
According to Ng & Kullander (2013 [34]), *Glyptothorax igniculus* is distinguished from all congeners in the Irrawaddy River drainage by its thoracic adhesive apparatus, in which the central depression is almost completely enclosed posteriorly by the skin ridges that make up the apparatus. It is distinguished from *G. chavomensis* sp. nov. In having a caudal peduncle depth of 2.2-2.8 times in its length vs. 3.0-3.5 and a longer pectoral-fin (21.2-26.1%SL vs. 19.9-21.4) respectively.

3.1.6.4 IUCN Status
Data deficient.

3.1.7 *Glyptothorax manipurensis* Menon, 1954.
Glyptothorax manipurensis Menon, 1954: 52, 23. Type locality: Barak River at Karong, Naga Hills, Manipur State, Assam, India. Holotype: ZSIF 738/2.
Glyptothorax manipurensis Vishwanath & Linthoingambi, 2007: 22, 2616 fig. 2, [+image 2 in "web supplement] (Rediscription & valid).
Glyptothorax manipurensis Ferraris, 2007: 1418, 301 (valid).
Glyptothorax manipurensis Kottelat, 2013: 27, 226 (valid).

3.1.7.1 Local name
Ngapang.

3.1.7.2 Distribution
Manipur: Brahmaputra drainage: Barak River at Maram and at Vanchengphai, Tamenglong district, Iyei River at Noney.

3.1.7.3 Remarks
Menon (1954 [25]) distinguished *Glyptothorax manipurensis* from its closest *G. sinense* (now, *G. sinensis*) in having a broader head and presence of black colour at the base of dorsal, adipose and caudal-fins. Misra (1976 [28]) and Talwar & Jhingran (1991 [45]) considered *G. manipurensis* as a junior synonym of *G. sinensis* and extended the distribution of the latter to India. However, Jayaram (1979 [16]) recognised two subspecies within this species viz., *G. sinense sinense* and *G. sinense manipurensis.* Kosygin & Vishwanath (2005 [21]) redescribed the species *G. manipurensis* Menon (1954 [25]) as a valid species. Thomson & Page (2006 [47]) reported its distribution form the Irrawaddy drainage of India based on Kosygin & Vishwanath 2005 [21]. Vishwanath & Linthoingambi (2007 [50]) reported that examination of more and fresh specimens of *Glyptothorax sinense* (or now *G. sinensis*) required for distinguishing from *G. manipurensis*.

3.1.7.4 IUCN Status
Vulnerable.

3.1.8 *Glyptothorax ngapang* Vishwanath & Linthoingambi, 2007.
Glyptothorax ngapang Vishwanath & Linthoingambi, 2007: 22, 2619 [+ image 4in "web supplement]. Type locality: India: Manipur: Imphal East District. Iril River at Bamonkampu, Chindwin drainage, holotype: MUMF 6131.
Glyptothorax ngapang Kottelat, 2013: 27, 226 (valid).

3.1.8.1 Local name
Ngapang.

3.1.8.2 Distribution
Manipur: Imphal River at Motbung, Khongnang Pheidekpi Sekmaijin, at Ithai near the Ithai barrage, Lokchao River at Lokcaho bridge, Pum-Pum Stream at Kwatha, Chandel District, Chindwin drainage, Yu River basin.

3.1.8.3 Remarks
Glyptothorax ngapang is a widely distributed species in the Chindwin basin of Manipur. It is distinguished from *G. dorsalis* in having equal length of dorsal-fin spine and greatest body depth vs. longer length of dorsal-fin spine than greatest body depths and serrated dorsal-fin spine vs. smooth respectively. Further, it is distinguished from *G. chavomensis* sp. nov. in having greater body depth at anus (17.0-18.2%SL vs. 11.2-16.4), absence (vs. presence) of 5-7 of ridges in front of the adipose-fin, a shorter adipose-fin base (11.7-11.8%SL vs. 13.1-16.9) a deeper head (17.0-17.2%SL vs. 12.3-16.1) and from *G. lanceatus* in having a larger eye (8.4-12.9%HL vs. 6.8-8.3) and a longer interorbital distance (22.1-27.8%HL vs. 20.2-22.1), a longer head (22.2-27.4%SL vs. 23.0-25.1), a longer dorsal-fin base (12.3-14.1%SL vs. 10.7-12.1) a shorter dorsal-fin spine (14.5-19.9%SL vs. 14.3-16.3) a shorter pelvic-fin (14.5-18.6%SL vs. 21.1-24.5), a longer pectoral-fin spine (15.4-21.0%SL vs. 16.6-17.8), a slender caudal peduncle (5.3-6.9%SL vs. 6.7-7.4) and body with black spots vs. uniformly dark coloured without marking respectively.

3.1.8.4 IUCN status
Least concern.

3.1.9 *Glyptothorax senapatiensis* Premananda, Kosygin & Saidullah, 2015.
Glyptothorax senapatiensis Premananda, Kosygin & Saidullah, 2015, 25,323 fig. 1 Type locality: India: Manipur: Imphal River at Motbung, Chindwin River drainage, $25^0$00′10″N $93^0$54′45″E, holotype: ZSI FF 4975, 51.5mm SL.

3.1.9.1 Local name
Ngapang.

3.1.9.2 Distribution
Manipur: Imphal River at Motbung, Senapati District, Chindwin River basin.

3.1.9.3 Remarks
Glyptothorax senapatiensis differs from *G. chavomensis* sp.

nov. in having a shorter post-adipose (16.2-17.6%SL vs. 18.3-23.9), a deeper caudal peduncle (8.4-9.3%SL vs. 6.5-6.7), a longer head (26.0-29.5%SL vs.22.4-24.3), a longer pre-anus (60.1-63.1%SL vs. 57.3-59.8), a slender head depth (54-67%HL vs. 70.1-76.8), a longer nasal barbel (32-40%HL vs. 17.5-21.2) and absence (vs. presence) of tubercle consisting elongate ridges particularly prominent on the dorsal surface of neurocranium; from *G. manipurensis* in having a deeper body (at dorsal-fin origin 21.0-26.8%SL vs. 17.7-20.0, at anus 17.1-18.2%SL vs. 13.5-15.1), a wider thoracic adhesive apparatus (77.5-85.5% its length vs. 71.0-78.9), a shorter dorsal-fin spine (14.6-15.8%SL vs. 17.6-20.8), tuberculated skin vs. smooth and presence vs. absence of a cream mid-dorsal stripe.

3.1.9.4 IUCN Status
Least Concern.

3.1.10 *Glyptothorax trilineatus* Blyth, 1860. (Fig. 3).
Glyptothorax trilineatus Blyth, 1860: 154. Type Locality: Burma, Tenasserim, Sittang drainage, Syntypes 2 ex; ZSI F 10380/1.
Glyptothorax trilineatus Jayaram, 1979: 14, 48. Fig.31 (identification).
Glyptothorax trilineatoides Li, 1984: 87, fig.5.Type locality: Tengchong Xian [Salween drainage], Yunnan China. Holotype: KIZ 764336.
Glyptothorax trilineatus Thomson & Page, 2006: 57 (distribution, valid).
Glyptothorax ventrolineatus Vishwanath & Linthoingambi, 2006: 201, Fig. 1. Type locality: India: Manipur: Ukhrul district, Iril River, holotype: MUMF L 0221.
Glyptothorax trilineatus Kottelat, 2013: 27, 227 (Valid)

Fig 3: *Glyptothorax trilineatus*

3.1.10.1 Local name
Ngapang or Ngapang Chandol-Thinbi.

3.1.10.2 Distribution
Manipur: Chandel district: Kana River at Sajik Tampak, Lokchao River at Moreh near Indo-Myanmar border areas Chindwin drainage, Yu River basin.

3.1.10.3 Remarks
Glyptothorax trilineatus is one of the distinct species form other congeners from Manipur due to the presence of very prominent pale mid lateral stripe wider than a single tubercle. It is distinguished from *G. ater*, a species of Koladyne basin, Mizoram in having a wider interorbital distance (30.0-37.4%HL vs. 28.7-30.4), a longer snout (46.0-49.0%HL vs. 11.1-16.6), a shorter caudal peduncle (17.0-20.0%SL vs. 19.7-22.8), a deeper caudal peduncle (9.0-10.4%SL vs. 6.7-8.1), absence (vs. presence) of 15-16 plicae on the ventral surface of pectoral-fin spine and absence (vs. presence) of 30-40 plicae on the ventral surface of pelvic-fin; differs from *G. clavatus* in lacking (vs. having) striae on the ventral surface of pectoral-fin spine; from *G. famelicus* in having a deeper caudal peduncle (9.0-10.4%SL vs. 5.8-7.3), a larger eye diameter (9.2-11.2%HL vs. 7-8) and a distinct mid-dorsal and mid-lateral stripes vs. a faint thin, light brown mid dorsal stripe extending base of last dorsal-fin ray to origin of adipose-fin and appearance of a diffuse lighter brown mid-lateral line; differs from *G. forabilis* in having wider interorbital distance (30.0-37.4%HL vs. 25.0-31.0), a shorter snout (46.0-49.0%HL vs. 48.0-54.0), a shorter caudal peduncle (17.0-20.0%SL vs. 19.3-23.9), a deeper caudal peduncle (9.0-10.4%SL vs. 7.4-9.0), a very prominent pale mid-lateral stripe wider than a single tubercle vs. a very thin pale mid-lateral stripe no wider than a single tubercle; from *G. laosensis* in having a deeper caudal peduncle (9.2-10.3%SL vs. 7.0-9.3); further differ from *G. porrectus* in having a larger eye (9.2-11.2%HL vs. 8.0-10.0), a shorter snout (45.6-49.3%HL vs. 44.0-55.0), a longer interorbital (30.0-37.5%HL vs. 23.1-31), a slender caudal peduncle (17.0-20.0%SL vs. 21.7-25.8), a deeper caudal peduncle (9.2-10.3%SL vs. 5.8-6.7) and a very prominent pale mid-lateral stripe wider vs. no wider than a single tubercle. It can be further distinguished from *G. striatus*, a species of Brahmaputra drainage in having a shorter snout (46.0-49.0%HL vs. 51.8-54.7), a deeper caudal peduncle (9.0-10.4%SL vs. 6.8-8.6) and absence (vs. presence) of prominent plicae on the ventral surfaces of pectoral-fin spine and first pelvic-fin ray.

3.1.10.4. IUCN Status
Least Concern.

3.1.11. *Glyptothorax chavomensis* sp.nov. (Fig. 4).
3.1.11.1. Material examined
Holotype: 85/NH/MUM, 83.33mm SK; 107.97mm TL; 93.76mm FL; Manipur: Chavom River at Moyon Khullen, Chandel district, $24^{0}15'$N Latitude and $94^{0}15^{0}$E longitude; Collected by: Wrangler A.M; 09 May 2017.

3.1.11.2. Paratype
85/NH/MUM, 92.81mm SL; 117.14mm TL; 103.42mm FL; same data as holotype.

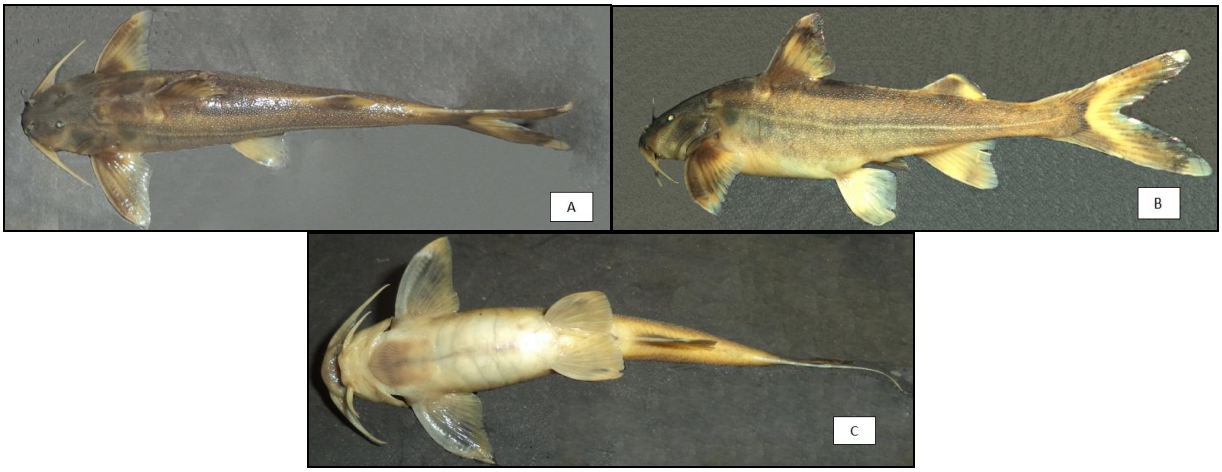

Fig 4: *Glyptothorax chavomensis* sp. nov. (A= dorsal view, B=lateral view and C = Ventral view).

3.1.11.3. Local name
Ngapang (in Manipuri), Ngasarbah (in Moyon dialect).

3.1.11.4. Diagnosis
Glyptothorax chavomensis sp. nov. can be distinguished from the Chindwin species, *G. burmanicus* in having tuberculated skin (vs. smooth), thoracic adhesive apparatus without a central pit (vs. with a central pit) and its single linear ridge and open caudally (with double linear ridges and enclosed), a shorter inner and outer mandibular barbels (26.7-32.6%HL vs. 37.2-57.4 and 45.1-46.5%HL vs. 59.2-85.7), a larger eye (11.6-11.9%HL vs. 5.5-9.1), a deeper body at anus (17.0-18.2%SL vs. 13.2-16.7), a slender caudal peduncle (6.5-6.7%SLvs. 6.5-8.7), a longer dorsal-fin (18.6-19.0%SL vs. 11.9-13.8), a longer pectoral-fin spine (16.9-17.3%SL vs. 13.3-16.5), shorter head length (22.4-24.3%SL vs. 27.6-30.8), a narrower head (18.1-19.1%SL vs. 19.5-21.7); from the Chindwin species, *G. dorsalis* in having tuberculated skin (vs. smooth), thoracic adhesive apparatus with a linear median depression (vs. ovate median depression), dorsal-fin spine length lower than body depth (vs. higher than body depth), a shorter dorsal-fin spine (59.7-64.2% depth of body at dorsal-fin origin vs. 75.0-105, 58.8-59.0%HL vs. 82.1, and 13.2-14.3%SL vs. 16.3-22.2) and a slender caudal peduncle (6.5-6.7%SL vs. 6.9-7.9); from the Chindwin species, *G. granulus* in having tuberculated skin (vs. smooth), presence (vs. absence) of dorso-neuro-spine or bumps or series of ridges in interdorsal fins, a shorter head (22.4-24.3%SL vs. 26.0-26.7), a deeper body at dorsal-fin origin (22.2-22.3%SL vs. 13.0-14.3), a longer interdorsal (23.2-27.5 vs. 19.7-22.8), a longer adipose-fin (15.6-16.3%SL vs. 13.8-14.6), a shorter pectoral-fin (19.9-21.4%SL vs. 23.8-24.9), a longer anal-fin (18.4-18.9%SL vs. 13.5-14.5), a deeper head (70.1-76.8%HL vs. 60.2-61.0), a wider internarial (19.2-19.3%HL vs. 13.7-17.0), a slender caudal peduncle (28.8-32.9%LCP vs. 48.3-56.0), a wider thoracic adhesive apparatus (59.9-70.6%HW vs. 48.1-54.3) and its narrower width (73.2-73.8%TAAL); from the Chindwin species, *G. igniculus* in having a shorter dorsal-fin base (11.5-12.2%SL vs.13.9-14.7), a shorter dorsal-fin spine (13.2-14.3%SL vs. 16.9-21.6), a slender caudal peduncle (6.5-6.7%SL vs. 8.2-9.7), a deeper body at dorsal-fin origin (22.2-22.3%SL vs. 15.2-16.4), a shorter head (22.4-24.3%SL vs. 24.6-28.2), a narrower head (18.1-19.1%SL vs. 20.3-21.8), a deeper head (17.0-17.2%SL vs. 12.3-15.3) and a shorter nasal barbel (17.5-21.2%HL vs. 30.1-35.3); from the Chindwin species, *G. ngapang* in having presence (vs. absence) of series of ridges or bumps in front of adipose dorsal-fin, a deeper body (at dorsal-fin origin 22.2-22.3%SL vs. 11.2-19.1 and at anus 17.0-18.2%SL vs. 11.2-16.4), a longer dorsal-fin (18.6-19.0%SL vs. 11.9-12.9), a longer adipose-fin (15.6-16.3%SL vs. 10.8-14.0), a deeper head (17.0-17.2%SL vs. 12.3-16.1), a longer anal-fin (18.4-18.9%SL vs. 15.5-16.3), a shorter dorsal-fin spine (13.2-14.3%SL vs. 14.5-19.9), a shorter adipose-fin base (42.5-51.2% in inter-dorsal length vs. 49.1-65.0), a shorter dorsal-fin spine (58.8-59.0%HL vs. 62.9-72.5), a deeper head at occiput (70.1-76.8%HL vs. 61.3-65.6), a wider inter-narial (19.2-19.3%HL vs. 14.1-16.2), a wider inter-orbital (27.9-33.6%HL vs. 22.1-27.8), a shorter anal-fin base (55.8-63.9%HL vs. 61-72), a narrower thoracic adhesive apparatus (50.9-52.9%HL vs. 61.5-68.9) a wider thoracic adhesive apparatus (59.9-70.6% head width vs. 41.9-59.5, 73.2-73.8% its length vs. 58.4-63.0) and a longer thoracic adhesive apparatus (69.6-71.6%HL vs. 59.8-68.9); from the Chindwin species, *G. senapatiensis* in having a shorter head (22.4-24.3%SL vs. 26.0-29.5), a longer preanal (65.2-69.3%SL vs. 60.1-65.0), a shorter preanus (57.3-59.8%SL vs. 60.1-63.1), absence (vs. presence) of 6-7serrae on dorsal-fin spine, a shorter branched dorsal-fin base (11.5-12.2%SL vs. 19.6-22.5), a longer post-adipose (18.3-23.9%SL vs. 16.2-17.6), a shorter adipose-fin base (11.7-11.8%SL vs. 12.5-18.5), a longer caudal peduncle (20.4-22.4%SL vs. 16.3-19.0), a slender caudal peduncle (6.5-6.7%SL vs. 8.4-9.3), a deeper head (70.1-76.8%HL vs. 54.0-67.0), a shorter nasal barbel (17.5-21.2%HL vs. 32.0-40.0) and a shorter inner mandibular barbel (26.7-32.6%HL vs. 38.0-43.0) and from the Chindwin species, *G. trilineatus* in lacking (vs. having) a distinct pale mid-lateral stripes on the flank and a deeper body depth at anus (17.0-18.2%SL vs. 10.1-16.2), a shorter nasal barbel (17.5-21.2%HL vs. 11.0-34.0) and a longer maxillary barbel (81.6-115.8%SL vs. 64.7-104.5) respectively.

3.1.11.5. Description
Biometric data in Table 1. Body sub-cylindrical, slender, elongated, its depth more than dorsal-fin spine length. Dorsal

profile rising evenly from the tip of snout to origin of branched dorsal-fin, and then sloping gently ventrally from origin of branched dorsal-fin to the end of caudal peduncle. Ventral profile sub-cylindrically flat to anal-fin base, then sloping gently dorsally from anal-fin base to the end of caudal peduncle. Vent openings located at the middle of adpressed pelvic-fin. Skin tuberculate, with elongate and ovoid tubercles densely arranged on flanks and head. Tubercles consisting of elongate ridges particularly prominent on the dorsal surface neurocranium (Fig. 5A).

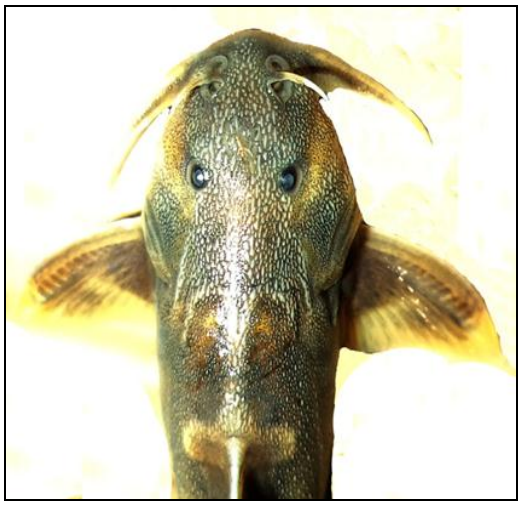

Fig 5A: *Glyptothorax chavomensis* sp. nov. Showing elongate tubercles of ridges on neurocranium and nuchal plate elements.

Lateral line complete and mid-lateral. Head depressed, somewhat triangular when viewed laterally. Snout plain when viewed from above the dorsal. Anterior and posterior nares separated only by base of nasal barbel. Eyes small and ovoid, horizontal axis longest, located nearer to origin of occiput than tip of snout.

Barbels in four pairs. Maxillary barbel extending to the base of second pectoral-fin ray. Nasal barbel slender, not reaching the anterior orbital margin when adpressed. Inner mandibular barbel extending to anterior edge of thoracic adhesive apparatus. Outer mandibular barbel originating posterior-lateral of inner-mandibular barbel, not reaching to the base of pectoral-fin spine but touch only the gill opening membrane. Mouth inferior, premaxillary tooth single crescent-shaped band. Lower jaw interrupted by a narrow space.

Dorsal-fin equidistant from tip of snout to origin of adipose-fin, with I, 6 rays, dorsal- fin spine strong, smooth anteriorly and without serrae. Dorsal tip edge of adipose dorsal-fin minutely file. Caudal-fin deeply forked, lower lobe slightly longer than upper lobe, tip end of upper lobe pointed or acute, lower lobe broader or obtuse and 16-17rays. Procurrent rays are equally symmetrical. Anal-fin with straight anterior margin and straight or slightly concave posterior margin; with ii, 9-10 rays. Pectoral-fin with I, 9 rays; posterior fin margin straight; anterior spine margin smooth, posterior spine with 10-12 serrations; pectoral-fin longer than length of head and extending upto origin vertically through the origin of the third branched dorsal-fin ray. Pelvic-fin with i, 5 rays; its origin vertically far behind the end of dorsal branched last fin ray, not reaching the anterior origin of anal-fin, its last branched ray reach the anal opening. Thoracic adhesive apparatus present, consisting of narrow skin ridges with an inverted 'v' shaped, caudally open and longer than width (Fig. 5B).

Fig 5B: Thoracic adhesive apparatus of *Glyptothorax chavomensis* sp.nov.

3.1.11.6. Colouration

In 10% formalin: dorsal and lateral surfaces of body dirty brown to grey. Ventral surface of head and body pale yellowish to white. ¾ of body with greyish black with distinct tubercles. Tip ends of all fins are pale yellowish white. Band like patches of greyish colour in all the fins. Anterior bases of dorsal, adipose, pectoral and caudal fins are clayish black. Caudal-fin with greyish band line submarginal. Maxillary and nasal barbels brown dorsally and light yellowish ventrally. Inner and outer mandibular barbels and ventral surface of body from tip of snout to the base of caudal-fin light yellow.

3.1.11.7. Distribution

Known form the Chavom River, Chandel district (Yu-River basin), Manipur (Fig.6).

3.1.11.8. Etymology

The species is named after the Chavom River, Chandel district, Manipur where it was collected.

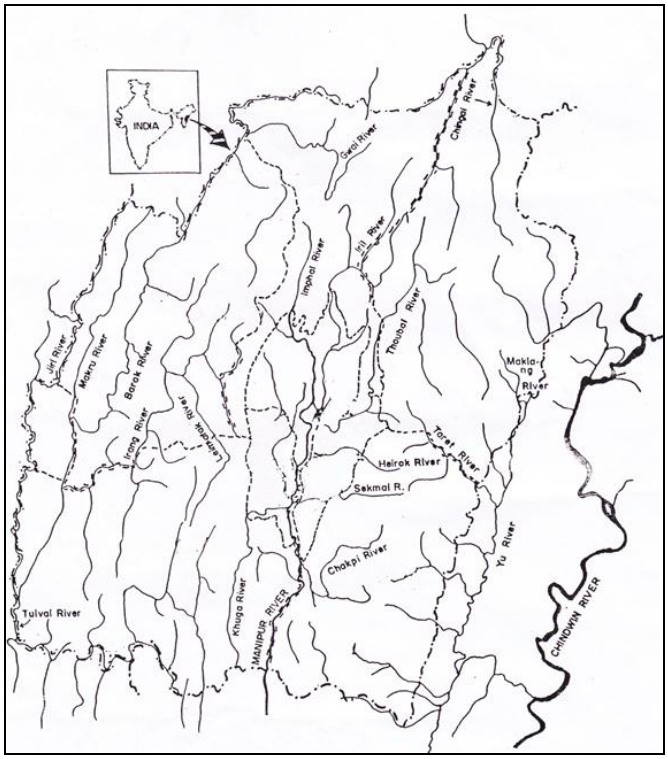

Fig 6: Map of Manipur showing the type locality of *Glyptothorax chavomensis* sp.nov. indicated by (*) symbol

Fig 7: Type locality and natural habitat of *Glyptothorax chavomensis* sp.nov. at Chavom river, Moyon Khullen village, Chandel District, Chandel, Manipur.

3.1.11.9. Habitat and ecology

The type locality (Fig.7) is about 250 m above the mean sea level. The banks fully covered with riparian vegetation, mostly with bamboo, shrubs and trees. Bed of the river consisting of cobbles, gravels, boulders, pebbles and large rocks and stones. The following is a list of species collected sympatrically with *Glyptothorax chavomensis* sp. nov.: Cyprinidae; *Devario aequipinnatus, Raiamas guttatus, Chagunius nicholsi, Neolissocheilus hexagonolepis, Pethia meingangbii, Systomus sewelli, Poropuntius burtoni Tor tor*, Sisoridae*: Glyptothorax burmanicus, G. trilineatus*, Mastacembelidae: *Mastacembelus armatus* etc.

Table 1: Morphometric data for *Glyptothorax chavomensis* sp.nov. (n=02).

	Holotype 85/NH/MUM	**Paratype 85/NH/MUM**
(1)	(2)	(3)
Total length (TL) (mm)	107.9	117.1
Standard length (SL) (mm)	83.3	92.8
In % of SL		
Predorsal	36.4	34.2
Preadipose length	70.0	64.2
Preanal length	69.3	65.2
Prepelvic length	49.4	48.5
Prepectoral length	20.0	21.5
Length of dorsal-fin base	12.2	11.5
Dorsal-fin spine length	14.3	13.2
Length of anal-fin base	13.6	14.3
Pelvic-fin length	16.6	14.2
Pectoral-fin length	21.4	19.9
Dorsal-fin length	19.0	18.6
Adipose-fin length	15.6	16.3
Pectoral -fin spine length	17.3	16.9
Caudal-fin length (upper lobe)	28.8	25.2
Caudal-fin length (lower lobe)	29.6	26.2
Length of adipose-fin base	11.7	11.8
Inter-dorsal length	27.5	23.2
Post-adipose distance	18.3	23.9
Length of caudal peduncle	20.4	22.4
Depth of caudal peduncle	6.7	6.5
Body depth at anus	17.0	18.2
Body depth at dorsal-fin origin	22.3	22.2
Head length	24.3	22.4
Head width	18.1	19.1
Head depth	17.0	17.2
Adhesive apparatus length	17.4	15.6
Adhesive apparatus width	12.8	11.4
Preanus length	59.8	57.3
Anal-fin length	18.9	18.4
Body width at dorsal-fin origin	18.0	16.9
Body width at anal-fin origin	10.7	9.1
In % of Head Length (HL)		
Snout length	52.9	50.9
Inter-orbital space	27.9	33.6
Nasal barbel length	21.2	17.5
Maxillary barbel length	81.6	115.8
Inner mandibular barbel length	32.6	26.7
Outer mandibular barbel length	46.5	45.1
Head depth at occiput	70.1	76.8
Head width (HW)	74.7	85.0
Mouth width	46.4	38.4
Eye diameter	11.9	11.6
Head depth at eye	46.9	57.6
Internarial space	19.3	19.2
Pectoral-fin length	88.0	88.8
Anal-fin length	77.8	82.1
Anal-fin base length	55.8	63.9
Thoracic adhesive apparatus width	52.9	50.9
Thoracic adhesive apparatus length	71.6	69.6
Dorsal-fin spine length	58.8	59.0
In % of Head Width (HW)		
Thoracic adhesive apparatus width	70.6	59.9
Interoribtal distance	37.3	39.5
In % of Thoracic Adhesive Apparatus Length (TAAL)		
Thoracic adhesive apparatus width	73.8	73.2
In % of Length of Caudal Peduncle (LCP)		
Depth of caudal peduncle	32.9	28.8

Table 2: Distribution records of eleven *Glyptothorax* species in the two river basin drainages of Manipur. (Note: Bb=Barak basin, Cb=Chindwin basin, + = present and ─ = Absent).

Name of species	Bb	Cb
G. burmanicus Prasad & Mukerji, 1929	-	+
G. cavia (Himilton-Buchanan, 1822)	+	-
G. chavomensis sp. nov.	-	+
G. clavatus Rameshori & Vishwanath, 2014	+	-
G.dorsalis Vinciguerra, 1890	-	+
G. granulus Vishwanath & Linthoingambi, 2007	-	+
G. igniculus Ng. & Kullander, 2013	-	+
G. manipurensis Menon, 1954	+	-
G. ngapang Vishwanath & Linthoingambi, 2007	-	+
G. senapatiensis Premananda *et al.*, 2015	-	+
G. trilineatus Blyth, 1860	-	+

3.4. Discussion

Glyptothorax chavomensis sp. nov. Differs from the species of the Barak river drainage of Manipur viz., *G. cavia, G. clavatus* and *G. manipurensis*. It differs from *G. cavia* in lacking (vs. having) a deep central pit on the thoracic adhesive apparatus; from *G. clavatus* in lacking (vs. having) striae on the ventral surface of pectoral-fin spine, a slender caudal peduncle (6.5-6.7%SL vs. 8.6-10.1), a shorter dorsal-fin spine (13.2-14.3%SL vs. 17.1-18.8), absence (vs. presence) of distinct light cream mid-dorsal stripe and from *G.manipurensis* in having tuberculated skin vs. smooth skin, a slender caudal peduncle (28.8-32.9% LCP vs. 45.4-48.0) and presence of a linear series of dorso-neuro-spines or bumps between branched dorsal-fin and adipose-fin and in between post-adipose to origin of procurrent caudal-fins (5-8 and 2 numbers) vs. absence respectively (Fig. 8).

Fig 8: *Glyptothorax chavomensis* sp.nov. Showing dorso-neuro-spine or bump between the inter-dorsal and post-adipose regions.

The genus *Glyptothorax* are restricted distributions, either being restricted to a single river drainage or found in only a few adjacent river drainages (Ng & Rachmatica, 2005 [39]; Jiang *et al.*, 2012 [20] and Ng & Kottelat, 2016 [33]). It is proved by the distribution of *G. burmanicus, G. dorsalis* and *G. trilineatus*. Therefore, the new species, *Glyptothorax chavomensis* has been compared mainly with its congeners of the Chindwin, the Irrawaddy, the Mekong and the Salween river drainages. *G. chavomensis* sp. nov. differs from the Ataran River species, *G. rugimentum* in lacking (vs. having) unculiferous ridges of the thoracic adhesive apparatus extending anteriorly onto the gular region, in absence (vs. presence) of light and dark vertical bands on the caudal peduncle, narrower head width (18.1-19.1%SL vs. 19.1-22.6), a larger eye (11.6-11.9%HL vs. 8.4-11.6) and a shorter nasal barbel (17.5-21.2%HL vs. 24.5-37.1); from the upper Irrawaddy species, *G. longicauda* in having a wider inter-orbital (27.9-33.6%HL vs. 22.4-29.9), a deeper body at anus (17.0-18.2%SL vs. 11.0-16.9); from the upper Irrawaddy species, *G. longjiangensis* in having a shorter nasal barbel (17.5-21.2%HL vs. 18.1-33.9), a longer maxillary barbel (81.6-115.8%HL vs. 65.8-102.8), a slender caudal peduncle (6.5-6.7%SL vs. 6.9-8.8), less number of pectoral-fin rays (9 vs. 11), pectoral-fin length shorter than head length vs. longer than head length and absence (vs. presence) of large ridged plaques bearing unculiferous ridges on the dorsal surface of head; from the upper Irrawaddy species, *G. minimaculatus* in having a shorter nasal barbel (17.5-21.2%HL vs. 18.3-26.2), a slender caudal peduncle (6.5-6.7%SL vs. 7.4-7.9) and skin of body (tuberculated vs. granulated); from the upper Irrawaddy species, *G. panda* in lacking (vs. having) saddle-shaped body bands and a deeper body at anus (17.0-18.2%SL vs. 10.4-11.8) a narrower head (18.1-19.1%SL vs. 19.3-20.4), a longer interdorsal (23.2-27.5SL vs. 14.1-16.6), a longer post-adipose (18.3-23.9%SL vs. 15.3-17.2), and a deeper caudal peduncle (6.5-6.7%SL vs. 5.3-6.2); further distinguished from the Mekong species, *G. macromaculatus* in having a shorter head (22.4-24.3%SL vs. 27.4-34.4) and a narrower head (18.1-19.1%SL vs. 20.6-25.4); further distinguished from the Salween species, *G. fucatus* in having a shorter nasal barbel (17.5-21.2%SL vs. 25.9-34.5), a wider thoracic adhesive apparatus (11.4-12.8%SL vs. 8.9-11.4), a longer thoracic adhesive apparatus (15.6-17.4%SL vs. 11.9-15.7), a longer post-adipose (18.3-23.9%SL vs. 13.5-18.7), a shorter adipose-fin base (11.7-11.8%SL vs. 12.8-16.7), a longer caudal peduncle (20.4-22.4%SL vs. 16.0-20.4), a slender caudal peduncle (6.5-6.7%SL vs. 8.2-11.1) and a longer caudal-fin (26.2-29.6%SL vs. 18.6-25.9); from the Salween species, *G. granosus* in having a longer preanal (65.2-69.3%SL vs. 59.7-66.3), a shorter pectoral-fin (19.9-21.4%SL vs. 22.8-26.5), a longer caudal-fin (26.2-29.6%SL vs. 20.5-25.9), a shorter adipose-fin base (11.7-11.8%SL vs. 12.8-15.9), a longer interdorsal (23.2-27.5%SL vs.16.7-23.6), a deeper body at anus (17.0-18.2%SL vs. 12.9-16.5), a deeper head (17.0-17.2%SL vs. 13.1-16.2), a wider thoracic adhesive apparatus (11.4-12.8%SL vs. 8.7-10.3), a larger eye (11.6-11.9%HL vs. 7.4-10.3), a wider interorbital space (27.9-33.6%HL vs. 20.4-28.8) and a shorter nasal barbel (17.5-21.2%HL vs. 22.8-34.0); from the Salween species *G. lanceatus* in having less number of dorso-neuro-spines (5-7 on interdorsal vs. 8-9 and

2-3 vs. 4-5 on post-adipose to the origin of procurrent ray of caudal-fin), less horizontally linear pile like ridges just above the anal-fin (10-12 vs. 14-15), longer maxillary barbel (81.6-115%HL vs. 86.2-91.1), a wider thoracic adhesive apparatus (1.35-1.37 times in its length vs. 1.60-1.74), a larger eye (11.6-11.9%HL vs. 6.8-8.3), wider interorbital (27.9-33.6%HL vs. 20.2-22.1), a shorter dorsal-fin spine (13.2-14.3%SL vs. 14.3-16.3), a shorter pectoral-fin (19.9-21.4%SL vs. 21.1-24.5), a shorter pelvic-fin (14.2-16.6%SL vs. 21.1-24.5), a shorter adipose-fin base (11.7-11.8%SL vs. 12.2-13.2), a shorter anal-fin base (13.6-14.3%SL vs. 15.2-16.3), a slender caudal peduncle (6.5-6.7%SL vs. 6.7-7.4), a deeper body at anus (17.0-18.2%SL vs. 12.4-14.8); a wider head (18.1-19.1%SL vs. 16.3-18.8), a deeper head (17.0-17.2%SL vs. 14.2-15.1), a longer thoracic adhesive apparatus (15.6-17.4%SL vs. 14.7-15.9) and a wider thoracic adhesive apparatus (11.4-12.8%SL vs. 8.7-9.5); from the Salween species, *G. longinema* in having a shorter adipose-fin base (11.7-11.8%SL vs. 13.1-17.8), a longer caudal-fin (26.2-29.6%SL vs. 19.3-25.6), a slender caudal peduncle (6.5-6.7%SL vs. 7.1-10.6), a narrower head (18.1-19.1%SL vs. 19.3-22.9), a longer dorsal-spine (13.2-14.3%SL vs. 10.3-13.8), longer post-adipose distance (18.3-23.9%SL vs. 14.2-18.2) and a shorter nasal barbel (17.5-21.2%HL vs. 27.6-49.4).

5. Conclusion

Glyptothorax cavia, *G. clavatus* and *G. manipuriensis* are confined and well distributed in the Barak drainage of Manipur. *Glyptothorax burmanicus*, *G. chavomensis* sp.nov., *G. dorsalis*, *G. granulus*, *G. igniculus*, *G. ngapang*, *G. senapatiensis* and *G. trilineatus* are the glyptothoracid ichthyofauna of the Chindwin drainage of Manipur. Their distribution patterns in Manipur are shown in Table 2. *Glyptothorax chavomensis* belongs to *G. manipurensis* group due to the thoracic adhesive apparatus is longer than its width (Hora, 1923 [14]), belongs to deep bodies group due to its body depth at dorsal-fin origin 22.2-22.3%SL and its depth at anus 17.0-18.2%SL (Ng & Rashmatica, 2005 [39]) and belongs to type-1 due to distinctly visible of mid-dorso-neuro-spine in the inter-dorsal and post adipose dorsal-fin base to procurrent caudal-fin rays (Arunkumar, 2016 [3]).

6. Comparative Material

***Glyptothorax burmanicus*:** Data from Ng. & Kullander (2013), Ng & Kottelat (2008) and Jiang *et al.* (2012).

***Glyptothorax cavia*:** MUMF 4019, l ex; 98.2 mm SL., Barak River, Vanchengphai, Tamenglong District, March 18, 1999; MUMF 4184, l ex; 154.0 mm SL., Iyei river, Noney, Tamenglong district, December 27, 2000. Data from Vishwanath & Linthoingambi (2007).

***Glyptothorax clavatus*:** ZSI FF 5273, 3 paratypes, 61.0-67.1 mm SL., India: Manipur, Senapati District: headwaters of Barak River, Maram Khullen, $25^0$23′N $94^0$04′E. Data from Rameshori and Vishwanath (2014).

Glyptothorax dorsalis: Data from ZSI F 225/2, 81.2mm. SL; Sittang drainage, Paunglaung Chaung, the main tributary of the Sittang around Taloktwin. ZSI F 102751/1, 49.5mm SL. Hora (1921), Jinag *et al.* (2012), Anganthoibi & Vishwanath (2010), Ng *et al.* (2012), IUCN Redlist;wwwiucnredlist org/details/168457/0[on 1st October 2017].

***Glyptothorax fucatus*:** Data from Jinag *et al.* (2012).

***Glyptothorax granulus*:** MUMF 6151, 76.6 mm SL., Iril River at Phungdhar, Ukhrul district, Manipur, India, 10 January, 2004, IL. MUMF 6152, 4 exs; 61.7-76.6 mm SL., data as for holotype. Data from Vishwanath & Linthoingambi (2007) and Ng *et al.* (2012).

***Glyptothorax granosus*:** Data from Jinag *et al.* (2012).

***Glyptothorax igniculus*:** Data from Ng. & Kullander (2013).

***Glyptothorax lanceatus*:** Data from Ng *et al.* (2012).

***Glyptothorax longicauda*:** Data from Jiang *et al.* (2012).

***Glyptothorax longinema*:** Data from Jinag *et al.* (2012).

Glyptothorax longjiangensis: Data from Mo & Chu (1996) and Jiang *et al.* (2012).

***Glyptothorax macromaculatus*:** Data from Jiang *et al.* (2012).

***Glyptothorax manipurensis*:** MUMF 4029-4032 (4), 69.0-104.0mm SL; India: Manipur, Barak river, Vanchengphai, Tamenglong District. Data from Kosygin & Vishwanath (2005), Vishwanath & Linthoingambi (2007) and Ng & Kullander (2013).

***Glyptothorax minimaculatus*:** Data from Jiang *et al.* (2012).

***Glyptothorax ngapang*:** MUMF 6131, 82.7 mm SL., Iril River, Bamonkampu, Manipur, India, July 6, 2001, IL. MUMF 6132, 9 exs; 61.7-99.5 mm SL, Lokchao River, Moreh (Indo-Myanmar border), April 10, 2003. Uncat. 4exs. from Sajik Tampak: Kana River, Manipur: collected by L. Arunkumar & Alphonsa, 17th April, 2017. Data from Vishwanath & Linthoingambi (2007), Ng *et al.* (2012), Jiang *et al.* (2012) and Ng & Kullander (2013).

***Glyptothorax panda*:** Data from Ferraris & Britz (2005), Jiang *et al.* (2012) and Ng *et al.* (2012).

***Glyptothorax rugimentum*:** Data from Ng & Kottelat (2008) and Ng & Kullander (2013).

***Glyptothorax senapatiensis*:** ZSI FF 4971, 51.5 mm SL., India: Manipur, Senapati district, Imphal River at Motbung (Chindwin River drainage), $25^0$00′10″N $93^0$54′ 45″E; N. Premananda. 15 Feb. 2012. ZSI FF 4972, 44.0-61.3mm SL., same data as holotype. Data from Premananda *et al.* (2015).

***Glyptothorax striatus*:** Data from Ng & Lalramliana (2013).

***Glyptothorax trilineatus*:** MUMF 12659-12665, 7exs. 76.3-96.4mmSL., Manipur: Chandel District: Chakpi River at Ducho –Dujang, collected by Shangningam *et al.*; 21 March 2011. 3 Uncat. Exs, collected by L. Arunkumar, March 12, 2000. Additional data from Jiang *et al.* (2012).

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