

青藏高原横断山区科学考察丛书

横断山区鱼类

中国科学院青藏高原综合科学考察队

科学出版社

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内 容 简 介

本书是中国科学院青藏高原横断山区科学考察系列研究成果之一。作者通过对横断山区鱼类的全面考察并参考前人的资料,系统地记述了横断山区鱼类 237 种及亚种,分隶于 8 目 18 科 97 属,其中描述了裂腹鱼类一新种和一新亚种。此外,本书对横断山区各水系间的发育关系以及我国淡水鱼类动物地理区的划分进行了较为深入的探讨,明确提出青藏高原区是与古北区及东洋区有着同等地位的一个 I 级区(界)的观点。

本书可供从事鱼类学、水产学等科研工作的人员及有关大专院校的师生参考。

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(编写分工详见前言)

THE CONTRIBUTIONS

Chen Yiyu: Preface

Chen Yiyu and Chen Yifeng: Studying History on Fishes of the Hengduan Mountains Region

Chen Yiyu: Physiographic Features of the Hengduan Mountains Region

Chen Yiyu, Chen Yifeng and Liu Huanzhang: Ichthyofauna and its Zoogeographical Analyses of the Hengduan Mountains Region

Chen Yifeng: Acipenseriformes, Anguilliformes

Yang Junxing: Salmoniformes, Catostomidae (Cypriniformes)

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Chen Yinrui: Danioninae, Leuciscinae, Culterinae, Xenocyprininae, Hypophthalmichthyinae, Acheilognathinae, Gobiioninae, Gobiobotinae, Barbinae and Labeoninae (Cypriniformes: Cyprinidae)

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《青藏高原横断山区科学考察丛书》序

辽阔的青藏高原,包括西藏全部、青海南部,以及四川西部和云南西北部。大部分地区海拔在4 000m以上,四面以巨大的落差急剧下降,衬托出世界屋脊的磅礴气势,素有世界第三极之称。由于青藏高原独特的地质历史和自然条件、丰富的生物组成和生物群落类型,成为地球上一个独具特色的地理单元。青藏高原蕴藏着丰富的自然资源,又是许多少数民族生活和居住的地区,且地处边陲,合理保护和开发这一地区的自然资源,对发展经济,改善人民生活,以及巩固民族团结和加强国防建设都有重要的意义。

为了探索青藏高原形成和演变的历史,研究自然条件的特点及其对周围环境的影响,研究自然资源的数量和质量及其合理开发利用的途径。解放以后,中国科学院对这里进行了多次科学考察,特别是自1973年起组织了青藏高原综合科学考察队,对这一地区进行了更为全面、系统的综合性研究。

1973—1980年期间,考察队重点对西藏自治区进行了考察。其科学成果将集中反映在陆续出版的《青藏高原科学考察丛书》(西藏部分)及论文集和画册中。有些成果在实际生产中已得到推广和应用,在国际和国内产生了深远的影响。

考察队从1981年起将考察研究的重点转移到横断山区。横断山地处我国西南的藏东、川西和滇西北一带,是青藏高原的一个组成部分。在行政区域上包括西藏自治区的昌都地区,四川省的阿坝、甘孜、凉山及云南省丽江、迪庆、怒江和大理等地区(州),总面积约500 000km²。

横断山脉在地质构造上处于南亚大陆与欧亚大陆镶嵌交接带的东翼,是我国东部环太平洋带与西部古地中海带间的过渡地带。地质构造复杂,新构造运动活跃。本区地势由西北向东南倾斜,大部为高山峡谷,山脉、河流南北纵贯,相间并列,高差很大,自然地理条件独具一格,生物区系绚丽多彩,且富含古老和子遗类型,是研究生物和地学中许多重大理论问题的关键性地区。

横断山脉自然资源丰富,尤以多种矿产、水利、森林、草场等资源最为丰富。但是随人口的增长和开发利用的加剧,自然资源承受的人类压力日益加大,有些地区生态平衡遭到了破坏。为了合理利用自然资源,必须研究本区的自然资源特点,探索其合理保护利用与开发的方向和途径。

横断山区科学考察工作主要围绕六个课题进行:①横断山脉形成的原因和地质历史;②横断山区自然地理特征及其与高原隆起的关系;③横断山区自然垂直地带的结构及其规律;④横断山区生物区系的组成;⑤横断山区自然保护与自然保护区;⑥横断山区自然资源的评价及其合理开发利用。

为了使科学考察研究更密切地与当地的经济开发工作结合起来,在自然资源评价与开发利用方面着重抓了农业自然资源条件与自然资源系列制图;亚高山暗针叶林采伐与更新;地方能源的综合利用;畜牧业发展战略及干旱河谷农业自然条件与开发利用等五项综合专题的考察研究。

横断山区的综合科学考察研究工作由中国科学院—国家计划委员会自然资源综合考察委员会负责组织领导。参加此次考察研究的包括中国科学院有关研究所、高等院校和地方科研与生产部门等单位计 40 余个,约 300 多人,涉及 40 多个专业。

《青藏高原横断山区科学考察丛书》将系列地总结青藏高原综合科学考察第二阶段的成果。

《青藏高原横断山区科学考察丛书》计划由横断山区农业自然条件与农业自然资源评价、四川省金川县农业自然条件与农业自然资源评价、横断山区的地方能源资源、横断山区亚高山暗针叶林采伐与更新的研究、横断山区(川西部分)畜牧业战略发展的研究、横断山区干旱河谷、横断山区地质构造、横断山区的沉积岩及沉积盆地演化、横断山区基性超基性岩、横断山区富碱侵入岩带地球化学和成矿、横断山区花岗岩类地球化学、横断山区锡矿带地球化学、横断山区地层、横断山区古生物、横断山区哺乳动物化石与生活的环境、横断山区地热与水热活动区名录、腾冲地热、横断山区自然地理、横断山区地貌与第四纪地质、横断山区气候、横断山区冰川、横断山区泥石流、横断山区土壤地理、横断山区森林、横断山区草场、横断山区植被、横断山区沼泽与泥炭、横断山区湖泊综合研究、横断山区中小河流及水资源、横断山区自然垂直带结构特征及分布规律、横断山区植物、横断山区场、横断山区植被、横断山区沼泽与泥炭、横断山区湖泊综合研究、横断山区中小河流及水资源、横断山区自然垂直带结构特征及分布规律、横断山区植物、横断山区家畜种群生态、横断山区鱼类、横断山区哺乳动物、横断山区鸟类、横断山区两栖爬行动物志、横断山区甲壳动物、横断山区昆虫、横断山区土地资源开发与农业布局等专著组成。我们希望这些著作能在探索青藏高原的奥秘和我国社会主义建设中发挥积极的作用。

中国科学院青藏高原综合科学考察队

PREFACE OF "THE SERIES OF THE SCIENTIFIC EXPEDITION TO THE HENGDUAN MOUNTAINS OF THE QINGHAI-XIZANG PLATEAU"

The vast Qinghai-Xizang Plateau, consisting of the Xizang (Tibet) Autonomous Region, the southern part of Qinghai, western part of Sichuan and northwestern part of Yunnan Provinces, is often eulogized as the third polar of the world. The major parts of the Plateau are 4 000 metres above sea level, while the areas around drop drastically setting off the tremendous momentum of the roof of the world. The particularities of the geological history and physical conditions, the variety of biological composition and the different types of bio-communities make the Qinghai-Xiang Plateau a unique geographical unit. As the Plateau, being rich in natural resources, lies on the border regions where inhabit many national minorities, the rational conservation and utilization of the natural resources in this region are of particular importance in developing economy, improving the local livelihood and consolidating national solidarity as well as strengthening national defence.

Since the foundation of new China, many scientific surveys have been carried out in this region so as to make a better understanding of the history of the formation and evolution of the Qinghai-Xizang Plateau, to study the characteristics of its natural conditions, to reflect the environment around and the quantity and quality of the natural resources and thus, to find a way of exploiting and utilizing them rationally. Especially after the forming of the Comprehensive Scientific Expedition to the Qinghai-xizang Plateau in 1973, an even more comprehensive, systematic integrated research has beingmade on this region.

A survey was mainly carried out on the Xizang (Tibet) Autonomous Region during the period of 1973—1980. the scientific findings of the survey, part of which have already been extended and applied to actual production and have brought a far-reaching influence both in and outside China, will be concentratedly compiled in the series of the seicntific xpedition to the Qinghai-Xizang Plateau (Xizang Volume), proeedings and pictorials. Since 1981, the survey team has shifted its major researching area to the Hengduan Moutains Region which is a constitutional part of the Qinghai-Xizang Plateau and is located in the east of Xizang, west of Sichuan and northwest of Yunnan Provinces in southwest China. The total area of this region is about 0. 5 million square kilometres and administratively speaking including the Qamdo district of Xizang, Erba, Cangzi, Liang-

shan of Sichuan and the Lijiang, Nujiang and Dali districts of Yunnan.

The Hengduan Range is complicated in geological structure and active in new tectonic movements. It lies on the east flank of the juncture area where south Asia and Eurasia are mounted. It is the transition region between the east zones encircling the Pacific and the west zones of ancient Mediterranean. The altitude of this area declines from northwest to southeast. Most parts of the area are characterised by a series of paralleled mountain ranges and rivers from south to north, and with a sharp altitudinal differentiation. Its unique physical conditions and variety ecosystems being rich in flora and fauna with abundant relic species, give the area a critical nature for the fundamental research in the field of biology and earth science.

The Hengduan Mountains Region is abundant in natural resources, among which multi-mineral products, hydrological resources, forest and grass-lands account for the great part. But with fast growth of the population and an extensive exploitation and utilization of the natural resources, the human pressure on natural resources has vastly increased which even caused ecologic equilibrium damage in some part of the area. In order to make a more reasonable utilization of natural resources, it is necessary to study the characteristics of the resources in this region so as to work out certain ways and methods for protecting, utilizing and exploiting them rationally.

There are six major subjects in the research work being carried out in the Hengduan Mountains:

1. The geological history of the Hengduan Range;
2. The physiographical characteristics of the Hengduan Mountains and their relationship with the rise of the Plateau;
3. The structure and rule of the altitudinal belts of the Hengduan Mountains;
4. The composition of bio-communities in the Hengduan Mountains;
5. The natural conservation and nature reserves in the Hengduan Mountains;
6. Evaluation of the natural resources in the Hengduan Mountains and their rational development and conservation.

Five integrated projects have also been given special attention in the research on natural resources evaluation, exploitation and utilization. They are as following: compilation of a series of maps on the conditions of agricultural resources; deforestation and regeneration of subalpine coniferous forest in subalpine areas; the multiple utilization of local energy resources; strategy for the development of animal husbandry and finally the management of the natural resources in the arid valleys. This has been done in line with purpose of linking scientific research closely to the development of the local economy.

The integrated survey on the Hengduan Mountains Region is organized by the Commission for Integrated Survey of Natural Resources, Chinese Academy of Sciences and the State Planning Commission. There are more than 300 people, coming from more

than 40 institutions including different institutes of the Chinese Academy of Sciences, Universities and local scientific research and production departments engaged in natural resources research.

A series of scientific publications of the Hengduan Mountains will provide the results acquired from the second phase of the integrated scientific survey in the Qinghai-Xizang Plateau. It is designed that this series will be consisted of 39 volumes and 48 monographs. It is also expected that this series will play an important role in exploring the wonders of the Qinghai-Xizang Plateau and in the construction of China.

The Comprehensive Scientific Expedition to the Qinghai-Xizang Plateau,
Chinese Academy of Sciences

前 言

中国科学院青藏高原综合科学考察队于 1981 年将考察重点转移到横断山区进行,其间鱼类调查作为生物区系组成的一项内容,于 1982 年至 1983 年对该区进行了全面考察。

横断山区系指青藏高原东缘、山川东西并列、南北纵贯的一个特殊的地貌地区。在本书中指昌都、察隅一线以东,岷山、邛崃山、大凉山以西,北起北纬 34°的迭部、玛曲,南抵北纬 25°左右的腾冲、保山,总面积达 40 余万平方公里的广大地区。在行政区域上包括了西藏自治区的昌都地区,四川的阿坝、甘孜、凉山和云南的丽江、迪庆、怒江大理等地(州)区,以及青海、甘肃南部的一小部分。

横断山区自然地理条件独特,区内河流众多,水系组成复杂,鱼类资源丰富并呈现出极大的多样性。但有关横断山区鱼类的资料,多属单篇论文零星报道,散见于国内外的各种刊物杂志中,已出版的《秦岭鱼类志》(1987)、《云南鱼类志》上、下册(1989,1990)等地方志也因范围所限而仅涉及了横断山的局部地区。有鉴于此,在中国科学院青藏高原综合科学考察队的支持下,我们编写完成了本书,意在通过横断山区鱼类全面考察所取得资料的基础上,对横断山区的鱼类区系组成进行全面的分析,提出鱼类资源保护与持续利用的意见。此外,对区内各水系间的发育关系以及我国淡水鱼类动物地理区的划分进行了较为深入的探讨,明确提出青藏高原区是与古北区及东洋区有着同等地位的一个 I 级区(界)的观点。

本书记述了横断山区鱼类共 237 种及亚种,分隶于 8 目 18 科 97 属。除个别种类外,都是依据实物标本进行鉴定和描记的;在编写过程中得助于国内外 1987 年以前的同类文献著作,个别的截止到 1990 年。本书对横断山区鱼类的每个类群和每个种的形态特征、分类和地理分布都有较为详细的描述,对部分经济鱼类的生物学特性与经济价值也作了简单的介绍;首次发表的学名、作者、文献出处、模式标本产地以及该种鱼类在横断山区的采集记录与同物异名等均一一列出。在本书中还描述了裂腹鱼类的一个新种和一个新亚种。

本项工作是由中国科学院水生生物研究所牵头,中国科学院昆明动物研究所共同协作完成的。鉴于这次调查的深度与广度,以及编著人员的水平所限,遗憾之处在所难免,敬请广大读者批评指正。

全书由陈宜瑜和陈毅峰同志负责汇总、修改和定稿,各部分的具体分工是:前言 陈宜瑜;横断山区鱼类研究简史 陈宜瑜、陈毅峰;横断山区的自然地理概况 陈宜瑜;横断山区的鱼类区系及动物地理学分析 陈宜瑜、陈毅峰、刘焕章;鲟形目、鳗鲡目 陈毅峰;鲑形目、胭脂鱼科 杨君兴;鳅科 陈景星、张卫;鲤科鲃亚科、雅罗鱼亚科、鮠亚科、鲃亚科、鲢亚科、鳊亚科、鲂亚科、鮠亚科、鳊亚科、野鲮亚科 陈银瑞;裂腹鱼亚科 陈毅峰、黄顺友;鲤亚科、平鳍鳅科 陈银瑞;鲶形目 杨君兴;鲈形目 陈银瑞;合

鳃鱼目 杨君兴；鲈形目暖鲈科 刘焕章；塘鳢科、鰕虎鱼科、鱧科 杨君兴；横断山区鱼类资源的利用与保护 陈银瑞。本书插图由蔡鸣俊、吴宝陆、郑加容、吴保荣等同志分别绘制。

本项工作得到中国科学院水生生物研究所曹文宣研究员、中国科学院昆明动物研究所褚新洛研究员的热忱指导并审阅文稿；中国科学院昆明动物研究所李再云同志曾参加野外考察工作；中国科学院水生生物研究所何舜平同志还参与了部分室内工作；蔡庆华同志为水系发育关系的分析提供了帮助；四川省自然资源研究所和四川大学生物系为查看标本提供了方便；本书的最终完成还得到了国家重点基金项目 39330030 和中国科学院分类区系学科发展特别支持费的支持。谨此表示衷心的感谢。

陈宜瑜

一九九四年五月于武昌

ABSTRACT

(英文摘要)

This book is a result of the ichthyofauna investigation in the Hengduan Mountains Region in western China, which was organized by The Comprehensive Scientific Expedition to the Qinghai-Xizang Plateau, Chinese Academy of Sciences.

There are many rivers in Hengduan Mountains Region, and almost all rivers that originate from the eastern Qinghai-Xixang Plateau flow through this region. These hundreds of rivers and their tributaries belong to 7 river systems the Brahmaputra River (Yarlung Zangbo R.), Irrawaddy River, Salween River (Nujiang R.), Mekong River (Lancangjiang R.), Red River (Yuanjiang R.), Yangtze River (Changjiang R.) and Yellow River (Huanghe R.). Thus, the basin area of each river system is very different from each other in Hengduan Mountains. Among them, the Yarlung Zangbo River is limited to the Chayu River upper Xiachayu County. The Irrawaddy River only includes part of the Dulongjiang River, some tributaries in the western slopes of Gaoligong Mountains and upreaches of the Dayinjiang River and Longchuanjiang River both in the north of Tenchong County. The Nujiang River is limited to its mainstream and tributaries between the north of Daojie County and the south of Bashu County. The Lancangjiang River is limited to its mainstream and affluents between the north of entrance of the Yangbihe River and Chandu County. Only the upreaches of Lidujiang River in the North of Nanjian County are included in the Yuanjiang River. The Changjiang River is the largest river system in the Hengduan Mountains Region and almost includes all of tributaries of its upper reaches. The Jinshajiang River consists of the main part of Changjiang River system. It is limited to the streams between Leibo County and Yushu County and includes all the mainstream and its affluents of the Yalongjiang River and Daduhe River upper Leshan City. The Minjiang River is justly limited to the streams upper Guanxian County and only the upreaches of the Bailong River upper Wudu County is included in Jialinjiang River. The Huanghe River system is only limited to its mainstream from Maqu County to Maduo County and its south tributaries.

Two hundred and thirty-seven species and subspecies are known in Hengduan Mountains Region, belonging to 8 orders, 18 families and 97 genera. All of them are the endemic freshwater fishes of Asia, with exception of *Acipenser sinensis*, *Psephurus gladius* and *Anguilla japonica* that is migration species.

Most species in Hengduan Mountains Region belong to Cypriniformes, which has 184 species and subspecies and occupies 77.6% of the total fishes. With 40 species and subspecies, Siluriformes is the second largest one and occupies 19.9% of the total. The Ostariophysi fishes of these two orders occupy 94.5% of the total in this region. This proportion is remarkably larger than that of any other regions in the eastern China. Cyprinid has the most species in all the 18 families, occupying about 54.0% of the total. Cobitidae is the second one that occupies 18.1%. Homalopteridae occupies 5.1% and Bagridae occupies 4.2%. These 5 families occupy 91.4% of the total fishes in Hengduan Mountains Region. In the other 13 families, there are only 1—4 species in each family. The proportion of Cyprinidae decreases or that of Cobitidae and Sisoridae increases remarkably is one of the ichthyofauna characters in this region.

Cyprinidae consists of 12 subfamilies in Hengduan Mountains Region. There are 4 genera and 4 species in Danioninae, 6 genera and 6 species in Leuciscinae, 6 genera and 15 species in Cultrinae, 2 genera and 3 species in Xenocyprinae, 2 genera and 2 species in Hypophthalmichthyinae, 8 genera and 9 species in Gobioninae, 1 genus and 2 species in Gobiobotinae, 1 genus and 1 species in Acheilognathinae, 7 genera and 18 species in Barbinae, 7 genera and 11 species in Labeoninae, 3 genera and 11 species Cyprininae, 8 genera and 46 species and subspecies in Schizothoracinae. In these 12 subfamilies, Schizothoracinae has the most species, occupying 35.9% of the total species of Cyprinidae. Barbinae is the second largest one, occupying 14.1%. Cultrinae occupies 11.7%. Both Labeoninae and Cyprininae occupy 8.6%. Gobioninae occupies 7.0%. Leuciscinae occupies 4.7%. Danioninae occupies 3.1% and Xenocyprinae occupies 2.3%. With 7 genera and 35 species, Nemacheilinae occupies 81.4% of the fishes in Cobitidae. Botiinae has 2 genera and 6 species and occupies 4.0%. Cobitinae has 2 genera and 2 species and occupies 4.7%. In families Cyprinidae and Cobitidae, that Schizothoracinae and Nemacheilinae are notably dominant group is another character of ichthyofauna in Hengduan Mountains Region.

The fishes' distribution of each river system in this region is greatly unequal. The case could be reflected by the constitution of Ostariophysans, which occupies 94% of the all fishes. The main cause should be certainly connected with the basin area of that each river system passes through in Hengduan Mountains Region. On the other hand, in these 5 river system (Irrawaddy River, Nujiang River, Lancangjiang River, Changjiang River and Huanghe River), the ratios of repetitive appearance of species are only 5.5% in Cyprinidae, 37.2% in Cobitidae and 25.0% in Sisoridae. There is only 1 genus that shared by these 5 river systems. If the upreach of Huanghe River is excluded because of its special physical environment, the common genera in the others 4 river systems are *Schistura*, *Tor*, *Garra*, *Schizothorax*, *Glyptothorax* and *Pareuchiloglanis*. The repetitious ratio is only 6.3% in genus. This case indicates that the difference of their evolutionary history of ichthyofauna should not be overlooked. To explain this question well, it is

necessary to analyze the characters of ichthyofauna in these 5 river systems.

There are 4 families, 19 genera and 32 species altogether in the upstreams of the Dulongjiang River, Dayinjiang River and Longchuan River, Which are included in the Irrawaddy River system within Hengduan Mountains Region. The main character of this river system is that it has comparatively more endemic genera and species and few of common fishes shared by the other river systems. For example, in Hengduan Mountains Region there are 5 genera *Nemacheilus*, *Danio*, *Crossocheilus*, *Glaridoglanis* and *Exostoma* that are only occur in the Dayinjiang River and Longchuanjiang River. There are 27 endemic species that occupies 84.4% of all the 32 species in this river system. Meanwhile, the common genus *Triplophysa* that widely distributes in the other river systems in Hengduan Mountains Region is not found here.

There are 5 genera and 26 species altogether in Nujiang River system upper Daojie County, Yunnan Province. The endemic genera of Nujiang River in Hengduan Mountains Region are *Epalzeorhynchus*, *Placocheilus* and *Balitoropsis*. There are 15 endemic species, occupying 57.7% of the all. It shares 4 species with the Lancangjiang river system, occupying 15.4%. It only shares 2 species with the Irrawaddy River, occupying 7.7%.

There are 18 families, 79 genera and 149 species and subspecies in the mainstreams and tributaries of the upper reaches of the Changjiang River in Hengduan Mountains Region. Compared with the other river systems in this region, the fish's composition of Changjiang River system shows an abundant diversity. On the one hand, its ichthyofauna includes all of the 18 families and 8 orders in the region, and 79 genera, occupying 81.4% of the all 97 genera, Species and subspecies that occur in here occupy 62.6% of the all in this region. On the other hand, there are many endemic taxa in this river system. It has 10 endemic families occupying 55.6% of the all 18 families and 50 endemic genera, occupying 63.3% of the all 79 genera. It also has 127 endemic species and subspecies occupying 85.2% of the all. Additionally, another notable character of the fauna in the mainstream and tributaries of the upper reaches of the Changjiang River is that the proportion of Cyprinidae increases. Subfamilies Leuciscinae, Cultrinae, Xenocyprinae, Acheilognathinae, Hypophthalmichthyinae and Gobioninae in Cyprinidae do not occur in the other river systems in this region. Thus the proportion of Sisoridae distinctively decreases from 22.5% in the other river systems to 3.4%.

The fishes that occur in the 5 principal streams of the upstream in Changjiang River also show unequally. The fishes of the Jinshajiang River constitute the main body of the ichthyofauna in Changjiang River in this region. With 15 families, 63 genera, 96 species and subspecies, the Jinshajiang River occupies 64.4% of the fishes in Changjiang River. With 26 genera, 36 species and subspecies, the Minjiang River occupies 23.5%. There are 16 genera and 30 species in Yalongjiang River and occupies 20.1%. Fifteen genera and 20 species occur in Dadu River and occupy 13.4%. Occupying 12.8%, 9 genera and 9 species occur in Jialinjiang River. The ratio of repetitive appearance of species is

34.2% in these 5 rivers.

Only the upreaches upper Maqu County in Huanghe River is included in Hengduan Mountains Region. Its ichthyofauna is only constituted by genus *Triplophysa* of Cobitidae and subfamily Schizothoracinae of Cyprinidae. There are 6 genera and 17 species altogether. Among them, 12 species of the genus *Triplophysa* occupies 70.6%. In genera *Gymnodiptychus*, *Gymnocypris*, *Schizopygopsis*, *Chuanchia* and *Platypharodon*, there is only 1 species in each genus which occupies 5.9% respectively. Deficiency of fishes, monotone of the ichthyofauna and absent of the largest genus *Schizothorax* Which widely distributes in the Hengduan Mountains Region are the most notable character of the ichthyofauna in the upreaches of the Huanghe river.

By means of fuzzy clustering method, analysis of similarities of ichthyofauna in 11 river systems in this region are done here, based on which developmental relationships among river systems are postulated. Having different evolutionary time and space history, different group of fishes has different meaning in the analysis. Analysis to all 237 species and subspecies in this region show that the overall similarities of the river systems vary from west to east. Analysis to the plateau fishes (Such as the subfamily Schizothoracinae and the genus *Triplophysa*) show that the river systems in the plateau are clustered in 2—3 groups from east to west. It coincided with the periodic uplift pattern of the plateau and indicates the east to west capture sequence of the river systems. Analysis to species excluding the plateau fishes show that the similarities of the river systems vary from west to east. It indicates the river systems departed from west to east accompanying with the uplift of the plateau.

From a historically temporal and spatial point of view, we have analyzed the process and the uniqueness of the ichthyofauna differentiation in Qinghai-Xizang Plateau from Tertiary to present. We also presented the opinion that the ichthyofauna differentiation due to the uplift of the Qinghai-Xizang Plateau should have been reflected in zoogeographic divisions. Thus the Qinghai-Xizang plateau should be considered as an independent unit. The formation of a certain zoogeographical division unit is surely related to a definite event in a given geological period. The division of the Holarctic Region and Oriental Regions was related to the temperature decrease that occurred in the middle stage of Tertiary Period. The upheaval of the plateau and the global temperature decrease occurred almost at the same period and might have made certain influences. These historical events jointly urged the differentiation of the Eurasia ichthyofauna and led to the division among the Holarctic Region, the Oriental Region and the Qinghai-Xizang Plateau Region. As a region reflection of those events that happened at the same period, the Holarctic Region, the Oriental Region and the Qinghai-Xizang Plateau Region must have equal positions in zoogeographic divisions. Related to the uplift of the Qinghai-Xizang Plateau, the natural distribution boundary of plateau fishes formed the demarcation line of the Qinghai-Xizang Plateau Region. Concerning