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Record of Economic Animals of China

Freshwater Fishes

by

Wu San-wen, Young Gan-yung, Yeh Pei-chi and Huang Hung-jean

Preface

This book was written as a part of the "Record of Economic Animals of China". It describes a total of 111 species of the major freshwater economic fishes which are produced in various parts of China. A key to all these 111 species of fishes was given in the beginning of this book for the convenience of readers to search for the name of a fish. Furthermore, taxonomic properties of every species of fish are briefly delineated along with the supplementary pictures of the exterior appearance of fishes to help readers confirm whether the name they find is correct. In addition to these, records of the habit, growth, reproduction, feed, distribution and economic application of every species of fish may serve as refereces for marine product workers and fish biologists.

Among these 111 species of freshwater economic fishes, a majority of 73 species is from Cyprinidae family. This reflects the characteristic distribution of the freshwater fishes of China as well as the situation for the application of freshwater fish resources of China. As far as geographical distribution is concerned, Chiangjiang river basin produces wide varieties of fishes. The number of species of freshwater fishes inhabiting the Chiangjiang river basin constitutes a high percentage of the total number of species of freshwater fishes in China. Some important species are also selected from various large rivers and their associated bodies of water from east to west and from south to north in every part of the country. Therefore, this book is widely applicable throughout the entire nation.

We would like to point out that the distribution of freshwater economic fishes is rather scattered and the number of species of fishes is very great. Although more than 100 species are described in this book, some renowned local products, such as spring fish of Hupei province and another type of Psephurus fish from northern Sinjiang province etc., are not yet incorporated in this book due to insufficient information. Furthermore, the following fishes which may also be classified as economic fishes are not included in this book; Oncorhynchus masou and Oncorhynchus keta of the northeastern region, fishes from Schizothorax genus and fishes from Misgurnus genus of Chinghai and Tibet areas

as well as fishes from the Spinibarbus genus of Seejiang river etc. These will be supplemented in the future.

We can see that the content of this book not only contains the taxonomy of every species of fishes but also includes its individual ecology. Research on individual ecology has only begun to make significant progress since the liberation. Therefore, the content of this book is restricted by the standard of the development.

The taxonomic information employed in this book was based on the specimenswhich were collected by us over the years. The ecological data were taken from results of investigations conducted by the Research Institute for Aquatic Life of the Chinese Academy of Science in various parts of China, such as the investigation of Liangtze lake, investigation on the resources of Chiangjiang, investigation of Hailungjiang, investigation of southern and northern bodies of water as well as the investigation of the five lakes. In addition to these, some results of investigations conducted by various organizations in the country were also employed. Even so, these materials were still insufficient. The author made special trips to Kwanxi and Hainandou to collect some ecological information on fishes. Although the source of information is not specified in the text of this book, a list of references is presented at the end indicating that we can not take all the credit.

Since there is still a lot to be desired from the contents of this book and there may be unavoidable errors, the authors sincerely hope that readers will give us their valued opinions through further investigation. These opinions will be useful for the future revision of this book.

Some of the Figures of this book were drawn by comrades Zen Chung-nian and Shieh Tsai-po. Some of them were photographed by Chuang Ding-tsu. The authors would like to take this opportunity to express their gratitude for their assistance.

The editors

Dec. 1961.

Foreword for the Second Printing

The publication of "Record of Economic Animals of China- Freshwater Fishes" in 1963 has been enthusiastically received by readers. Within one year, many valuable opinions were contributed by readers. In the meantime, research on freshwater fishes has made impressive progress in China. These triggered off the necessity of supplementing and verifying this book. We revised some parts of the text. We still hope

to improve the quality of this book in the future by making a greater effort in our research of this area. Meanwhile, we sincerely hope that readers will give us their opinions again.

The editors

12, Feb., 1964

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Key to the Major Freshwater Economic Fishes of China

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2(3). Mouth in the center of a round basin, maxillary and mandible absent (Fig.1). .... Lampetra japonica (Martens) (p.11).

3(2). Maxillary and mandible present; mouth situated between maxillary and mandible

4(5). Fins absent; Right and left gill openings extending downward to unite at the ventral side of the head (Fig. 2).... .....Monopterus albus (Zuiew) (p.138).

5(4). Pelvic fin absent but pectoral fin present; left and right gill openings separated from each other.

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9(18). Heterocercal caudal fin, Upper lobe of the caudal fin conspicuously longer than the lower lobe of the caudal fin.

10(11). Lateral body smooth without bony plates; very long

snout, its length more than twice the head length measured from the posterior margin of the eye.....
.....Psephurus gladius (Martens) (p.16)

11(10). One row of bony plates on lateral line and ventral side respectively; snout relatively long, length of snout equal to or shorter than the length of the head measured from the posterior margin of the eye.

12 (13). Left and right gill membranes extending ventrally and eventually united. (Fig. 3).....
.....Huso dauricus (Geogi) (p.12).

13(12). Left and right gill membranes attached to the relatively wide isthmus, but separated from each other.

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..... Acipenser schrenchi (Brandt) (p.14).

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22(23). Long maxillary extending posteriorly near or reaching the base of pectoral fin; Vertical scale rows at the lateral side of the body 74-84..... .....Coilia ectenes J. et S. (p.18).

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27(30). Entire body transparent when alive; skull of immersion specimen becoming transparent; brain visible externally.

28(29). Anterior end of the snout sharp; small teeth on palatine bone; large canine teeth at the anterior part of the lower jaw..... Hemisalanx prognathus Regan (p.25)

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part of the lower jaw.....
..... Neosalanx tankankei taihuensis Chen (p.26).

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63(64). 2 rows of infrapharyngeal teeth.....
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.....P. rabaudi (Tchang) (p.38).

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.....Cyprinus pellegrini Tchang (p.39).

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78(79). One pair of barbels; distinctive lateral line, lateral

line scales about 97; soft spines of dorsal fin smooth.....Diptychus dybowskii Kessler (p.43).

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84(85). Continuous groove behind the lip; border of the lower jaw slightly ossified, but not forming a very sharp edge.....Schizothorax yunnanensis Norman (p.46).

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87(90). Soft saw teeth present on the posterior edge of hard spines of dorsal fin.

88(90). Mouth slightly curved, very sharp chitinous edge at

the lower jaw.....Sch. prenanti (Tchang) (p.48).

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91(92). Short barbels, length shorter than the diameter of eye; barbel at anterior jaw at most reaching the underside of the posterior margin of nostril; barbels at the posterior jaw at most reaching vertical line through the middle of the eye ball.....
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.....Sch. dolichonema Herz. (p.50).

93(76). No especially large-sized scales at the base of anal fin and the vicinity of anus.

94(119). Very long anal fin, branched fin rays 15-35; abdominal keel present at abdomen.

95(104). Complete abdominal keel (from the base of pectoral fin to anus).

96(97). No hard spine in dorsal fin.....
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97(96). spiny dorsal fin.

98(101). Anal branched fin rays less than 17; lateral line drastically descending downward from pectoral fin.

99(100). Lateral line scales over 48; gill rakers 15-18; abdominal membrane grayish black.....
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100(99). Lateral line scales less than 48; gill rakers 18-24; dark black abdominal membrane.....
.....H. bleekeri Warp. (p. 53).

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102(103). Mouth in superior position; gill rakers 25-29; anal branched fin rays 24-29.....
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103(102). Mouth in horizontal position; gill rakers 14-20; anal branched fin rays 27-35.....
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104(95). Abdominal keel incomplete (only between the base of pelvic fin to anus).

105(108). Mouth in horizontal position; body high with the shape of water chestnut; body length 1.9-2.8 times of the body depth.

106(107). Angle for upper and lower jaws large; well developed chitinous edge; height of dorsal fin obviously greater than head length; length of peduncle greater than

height of peduncle...Megalobrama terminalis (Rich.) (p.56).

107(106). Angle for upper and lower jaws small; well developed chitinous edge absent; height of dorsal fin not exceeding length of head; length of peduncle less than height of peduncle.....M. amblycephala Yih (p.58).

108(105). Mouth superior; body not in the shape of water chestnut, body length about 4 times of the body depth.

109(114). Lateral line scales below 70.

110(113). Body rather thin and compressed; body length 3.3-4.0 times the head length; gill rakers 20-22; all the fins grayish black. P.5

111(112). Back of the posterior part of the skull bulged; head length 3.7-3.9 times the length of snout; entire body gray.....Erythroculter dabryi (Bleeker) (p.59).

112(111). Back of the posterior part of the skull strongly bulged; head length 3.3-3.7 times the length of snout; entire body silvery gray..... E. dabryi shikainensis Yih et Chu (p.61).

113(110). Body relatively thick; body length 4.1-4.5 times head length; gill rakers 22-23; caudal fin orange red.....E. oxcephalus (Bleeker) (p.61).

114(109). Lateral line scales more than 70.

115(118). Mouth in sub-superior position, splitting obliquely; gill rakers 17-22; lateral line scales below 85; caudal fin red.

116(117). Head small, posterior part of the head bulged; lateral line scales 80-85; anal branched fin rays 23-24; lower lobe of caudal fin orange red.....E. exycephaloids (K. et P.) (p.62).

117(116). Posterior part of head not bulged; lateral line scales 73-79; anal branched fin rays 18-22; lower lobe of caudal fin bright red.....E. mongolicus (Basil.) (p. 63).

118(115). Mouth splitting vertically, superior position; gill raker 23-28; lateral line scales 83-93; caudal fin grayish black.....E. ilishaeformis (Bleeker) (p. 64).

119(94). Anal fin short or medium length, branched fin rays below 15; abdominal keel absent (few exceptions).

120(155). Anal fin medium length, branched fin rays 7-14.

121(128). Mouth in inferior position; special anterior cartilagious edge in lower jaw; one smooth hard spine in dorsal fin.

122(123). One row of infrapharyngeal teeth; lateral line scales below 50...Acanthobrama simoni Bleeker (p. 66).

123(122). 3 rows of infrapharyngeal teeth; lateral line scales over 50.

124(125). Abdominal keel present between the base of pelvic

fin and anus; lateral line scales 74-84.....
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125(124). Abdominal keel absent; even if present, only appearing as a very small section in front of anus; lateral line scales 50-70.

126(127). Body length 3.7-4 times the body depth; lateral line scales 53-64...Xenocypris argentea Günther (p.67).

127(126). Body length 3.3-3.7 times the body depth; lateral line scales 63-68.....X.davidi Bleeker (p.68).

128(121). Mouth in horizontal or slightly inferior position; no special cartilaginous edge at the lower jaw; hard spine in dorsal fin absent.

129(134). One row of infrapharyngeal teeth.

130(131). Infrapharyngeal teeth rounded, molar like.....
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132(133). Straight unforked tail or slightly concave inward; lateral line scales 95-110....Tinca tinca (L.) (p. 70).

133(132). Tail forked; lateral line scales 41-42.....
.....Rutilus rutilus aralensis Berg (p.71).

134(129). 2-3 rows of infrapharyngeal teeth.

136(137). Infrapharyngeal teeth laterally compressed, obliquely cut, in a comb shape.....
..... Ctenopharyngodon idellus (C. et V.) (p.72).

137(136). Tip of infrapharyngeal teeth curved like a hook.

138(139). Anterior part of head elongated; snout duckbill-like; lateral line scales 140-170.....
.....Leciobrama macrocephalus (Lacép.) (p. 74).

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.....Pseudaspius leptocephalus (Pallas) (p.75).

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142(143). Lateral line scales 46-48; posterior part of the lateral line situated below the central axis of peduncle; number of scales in front of dorsal fin 21-24.....Leuciscus baicalensis (Dyb) (p.76).

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144(145). Head length 2.7-3.6 times the distance between the two eyes; lateral line scales 50-56; scales in front of dorsal fin 24-28...L. Walechii (Dyb.) (p.76).

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.....L. idus (L.) (p.77).

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149(150). One indentation on each side of the lower jaw fitting into the protuberance of the upper jaw.....
.....Opsariichthys uncirostris bidens Günth (p.79).

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151(152). More than 10 vertical stripes on both sides of the body; anal fin rays generally elongated.....
.....Zacco platypus (Schlegel) (p.73).

152(151). No vertical stripes on both sides of the body; anal fin rays not elongated.

153(154). No red speck on eye; snout conical shape; lateral line scales 67-70.....
.....Ochetobius elongatus (Kner) (p.80).

154(153). One red speck on the eye; snout relatively rounded; lateral line scales 43-48.....
..... Squaliobarbus curricus (Rich) (p.81).

155(120). Anal fin short, branched fin rays 5-6.

156(187). 3 rows of infrapharyngeal teeth (very few of them have only one row), anal branched fin rays 5.

157(162). Skin of snout connecting the upper lip without any separation line in between.

158(159). A small chitinous protuberance covering a small area in the back side of the lower lip (Fig. 9).....
.....Pseudogyrinocheilus procheilus (S. et D) (p.81).

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160(161). Two pairs of barbels; lateral line scales 32-34..... .....Garra orientalis Nichols (p.82).

161(160). Barbel absent; lateral line scales about 50..... .....Ageneiogarra imberba Garman (p.83).

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163(166). Dorsal branched fin rays more than 10; hard spine absent.

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167(172). A horizontal spine sticking out in forward direction in front of the origin of dorsal fin (Occasionally, this horizontal spine is buried under the skin) (Fig.11).

168(169). Posterior edge of the hard spine in dorsal fin smooth; lateral line scales 24-26..... .....Spinibarbus caldwelli Nichols (p.86).

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169(168). Saw teeth present on the posterior edge of the hard spine in dorsal fin; lateral line scales 28-35.

170(171). Pelvic fin in front of the origin of dorsal fin; lateral line scales 28-32.....
.....Spinibarbichthys denticulatus Oshima (p.86).

171(170). Pelvic fin behind the origin of dorsal fin; lateral line scales 32-35....S. sinensis (bleeker) (p.87).

172(167). No horizontal spine in front of the origin of dorsal fin.

173(176). Mouth in superior position; lower jaw slightly more forwardly protrudent than the lower jaw.

174(175). Lateral line scales 51-54.....
.....Percocypris pingi (Tchang) (p.88).

175(174). Lateral line scales 73-85...P. grahami (Regan) (p.89).

176(173). Mouth in inferior position; upper jaw slightly more forwardly protrudent than the lower jaw.

177(180). Lower lip completely covering the lower jaw, lower lip obviously divided into 3 lobes.

178(179). Middle lobe of the lower lip only a little square block extending backward but not exceeding the horizontal line through the edge of the mouth.....
.....Tor brevifilis (Peters) (p.90).

179(178). Middle lobe of the lower lip extending backward exceeding the horizontal line through the edge of the mouth.....Parator zonatus (Lin) (p.91).

180(177). Lower lip only present in both lateral sides of the base of lower jaw; groove behind the lip not continuous.

181(184). Saw teeth present in the posterior edge of the hard spines in dorsal fin; anal fin rays 3-5; mouth wide; chitinous edge at the lower jaw.

182(183). One pair of barbels or completely degenerated; lateral line scales 46-49.....
.....V. angustistomatus Fang (p.93).

184(181). Hard spines of dorsal fin smooth; anal fin rays 3-6; mouth narrow, no chitinous edge at the lower jaw.

185(186). Many black blotches on the back of the body as well as the caudal fin of adult fish.....
.....Hemibarbus maculatus Bleeker (p.94).

186(185). Bloches absent from the body and all the fins of adult fish (However, blotches were sometimes observed in young fish)....H. labeo (Pallas) (p.94).

187(156). 1 or 2 rows of infrapharyngeal teeth; anal branched fin rays 6.

188(197). One row of infrapharyngeal teeth.

189(192). Lateral line scales below 51.

190(191). Lateral line scales 40-41; 4 very wide black blotches on the lateral side of the body; well developed chitinous layer in the anterior edge of the lower jaw.....Sarcocheilichthys sinensis Bleeker (p.95).

191(190). Lateral line scales 48-51; 10 irregular blotches on the lateral side of the body; many papillae on upper and lower lips.....Saurogobio dabryi Bleeker (p.96).

192(189). Lateral line scales over 50.

193(194). Arch shapedmouth; posterior part of pectoral fin far exceeding the base of pelvic fin.....
.....Coreius zeni Tchang (p.98).

194(193). Mouth in horseshoe shape; posterior part of pectoral fin not exceeding the origin of pelvic fin.

195(196). Mouth relatively narrow; head length 7.3-8.8 times the width of mouth; tip of infrapharyngeal teeth hooked.....C. cetopsis (Kner) (p.99).

196(195). Mouth rather wide; head length less than 7 times the width of mouth; end of infrapharyngeal teeth obliquely cut.....C. styani (Günther) (p.97).

197(188). 2 rows of infrapharyngeal teeth. P.8

198(199). Mouth in inferior position; one pair of barbels; lateral line scales 48-50....Rhinogobio typus Bleeker (p.99)

199(198). Mouth in horizontal position; barbel absent; lateral line scales 98-104....Fustis vivus Lin (p.100).

200 (51). Teeth present on both upper and lower jaws; no well developed infrapharyngeal bone.

201(202). Dorsal fin and anal fin extending backward near the base of caudal fin; dorsal fin rays 47-52; anal fin rays 31-33....Ophicephalus argus Cantor (p.137).

202(201). Dorsal fin and anal fin not near the base of caudal fin, also fewer fin rays.

203(204). Two pelvic fins connected forming a platter.....
.....Rhinogobius leavelli (Herre) (?) (p.145).

204(203). Pelvic fin absent; even if present, they are separated.

205(206). One pair of incisors on both upper and lower jaws; Pelvic fin absent.....
.....Spheroides ocellatus (Osbeck) (p.146).

206(205). Teeth on upper and lower jaws not incisor shape; pelvic fin generally present.

207(208). Body naked without scales, only a sort of wrinkled skin or protuberance present.....
.....Trachidermus fasciatus Heckel (p.144).

208(207). Body covered with scales.

209(210). Body covered with round scales; one barbel at the chin....
.....Lota lota (L.) (p.135).

210(209). Body covered with comb-like scales; no barbel at the chin.

211(214). Anterior and posterior parts of dorsal fin continuously connected; anterior part of fin rays hard and spiny while fin rays in the posterior part mostly branched fin rays.

212(213). Eyes relatively small; lateral line scales 121-128....
.....Siniperca chuatsi (Basil) (p.140).

213(212). Eyes rather large; lateral line scales 85-98.....
.....S. kneri Garman (p.141).

214(211). Dorsal fin clearly separated into 2 parts to become first and second dorsal fins.

215(218). Number of hard spines in the first dorsal exceeding X.

216(217). Hard spines of first dorsal fin XIX; lateral line scales 70; 5 black stripes on the lateral side of the body...
.....Perca fluviatilis L. (p.142).

217(216). Hard spines of the first dorsal fin XII; lateral line scales 77-95; many black spots on lateral side of the body.....Lateolabrax japonicus (C. et V.) (p.143).

218(215). Hard spines of the first dorsal fin less than X.

219(220). No adipose membrane on the eyelid; mouth in superior position; pelvic fin in breast position; tail rounded.....Odontobutis obscura (T. et S.) (p.143).

220(219). Adipose membrane on eyelid; mouth in horizontal position; pelvic fin slightly behind pectoral fin; tail forked.....
.....Mugil cephalus L. (p.136).