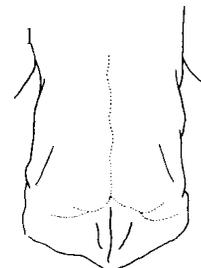


Tenualosa Fowler, 1934

CLUP Tenu

Tenualosa Fowler, 1934, Proc.Acad.nat.Sci.Philad., 85:246 (type: Alosa reevesii Richardson). Macrura Fowler, 1941, Bull.U.S.natn.Mus., (100):626 (type: Clupea kelee Cuvier; genus wrongly attributed to van Hasselt, 1823 by Fowler). Hilsa (part): virtually all authors included the species of Tenualosa in Hilsa until the latter was recently restricted to H. kelee by Wongratana (1983:385).

Diagnostic Features : Moderate or large herring-like fishes (to 50 cm standard length in one species), moderately elongate but compressed, with a keel of scutes along belly. Top of head without numerous longitudinal striae (fronto-parietal striae); upper jaw with a distinct median notch. Gillrakers fine and numerous, those on the inner arches more or less straight, not curled outward. Pelvic finrays i 7; anal fin short, well behind dorsal fin base. Scales moderate, 37 to 47 in lateral series, hind part without perforations. Resembles Hilsa, which has numerous striae on top of head, has the gillrakers on the inner arches curled outward and perforations on scales; gizzard shads (Nematalosa, etc.) have an inferior mouth and most have a filamentous last dorsal finray. Other clupeids have no notch in the upper jaw.



top of head

Biology, Habitat and Distribution : Anadromous or riverine shads of the Indo-West Pacific region, from "the Gulf" to China.

Interest to Fisheries : All contribute to artisanal fisheries, but Hilsa ilisha and to a lesser extent H. toli are of considerable importance (total catch for 1983 was 8 807 tons - recorded as Hilsa ilisha and H. toli).

Species : Wongratana (1980, 1983) recognized 5 species:

- T. ilisha (Hamilton-Buchanan, 1822), northern Indian Ocean
- T. macrura (Bleeker, 1852), Indonesia
- T. reevesii (Richardson, 1846), China to Andaman Sea
- T. thibaudeaui (Durand, 1940), Mekhong River
- T. toli (Valenciennes, 1847), India to Indonesia.

Tenualosa ilisha (Hamilton-Buchanan, 1822)

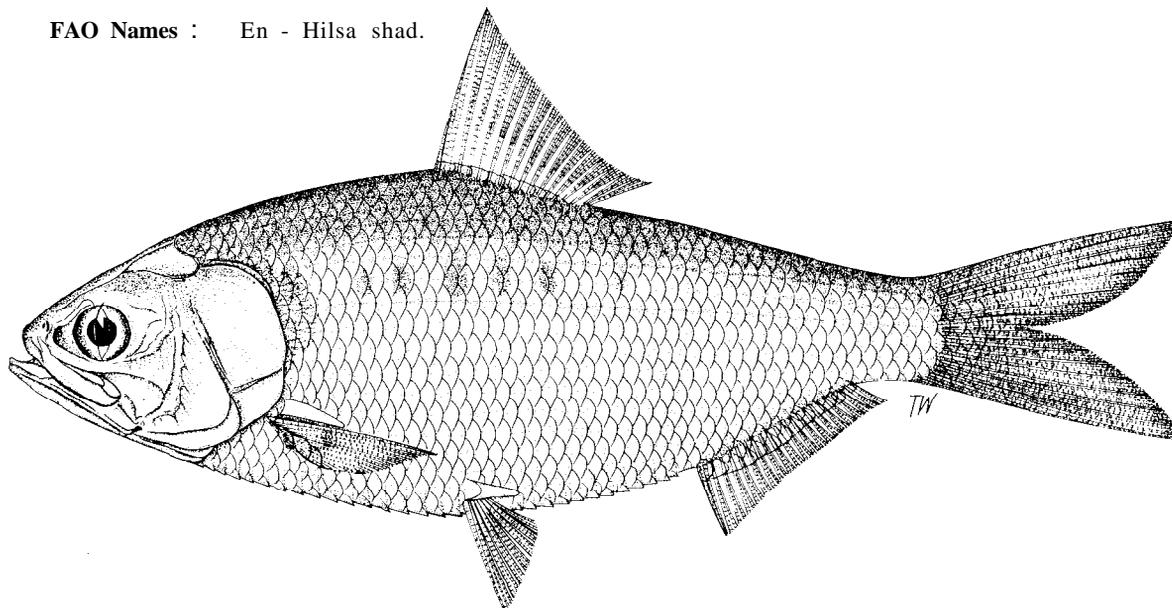
CLUP Tenu 1

Formerly CLUP Hils 2

Clupanodon ilisha Hamilton-Buchanan, 1822, Fishes of Ganges:243, 382, pl. 19, fig. 73 (Ganges estuaries).

Synonyms : Clupea palasah Cuvier, 1829:320 (on Palasah of Russell, 1803); Macrura ilisha :Fowler, 1941:633 (compiled); Hilsa ilisha:Rosa & Pillay, 1963; unpagged (synopsis, biol.); Whitehead, 1965:134, fig. 9 (revision!; Idem, 1967:91 (types of palasah); Idem, 1973:199, fig. 27 (key, synonymy, refs); Tenualosa ilisha - Wongratana, 1980:164, pls 110, 111 (revision; Whitehead & Bauchot, in press (palasah)).

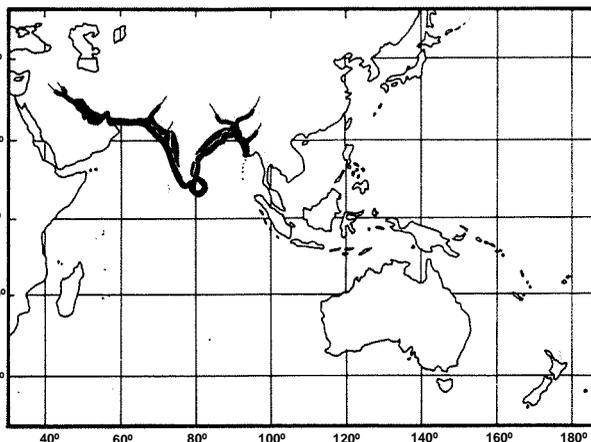
FAO Names : En - Hilsa shad.



Diagnostic Features : Body moderately deep, compressed, belly with 30 to 33 scutes. Head length 28 to 32% of standard length; distinct median notch in upper jaw. Gillrakers fine and numerous, about 100 to 250 on lower part of arch. Caudal fin moderate, 25 to 31% of standard length. A dark blotch behind gill opening, followed by a series of small spots along flank. Resembles T. toli, which has a shorter head (22 to 27% of standard length), a longer caudal fin (31 to 34% of standard length), fewer gillrakers (60 to 100) and no spots along flank, also scutes 28 to 30. The notched upper jaw distinguishes it from other similar clupeids, except Hilsa kelee, which has numerous longitudinal striae on top of head. See CLUP Tenu 1, Fishing Area 51; also, CLUP Hils 2, Fishing Areas 57, 71.

Geographical Distribution : Northern part of Indian Ocean (from "the Gulf" eastward to Burma, including western and eastern coasts of India, also rivers).

Habitat and Biology : Marine, pelagic and schooling in coastal waters, euryhaline, anadromous, ascending rivers for as much 1200 km, but usually about 50 to 100 km. Feeds on plankton, mainly by filter-feeding, but apparently also by grubbing on muddy bottoms; diatoms, protozoans, crustaceans, molluscs and tunicates are recorded, as well as young Tenualosa (Pillay & Rosa, 1963). Breeds mainly in rivers, in some cases far up (about 400 km up the Mahanadi system, and even to Agra and Delhi or over 1000 km up the Ganges), but elsewhere only to about 50 km or less (younger fishes may breed in the tidal zone of rivers). In some rivers the migration is restricted by barrages; there some evidence that Hilsa far up the Ganges and other large rivers, although migrating upstream to spawn, are permanent river populations that do not descend to the sea. The main breeding season is during the southwest monsoon, with a shorter season from January to February or March.



Size : To 60 cm standard length, commonly to 35 to 40 cm.

Interest to Fisheries : The most important of the Indo-Pacific shads, with a total catch in 1983 of 6 277 tons (West Pakistan 5 990 tons, Kuwait 287 tons). The fishes are mainly caught with traps, fishing weirs and drifted or fixed gillnets in estuaries and rivers during the upstream spawning migration; fishermen also use Seine nets, bag nets, clasp nets and cast nets. The esteem in which the hilsa is held is reflected in Sanskrit and Bengali literature, where the fish is described as matsyaraja (king of fishes) and it is said that Illisah jitapiyusah (hilsa surpasses nectar).

Local Names : BURMA: Nga-tha-lauk; INDIA: Chaksi (Narbada River), Hilsa (Bengali, Hindi), Ilihi (Assam), Ilish, Ilisha (Bengal, Orissa), Oolum, etc. (Tamil), Palasah (Telugu), Pala, Palo, Pulla (Sindhi), Paliyah, Paluva, Valava (Malayalam), Palla (Marathi), Paliya (Canarese), Hilsa, Koira (juveniles, West Bengal), Jodi (juveniles, Chilka Lake); IRAN: Soboor IRAK: Shour; PAKISTAN: Ilish, Jatka, Palla.

Literature : Pillay & Rosa (1963 - best summary of biology, fishery); Whitehead (1973 - additional references to biology).

Remarks : Authors have (probably correctly) suspected that individual populations are often isolated and that distinct races exist (reviewed by Pillay & Rosa, 1963). No overall study has yet been made the morphological characteristics of the various 'races'.

Tenualosa macrura (Bleeker, 1852)

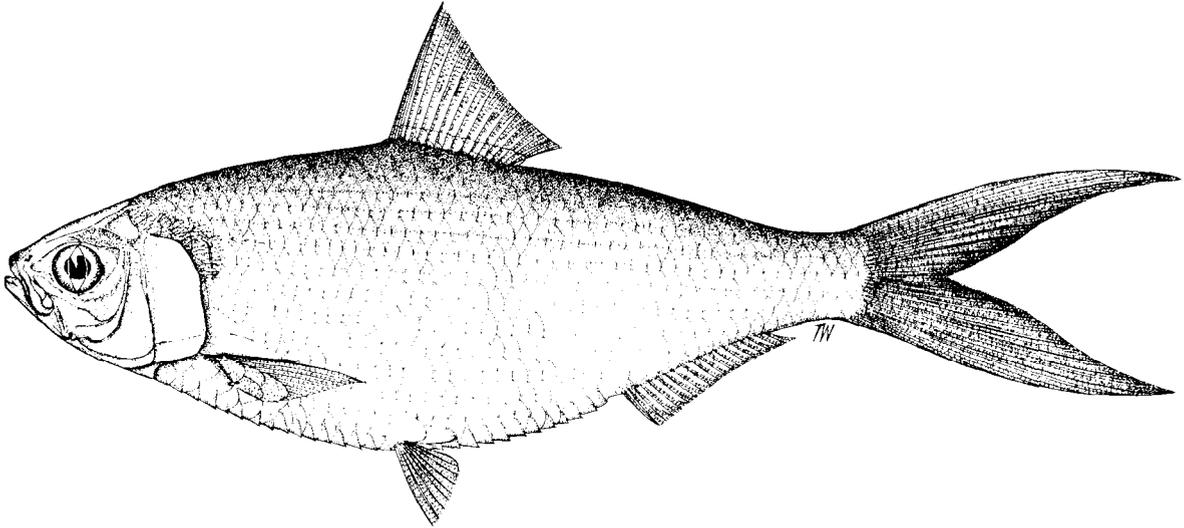
CLUP Tenu 3

Formerly CLUP Hils 3

Alausa macrurus Bleeker, 1852:31 (on macrura of Kuhl & van Hasselt, 1823 - Jakarta, Java).

Synonyms : Macrura macrura:Fowler, 1941:632 (compiled); Hilsa macrura:Whitehead, 1965:141 (revision); Whitehead et al., 1966:86 (neotype for macrurus); Tenualosa macrura - Wongratana, 1980:162, pls 106, 107 (revision).

FAO Names : En - Longtail shad.



Diagnostic Features : Body moderately deep, compressed, belly with 30 to 31 scutes. Head length 22 to 25% of standard length; a distinct median notch in upper jaw. Gillrakers fine but not numerous, 60 to 75 on lower part of arch (barely increasing after 10 cm standard length). Caudal fin long, 40 to 42% of standard length, the lobes long and pointed. No series of dark spots along flanks. Resembles *T. toli*, which has a longer head (25 to 27% standard length), but shorter tail (only 31 to 34% standard length) *T. reevesii* has many more lower gillrakers (80 to 250) and a larger head (27 to 33% standard length). The notched upper jaw distinguishes it from other similar clupeids, except *Hilsa kelee*, which has numerous longitudinal striae on top of head, also spots along flank. See CLUP Hils 3, Fishing Areas 57, 71.

Geographical Distribution : Malaysia and Indonesia (Java Sea and Sarawak, also affluent rivers).

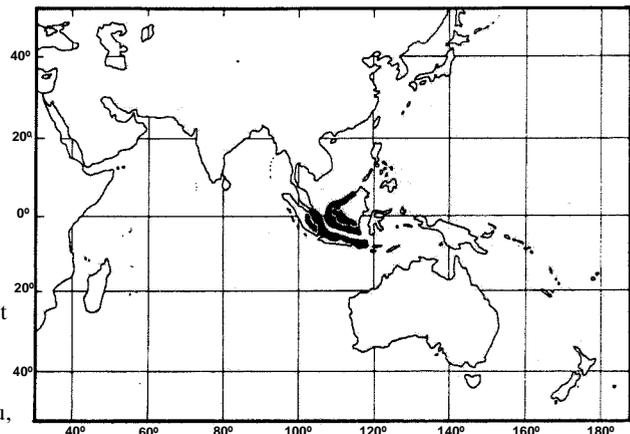
Habitat and Biology : Marine, pelagic and schooling in coastal waters, euryhaline, anadromous, ascending rivers to breed. Presumably its biology is similar to that of *T. ilisha*, but the fewer gillrakers suggest that it takes larger food organisms.

Size : To 52 cm standard length.

Interest to Fisheries : Perhaps more important locally than the records imply. Indonesian records (as *Hilsa toli*) gave a total of 2 530 tons in 1983.

Local Names : INDONESIA, MALAYSIA: Trubu, Trubuk.

Literature : There seems to be no modern study of the biology of this species.



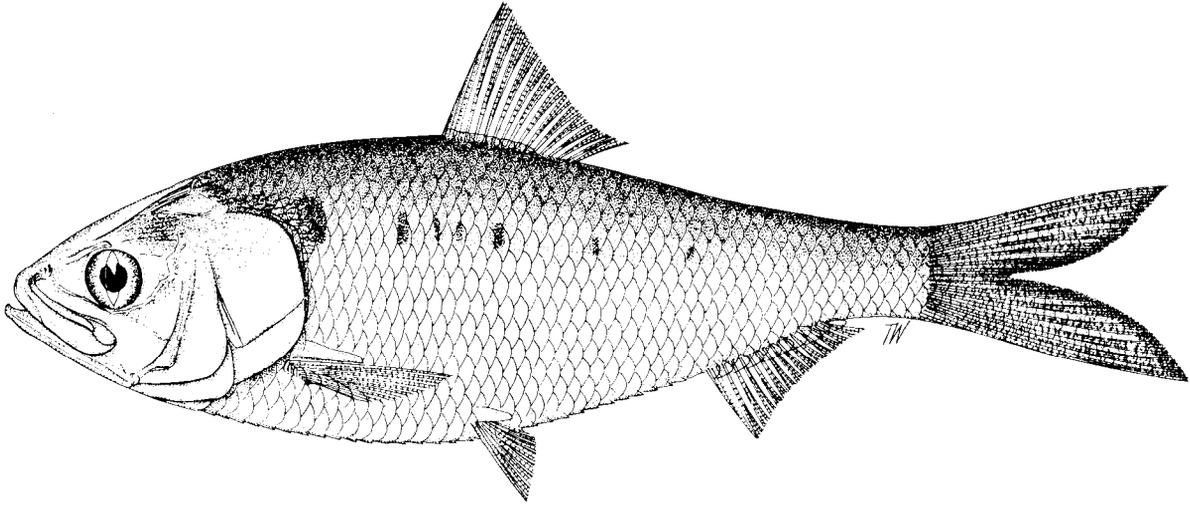
Tenulosa reevesii (Richardson, 1846)

CLUP Tenu 4

Alosa reevesii Richardson, 1846, *Ichthyol.China Japan*:305 (China, in fact Canton or Macao).

Synonyms : ? *Clupea sinensis* Linnaeus, 1758:319 (identity uncertain, best considered a *nomen dubium*); *Macrura reevesii*:Fowler, 1941:630, fig. 17 (China); Chu, Tchang & Chen, 1963:101, fig. 76 (China); *Hilsa reevesii*:Whitehead, 1965:139 (revision); *Idem*, 1966:30, pl. '2, fig. 3 (type of *reevesii*, the Reeves drawing); *Idem*, 1970:208 (type of *reevesii*, listed); *Tenulosa reevesii* - Wongratana, 1980:163, pl. 108, 109 (revision).

FAO Names : En - Reeves shad.



Diagnostic Features : Body moderately deep, compressed, belly with 31 to 32 scutes. Head large, its length 27 to 33% of standard length; a distinct median notch in upper jaw. Gillrakers fine and numerous, 80 to 250 on lower part of arch (increasing with size of fish), each raker with scattered asperities. Caudal fin moderate, 25 to 31% of standard length. A dark blotch behind gill opening and a series of spots along flanks. Resembles T. toli, which has a smaller head (25 to 27% of standard length), but longer caudal fin (31 to 34% of standard length) and only 60 to 75 gillrakers; T. macrura of Indonesia has a much longer tail (40 to 42% of standard length); T. thibaudeau of Thailand has more gillrakers (more than 250 from 10 cm standard length). The notched upper jaw distinguishes it from other similar clupeids, except Hilsa kelee, which has numerous longitudinal striae on top of head.

Geographical Distribution : China (to about 30° N) and possibly southward into South China Sea, but records uncertain. Two specimens from eastern part of Indian Ocean (Phuket Island, Andaman Sea - see Wongratana, 1980:164). The species thus overlaps T. toli in range.

Habitat and Biology : Marine, pelagic and schooling in coastal waters, euryhaline, anadromous, ascending rivers to breed. More data needed.

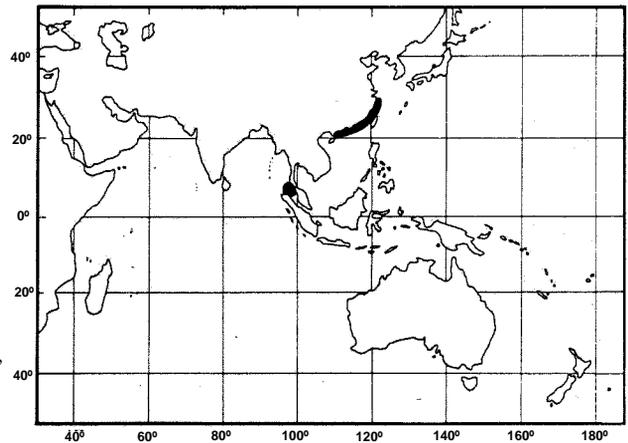
Size : To at least 50 cm standard length.

Interest to Fisheries : Catches not reported, but probably of some importance in China.

Local Names : CHINA: Sam lai, San le.

Literature : There appear to be no recent studies.

Remarks : The Phuket Island specimens (Andaman Sea) suggest that T. reevesii continues the range eastward of the closely related T. ilisha (Indian Ocean only).



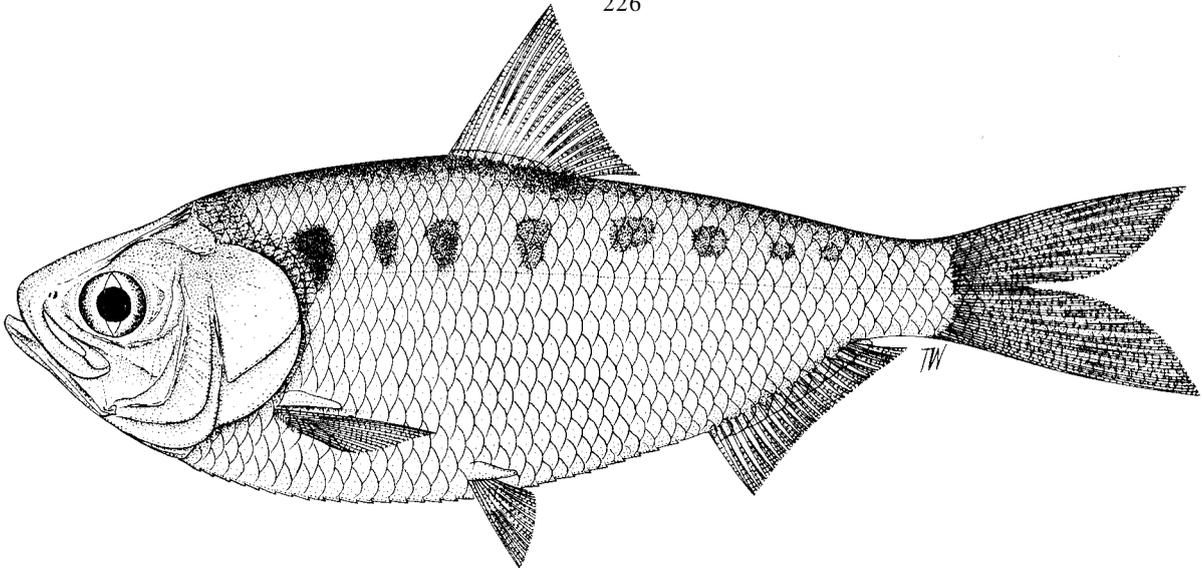
Tenulosa thibaudeau (Durand, 1940)

CLUP Tenu 5

Clupea (Alosa) thibaudeau Durand, 1940, Inst.oceanogr.Indochine, (note 36):6, pl. 1 (Phnompenh).

Synonyms : Hilsa kanagurta:Taki, 1974:47, fig. 48 (Laos - misidentified); Tenulosa thibaudeau - Wongratana, 1980:166, pls 112, 113 revision).

FAO Names : En - Laotian shad.



Diagnostic Features : Body moderately deep, compressed, belly with 28 to 30 scutes. Head large, its length 30 to 33% of standard length; a distinct median notch in upper jaw. Gillrakers fine and very numerous, 204 to 316 on lower part of arch (in fishes of 8.5 to 22 cm standard length, increasing with size of fish); with mucosal buds and not asperities on upper edges of rakers. Caudal fin moderate, about 25 to 30% of standard length. A dark blotch behind gill opening and a series of spots along flank. Closely resembles the Indian Ocean T. ilisha, which has fewer gillrakers (about 100 to 250) and T. reevesii (probably present in South China Sea), which also has fewer gillrakers (about 80 to 250); the gillrakers increase with size of fish, but even at 10 cm standard length T. thibaudeaui has more than 250 rakers. The notched upper jaw and spots along flank distinguish it from any similar clupeids where it occurs, except Hilsa kelee, which has numerous longitudinal striae on top of head.

Geographical Distribution : Mekong River system (at Nongkai and at Ubon-rajthani on Mool River, Thailand; also Luang Prabang, Vientiane, Pakse, Hatsalao, Tha Ngon and Tha Bo, Laos; these localities are up to nearly 2000 km from the sea, e.g. Luang Prabang at about 20° N).

Habitat and Biology : Riverine (at least judging from the distance up the Mekong River). A ripe male of 12.7 cm was recorded at Nongkai, Thailand (Wongratana, 1980:167). More data needed.

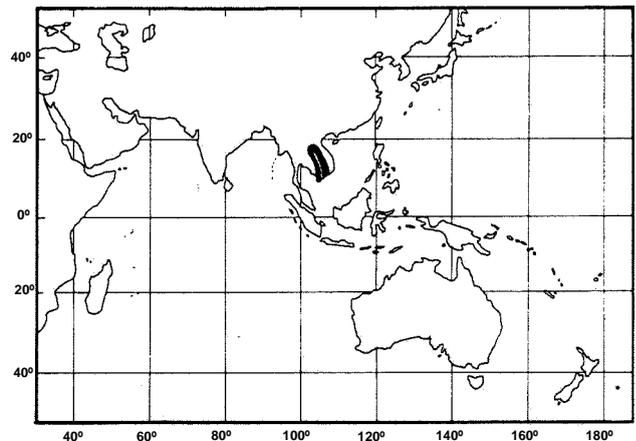
Size : To 26 cm standard length (fide Durand, 1940 - specimens lost; a fish of 21.7 cm examined by Wongratana).

Interest to Fisheries : Perhaps of local interest.

Local Names : LAOS: Pa mak pang.

Literature : See synonymy.

Remarks : If truly confined to freshwaters, then resembles the populations of T. ilisha in the upper parts of the Ganges, which are believed not to migrate back to the sea.



Tenualosa toli (Valenciennes, 1847)

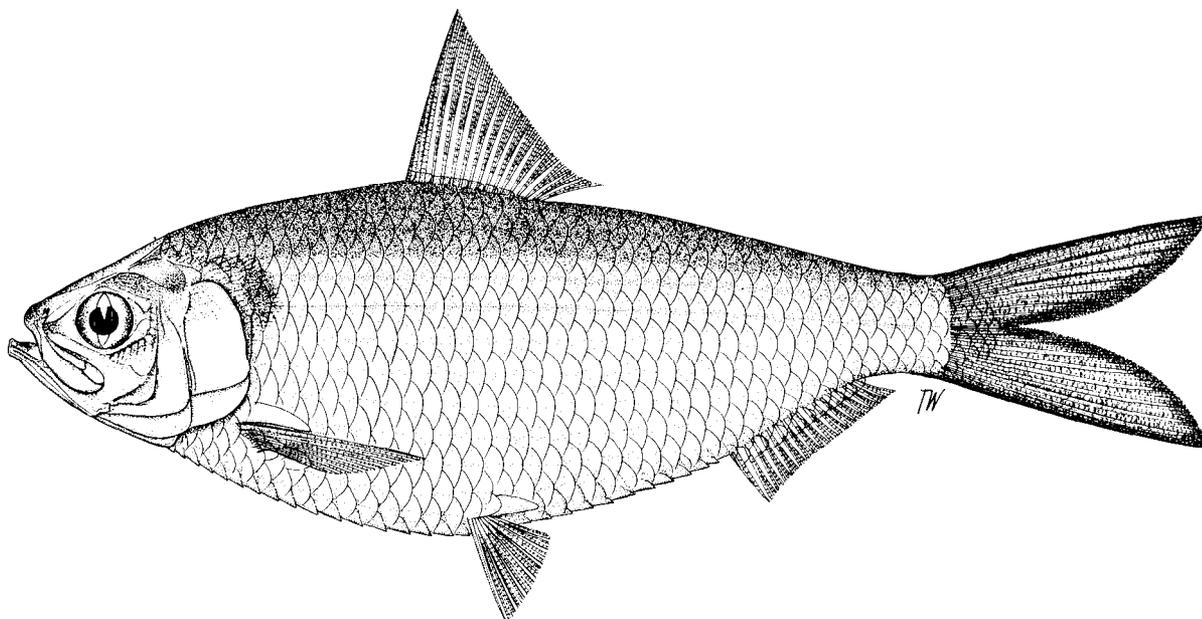
CLUP Tenu 2

Formerly CLUP Hils 4

Alausa toli Valenciennes, 1847, Hist.nat.poiss., 20:435 (Bombay, Pondicherry).

Synonyms : Alausa argyrochloris Valenciennes, 1847:440 (Bombay, but not Mauritius specimens); Alausa ctenolepis Bleeker, 1852:74 Jakarta, Muntok, Singapore); Macrura sinensis:Fowler, 1941:631 (compiled, the name sinensis considered to derive from Clupea sinensis Linnaeus, 1758:319, but that species probably composite; Fowler's China references will be T. reevesii or for Thailand perhaps T. thibaudeaui); Hilsa toli:Whitehead, 1965:143, fig. 10 (revision); Whitehead et al., 1966:85 (type of ctenolepis); Whitehead, 1967:93 (types of tolu, argyrochloris); Whitehead, 1973b:200, fig. 28 (key, synonymy, refs); Tenualosa toli - Wongratana, 1980:161, pls 104, 105 (revision); Whitehead & Bauchot, in press (types of tolu, argyrochlorid).

FAO Names : En - Toli shad.



Diagnostic Features : Body moderately deep, compressed, belly with 28 to 30 scutes. Head length 25 to 27% of standard length; a distinct median notch in upper jaw. Gillrakers fine but not numerous, 60 to 100 on lower part of arch (barely increasing after 10 cm standard length). Caudal fin short, 31 to 34% standard length. At most, a dark diffuse mark behind gill opening, but no other spots on flank. Resembles *T. ilisha*, which has a longer head (28 to 32% standard length), shorter caudal fin (25 to 31% standard length), more gillrakers (100 to 250, increasing in larger fishes) and spots along the flank, also scutes 30 to 33. Other *Tenualosa* species also have more than 100 gillrakers in fishes over about 10 cm standard length. The notched upper jaw distinguishes it from other similar clupeids, except *Hilsa kelee*, which has numerous longitudinal striae on top of head and spots along flank. See CLUP Tenu 2, Fishing Area 51; also CLUP Hils 4, Fishing Areas 57, 71.

Geographical Distribution : India (eastern and western coasts, also rivers) to Java Sea and South China Sea (Java, Thailand, thus overlapping range of *T. macrura*).

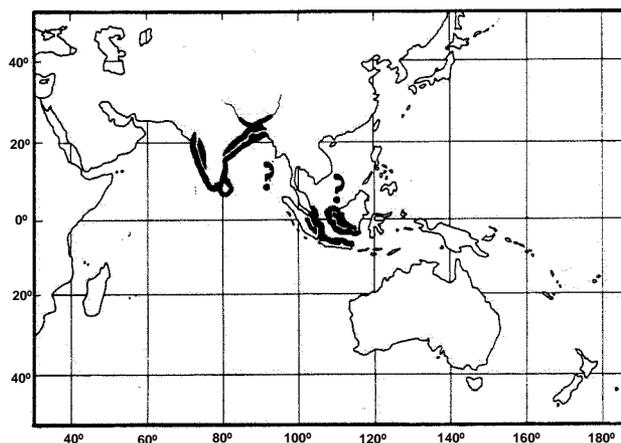
Habitat and Biology : Marine, pelagic and schooling in coastal waters, euryhaline and perhaps anadromous, ascending rivers to breed (but in some areas fishery workers claim that it does not). Presumably its biology is similar to that of *T. ilisha*, but the fewer gillrakers suggest that it takes larger food organisms. More data needed, especially since it is not always distinguished from *T. ilisha*, especially at juvenile stages.

Size : To 50 cm standard length.

Interest to Fisheries : Not always distinguished from *T. ilisha* in catches. Caught with the same gear as *T. ilisha* (gillnets, seines, etc.).

Local Names : INDIA: Chandan-ilish (Calcutta), Kajli-ilish.

Literature : As given in synonymy.



Gudusia Fowler, 1911

CLUP Gud

Gudusia Fowler, 1911, Proc.Acad.nat.Sci.Philad: 207 (type: Clupanodon chapra Hamilton-Buchanan). Given incorrectly by some authors as Gadusia.

Diagnostic Features : Moderate-sized herring-like fishes (to about 16 cm standard length), body quite deep and compressed, with a keel of scutes along belly. Snout shorter than eye; upper jaw with a distinct median notch. Gillrakers fine and numerous, increasing with size of fish (100 to 280 in specimens of 4 to 16 cm standard length). Pelvic finrays i 7, its insertion usually just before dorsal fin origin; anal fin short, well behind dorsal fin base. Scales small, the rows somewhat irregular except on upper part of body, 77 to 91 in lateral series. Resembles Tenualosa, which has fewer scales (37 to 47), evenly arranged, and the snout usually longer than eye. Gizzard shads have an inferior mouth and most have a filamentous last dorsal finray. Other clupeids have no notch in the upper jaw.

Biology, Habitat and Distribution : Riverine shads of India to Burma.

Interest to Fisheries : Contribute to artisanal fisheries in rivers.

Species : According to Wongratana (1980) only 2 species:

G. chapra (Hamilton-Buchanan, 1822), Indian rivers

G. variegata (Day, 1869), Burmese rivers.

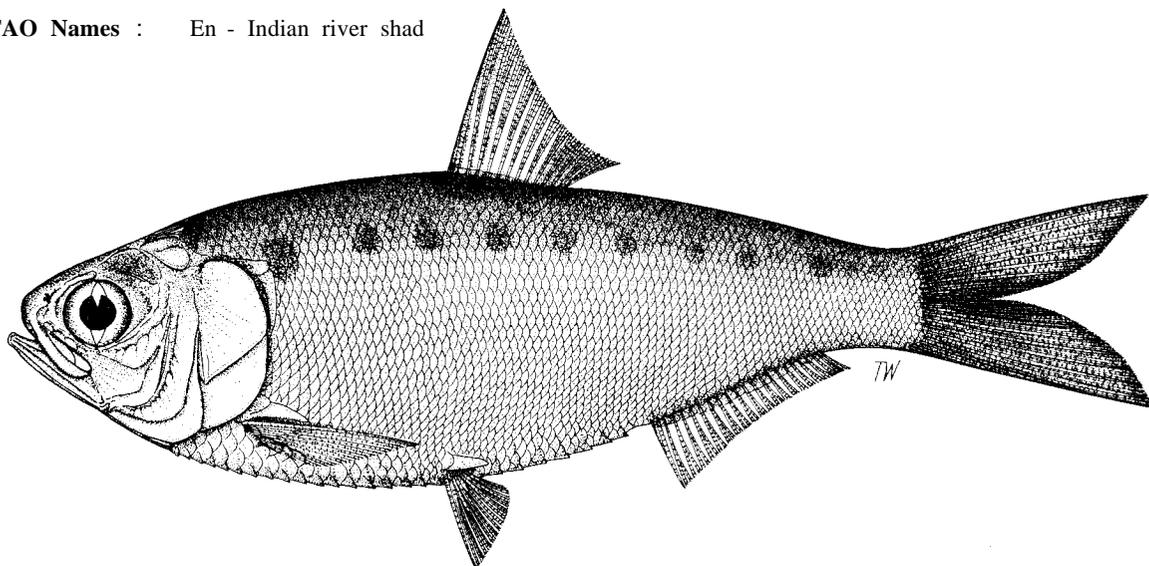
Gudusia chapra (Hamilton-Buchanan, 1822)

CLUP Gud 1

Clupanodon chapra Hamilton-Buchanan, 1822, Fishes of Ganges:248, 383 (upper Ganges).

Synonyms : Clupanodon cagius Hamilton-Buchanan, 1822:250, 383 (Ganges in northern Bihar); Clupea indica Gray, 1834:pl. 91, figs 1, 2 (India, on Hardwicke drawing); Clupea champil Gray, 1834:pl. 91, figs 5, 6 India, on Hardwicke drawing); Alausa microlepis Valenciennes, 1847:439 (Bengal); Clupea suhia Chaudhuri, 1912:436, pl. 38, fig. 1 (Gandak River at Saran, Bihar); Gudusia godanahiai Srivastava, 1968:6, fig. 4a, b (Gorakhpur, Uttar Pradesh); Gudusia chapra - Fowler, 1941:634 (Ganges); Whitehead, 1965:148, fig. 11 (revision); Idem, 1967:95 (types of microlepis); Idem, 1973b:201, fig. 29 (key, synonymy, refs); Wongratana, 1980:167, pls 114, 115 (revision); Jayaram, 1981:40, fig. 25 (key only).

FAO Names : En - Indian river shad



Diagnostic Features : Body fairly deep, its depth 31 to 39% of standard length; 26 to 29 scutes along belly. A single triangular pectoral axillary scale; depressed tip of dorsal fin to behind vertical from anal fin origin. Hind margin of scales smooth. Dark blotch behind gill opening, often followed by a series of spots along flank. Resembles G. variegata of Burmese rivers, which is much deeper (depth 42 or 43% of standard length), has more scutes (29 or 30, the depressed dorsal fin tip not reaching vertical from anal fin origin, and the hind margin of the scales toothed. Species of Tenualosa have larger scales (only 37 to 47 in lateral series; cf. 77 to 91).

Geographical Distribution : Rivers of India and Bangladesh affluent to the Bay of Bengal (chiefly the Ganges and Brahmaputra systems and the Mahanadi River of Orissa).

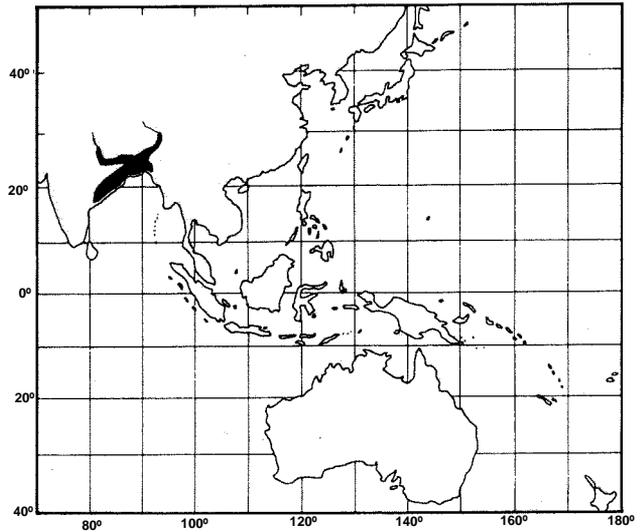
Habitat and Biology : Riverine in middle and upper reaches. More data needed.

Size : To 15 cm standard length.

Interest to Fisheries : Contributes to riverine artisanal fishes, but catches not recorded.

Local Names :-

Literature : Whitehead (1973b - reference to 5 papers that include notes on biology).



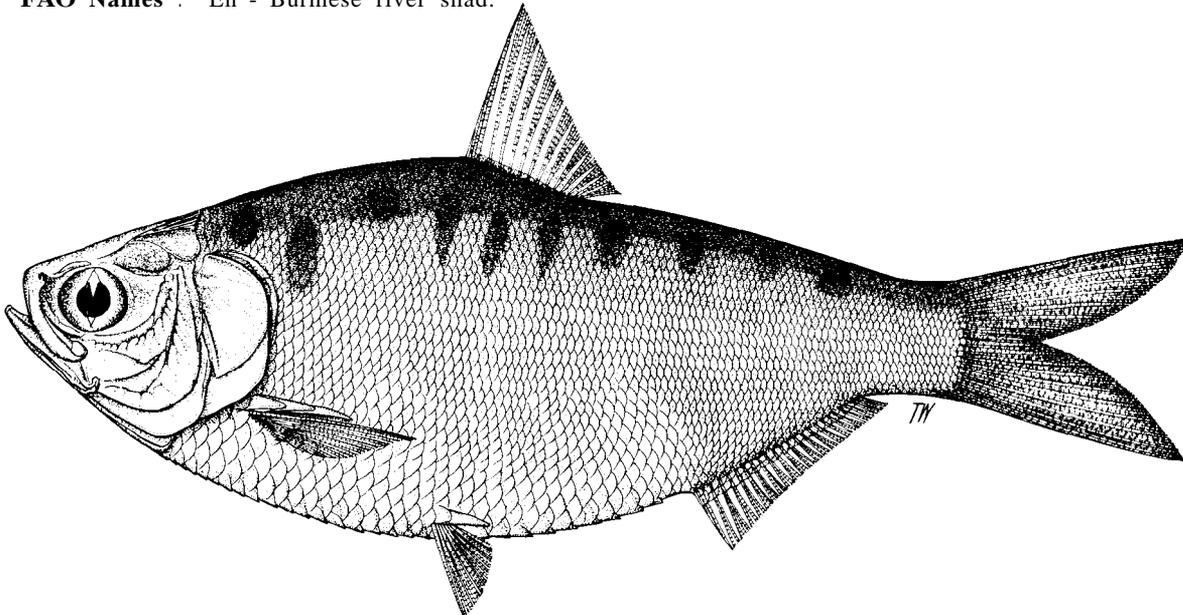
Gudusia variegata (Day, 1869)

CLUP Gud 2

Clupea variegata Day, 1869, Proc.zool.Soc.Lond.:623 (Irrawady River, Burma).

Synonyms : *Gudusia variegata* - Fowler, 1941:635 (on Day); Whitehead, 1965:150, fig. 12 (revision); *Idem*, 1973b:201 (in key only); Wongratana, 1980:169, pls 116, 117 (revision); Jayaram, 1981:40 (key only).

FAO Names : En - Burmese river shad.



Diagnostic Features : Body deep, its depth 42 or 43% of standard length; 29 or 30 scutes along belly. Three small triangular pectoral axillary scales; depressed tip of dorsal fin not reaching to vertical from anal fin origin. Hind margin of scales toothed. Dark blotch behind gill opening, followed by a series of spots along upper flank. Resembles *G. chapra* of Indian rivers, which is more slender (depth 31 to 39% of standard length), has fewer scutes (26 to 29), the depressed dorsal fin tip surpassing the anal fin origin, and the hind border of the scales smooth. Species of *Tenualosa* have larger scales (only 37 to 47 in lateral series; cf. 77 to 91).