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Considerations on the freshwater ichthyological fauna of Asia and particularly Indochina

Upon examining the freshwater ichthyological fauna of Asia (pl. XI), there are four large regions to consider; each characterized by a number of genera, these regions, although distinct, merge at their borders with neighboring regions, as do all zoological regions elsewhere.

In the northern, or Siberian, region, we note the predominance of European varieties, perch, carp, burbot, gudgeon, bouviere, tench, and still others; carp and *Misgurnus anguillicaudatus* are common in this region and in northern China. In the eastern region, Siniperca (*S. Chuatsi, Chuantsi, Matsaki*), represent the European perch; *Gobio imberbis, argentatus, nigripinnis, nitens*, the gudgeon of Europe; *Pseudophoxinus oxycephalus*, our minnow; *Rhodeus sinensis*, our bouviere, *Cobitis japonica* and *Cobitis sinensis*, our loach; *Anguilla japonica*, our common eel. But alongside these European varieties, we find others characteristic of the eastern region, such as *Saurogobio, Rhinogobio, Acanthorhodeus, Pseudobrama, Barilius, Opsariichthys, Hypophthalmus, Parabramis, Hemiculter, Culter, Elopichthis, Chanodichthys, Paracanthobrama, Xenocypris, Oreonectes, Ctenopharyngodon*, to mention only the most characteristic of them.

The presence of Mastacembelidae (*M. sinensis, maculatus*), Labyrinthici (*Anabas oligolepis, Macropodus viridiauratus*), Ophicephalidae (*O. argus, nigricans, grandinosus*, etc.); Eleotris (*E. potamophila, obscurus, Swinhonis, butis*, etc.); Hemibagrus (*H. macropterus, taphrophilus*); Leiocassis (*L. crassilabris*); Puntius of the Barbodes group (*B. deauratus, sinensis*); and Capoeta (*C. Guntheri*); bears more resemblance to the southern, or Asian, region.

The genera *Pseudogobio, Pseudorasbora, Achilognathus, Opsariichthys Misgurnus* are also common between China and Japan; Japan is connected, furthermore, by the ichthyological fauna of these waters to the Chinese region.

There have already been recorded, in the waters of this last region, shells of the Unios group, which are analogous to those of the freshwaters of North America; we also noted in northern China the presence of the genus Sclerognathus (*S. asiaticus*), of the *Catostomina* group, of which all other species are American.

The western region possesses, as should be expected, affinities with Europe, east Africa, and the Asian region itself. This western region, which includes Asia Minor, Persia, and Mesopotamia,

has, along with Africa, the genus *Chromis*, of which the group is from Africa and tropical America; among the Cyprins we note the genus *Barbus*, widespread in Europe and Asia Minor, though the center of creation of the genus seems to be in the warm regions of Africa. *Leuciscus*, *Aspius*, and *Alburnus* are common to Europe and this region; the genera *Alburnus* and *Aspius* are however more from western Asia than from Europe; similarly to the southern region, the western region has the genera *Tylognathus* (*T. nanus*), *Discognathus* (*D. variabilis*) and *Nemachilus*, which we have already reported in China and Japan; in the same family of Cyprinidae, the genera *Capœta*, *Cyprinion*, *Acanthobrama* are specific to the region; the Silures are represented here by the genus *Euclytosternon*, of the *Bagarina* group, a genus which is found in the Asian region, and by the genus *Clarias*, widespread in Africa, India, and China. The western region is characterized, in short, by the absence of *Ophicephalidae* and *Labyrinthici*.

As for the southern region, it could be appointed the ultimate Asian region. We found here *Labyrinthici* and *Ophicephalidae*, which we had already found in the eastern region, but here these two families are at their maximum development and present a number of special genera. Among the Siluridae, in the *Heteropterae* group, of 21 genera, 17 are only found in this region; in the *Proteropterae* group, of 18 genera, 12 are reported in India and its islands. For the Cyprins, the species of this region are too numerous to mention all of them, so we will instead list the genera: *Dangila, Osteochilus, Crossochilus, Epalzeorhynchus, Cyclocheilichthys, Thynnichthys, Amblyrrhynchichthys, Schizothorax, Rohteichthys, Luciosoma, Nuria, Danio, Pteropsarion, Bola, Barbichthys, Osteobrama, Smiligaster, Eustira, Chela, Homaloptera, Lepidocephalichthys, Acanthopsis, Lepidocephalus, Acanthophthalmus.*

This southern region is divided into two geographically distinct sub-regions, India and Indochina; the islands of the Malay Archipelago, Java, Sumatra, Borneo, Ambon Island, and the islands below the Wallace Line belonging to Indochina. The freshwater fauna of India is well known since the time of Hamilton Buchanam's writing; thanks to the work of Mr. Bleeker, the fauna of the Indian archipelago is one of the best described; the freshwater fish of Indochina, however, were represented only by a few species brought to the British Museum by Henry Mouhot or to the Museum of Paris by Mr. Bocourt, until, thanks to the zeal of Mr. J. Jullien and Mr. Harmand, the Museum of Paris received a number of freshwater fish from Cochinchina and Siamese and Cambodian Laos. The collections addressed by the two travelers we just cited, compared with the species of the same region already indicated, allow us to establish a list of species found in Indochina – 116 species distributed between the families of *Labyrinthici* (8 species), *Ophicephalidae* (4 species), *Mastacembelidae* (3 species), *Nandidae* (1 species), *Siluridae* (38 species), *Cyprinidae* (61 species) and *Apodes* (1 species).

Upon studying these species and comparing to the freshwater fish found in the Indian peninsula, we see that only a few species are common to both peninsulas. In the Siluridae family, for example, of the 38 species, we note only 6 present in both India and Indochina. In the Cyprinidae

family, of 61 species, only 7 are found in both India and Indochina. The Ophicaephalidae and Labyrinthici families have a larger geographic distribution; of 12 species, we can cite 8 found in both regions.

The affinities of Indochina's ichthyofauna are, by contrast, with the islands of the Malay Archipelago located below the Wallace Line—Borneo, Sumatra, and Java; it is not only an affinity between the ichthyofauna, but a complete similitude; the species of Cyprins and Siluroides are identical in Indochina and these three islands. We must conclude that at a recent geological era, Java, Borneo and Sumatra were connected, to each other and to the Indochina peninsula. Thanks to this connection by land, a certain number of species were able to disperse, while others remained in their original territories, varying and giving rise to local species or, rather, types. This similarity between the ichthyofauna of Indochina and of the Malay islands, as opposed to the differences with the Indian fauna, confirms that in this region, there are two distinguishable ichthyological sub-regions: the Indian sub-region and the Indo-Malay sub-region.

Of the 38 species of Siluroïdes known in Indochina, 3 species are new and particular to the region; 8 are found in Borneo; 6 in Sumatra; 4 in Java; 3 in Bangka; 1 species is present in Indochina, Java and Borneo; 2 are found in Cochinchina, Sumatra, and Borneo; and 2 are found in Sumatra, Borneo and Java.

Of the 61 species of Cyprins, we note only 19 particular to Indochina, and of these, 14 are new to science; 10 species are present in Borneo, Sumatra and Java; 7 in Borneo and Sumatra; 5 in Sumatra and Java; 3 only in Sumatra; 2 only in Java; 1 only in Borneo; 1 species is present in Java and India; and 6 species in India.

It is apparent, then, that the strongest similarities between Indochina ichthyofauna and that of neighboring regions are first with Borneo, then Sumatra, and finally Java.

The conclusions we have reached on the similarities between the islands of the Indian Archipelago with Indochina emerge, no doubt, in the following list of species:

Labyrinthici

Anabas scandens Dald., – *Osphronemus olfax* Comm., – *Trichopus trichopterus* Pall.; *T. siamensis* Gthr.; *T. microlepis* Gthr.; *T. parvipinnis* Sauvg.; *T. striatus* C.V. – *Betta pugnax* Cant.

Ophicephalidae

Ophicephalus striatus Bl.; *O. siamensis* Gthr.; *O. micropeltes* C.V., *O. Lucius* C.V., *O. melanosma* Blkr.; *O. Stevensi*, Blkr.

Mastacembelidae

Mastacembelus argus Gthr.; *M. erythrotoenia* Blkr. – *Rhynchobdella aculeata* Bl.

Nandidae

Catopra fasciata Blkr.

Siluridae

Clarias macrocephalus Gthr.; *C. leiacanthus* Blkr. – *Plotosus canius* H.B. – *Saccobranchus fossilis* Bl. – *Silurus Cochinchinensis* C.V. – *Wallago attu* Bl. – *Belodontichthys macrochir* Blkr. – *Micronema Bleekeri* Boc. – *Macrones nemurus* C.V. – *Callichrous hypophthalmus* Blkr.; *C. bimaculatus* C.V. – *Pangasius Larnandi* Boc.; *P. macronema* Blkr.; *P. pleurotœnia* Sauvg.; *P. Djombal* Blkr. – *Pseudopangasius polyuranodon* Blkr.; *P. nasutus,* Blkr. - *Helicophagus Wandersii* Blkr,; *H. hypophthalmus* Sauvg. – *Hypselobagrus nigriceps* C.V.; *H micracanthus* Blkr.; *H. Wolffi* Blkr. – *Bagroides macropterus* Blkr. – *Hemibagrus nemurus* C.V. – *Heterobagrus Bocourti* Blkr. – *Pseudobagrus brachysoma* Gthr. - *Leiocassis pœcilopterus* C.V. – *Arius truncatus* C.V.; *A. macracanthus* Gthr.; *A. cochinchinensis* Gthr.; *A. Cœlatus* C.V. – *Hemiarius Stormii* Blkr. – *Hemipimelodus borneensis* Blkr,; *H. macrocephalus* Blkr,; *H. siamensis* Sauvg. – *Bagarius Yarrellii* Sykes. – *Pseudobagrichthys macropterus* Blkr. – *Ketengus typus* Blkr.

Cyprinidae

Catla Buchamani C.V. – *Carassius auratus* L. – *Osteochilus Hasseltii* C.V. – *Labeo aurovittatus* Sauvg. – *Cosmochilus Harmandi* Sauvg. – *Barbichthys nitidus* Sauvg. – *Puntius lœneis* Gthr.; *P. altus* Gthr.; *P. rubripinnis* C.V.; *P. javanicus* Blkr.; *P. gonionotus* Blkr.; *P. erythropterus* Blkr.; *P. bulu* Blkr.; *P. leiacanthus* Blkr.; *P. proctozysron* Blkr. – *Cyclocheilichltys Dumerilii* Blkr.; *C. apogonoides* Blkr.; *C. siaja* Blkr.; *C. macracanthus* Blkr.; *C. armatus* C.V. – *Dangila lineata* Sauvg.; *D. Cuvieri* C.V.; *D. leptochila* C.V. – *Rohita brachynotus* Blkr.; *R. barbatula* Sauvg.; *R. pectoralis* Sauvg.; *R. sima* Sauvg. – *Cirrhina microlepis* Sauvg.; *C. aurata* Sauvg.; *C. Jullieni* Sauvg. – *Macrocirichthys uranoscopus* Blkr. – *Morulius chrysosphekadion* Blkr.; *M. dinema* Blkr. – *Osteochilus melanopleurus* Blkr.; *O. Schlegelii* Blkr.; *O. borneeneis* Blkr.; *O. Hasseltii* C.V.; *O. brachynopterus* Blkr. – *Crossochilus reba* H.B.; *C. Langii* Blkr. – *Hampala macrolepidota* K.H. – *Balantiocheilos melanopterus* Blkr. – *Thynnichthys thynnoides* Blkr. – *Amblyrhynchichthys truncatus* Blkr. – *Leptobarbus Hoeveni* Blkr. – *Rasbora Einthoveni* Blkr.; *R. Dusoniensis* Blkr.; *R. Daniconius* H.B. – *Morara siamensis* Blkr. – *Luciosoma spilopleura* Blkr. – *Chela siamensis* Gthr. – *Pseudolaubuca lateralis* Sauvg. – *Homaloptera lineata* C.V. –

Nemachilus spilopterus C.V. – *Botia modesta* Blkr.; *B. hymenophysa* Blkr.; *B. helodes* Sauvg.; *B. rubripinnis* Sauvg. – *Acanthopthalmus Kuhlii* C.V. – *Acanthopsis chrysorhynchus* Blkr. – *Misgurnus laœnsis* Sauvg.

Apodes

Monopterus javanicus Lacép.