

沼泽学概论

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前 言

沼泽是地球上水陆相互作用形成的独特自然综合体,是水域与陆地生态系统的过渡类型。沼泽具有 3 个相互联系、相互制约的基本特征:地表常年过湿或有薄层积水;生长沼生或湿生植物;与土壤过湿和还原环境相联系的成土过程,即土层潜育化显著或有泥炭积累。

沼泽是湿地的最主要类型。据统计,全球沼泽面积约占天然湿地总面积的 76%,我国沼泽与沼泽化草甸湿地也占天然湿地总面积的 38%。与湖泊、河流等湿地类型相比,沼泽不仅具有蓄水调洪、维持区域水平衡的作用,而且更具有固土防蚀、降解和转化污染物的生态功能,在维系生物多样性和减缓全球气候变暖方面也有重要作用。不仅如此,沼泽还可向人类提供多种食品、药品、工农业生产原料,以及生态旅游资源等。由此,加强沼泽的综合研究,建立和发展沼泽学,具有重要的理论意义和应用价值,也是发展湿地科学的急需。

沼泽学是研究沼泽的形成演化、类型特征、生态过程、结构与功能以及保护利用的科学。在国际上,已有沼泽学、沼泽水文学、森林沼泽学、泥炭地学等著作,而在我国尚没有以论述淡水沼泽为主的沼泽学专著。

《沼泽学概论》的编写旨在论述沼泽学的若干基本问题,并对作者几十年从事淡水沼泽考察研究以及近几年的部分沼泽理论研究成果进行科学总结,也包含对前人研究工作的继承。全书内容有以下 6 个部分:沼泽学的研究对象与任务;沼泽的类型分布、形成演化;沼泽的水文、土壤、气候及生物地球化学过程特征;沼泽植被和沼泽区动物资源;沼泽生态系统服务功能及其健康与价值评价;沼泽的生态保育与可持续利用等。

本书在编著过程中得到中国科学院知识创新工程重要方向性项目

“三江平原典型沼泽湿地系统物质循环研究”(KZCX3-SW-332)和国家自然科学基金项目“三江平原典型类型沼泽湿地界面水通量模拟研究”(40171017)的支持,书中有关章节采用了上述项目的相关研究成果。

全书由刘兴土、邓伟、刘景双等编著,各章的执笔人如下:第一章刘兴土;第二章刘兴土、王继富;第三章刘兴土;第四章马学慧、刘兴土、黄初龙;第五章邓伟、栾兆擎、胡金明;第六章的第一节张养贞,第二节刘兴土;第七章刘景双、杨继松、孙志高、宋长春;第八章赵魁义;第九章李晓民;第十章吕宪国、姜明;第十一章刘子刚、杨扬、刘向华;第十二章刘兴土。

2006年,对该书(2005年版)的个别章节内容进行了补充。在我国,本书是阐述沼泽学体系的首次尝试。由于作者水平有限,难免有疏漏与不当之处,敬请读者批评指正!

作 者
2006年12月

PREFACE

As a special natural complex formed during the interaction of water and land, marsh is the transition type between aquatic and terrestrial ecosystems. It has three basic coordinated features. Water reserve either at the surface or in perennially over-saturated soil; vegetation adapted to the wet conditions (hydrophytes); unique pedogenesis processes that related to over-saturated and reducing environment, that is, gleyed process or accumulation of peat.

As the main type of wetlands, marsh occupies 76 percent of world's total natural wetlands. In China, marsh and wet meadow account for 38 percent of the total area of natural wetlands. Compared to the other types of wetlands such as lake and river, marsh not only reduce flood risks, store water, and maintain regional water balance, but also have a variety of unique functions of soil fixation and erosion control, pollutant reduction and transformation. It plays an important role in the maintenance of biodiversity and mitigation of global warming. In addition, marsh also provides a great variety of foods, medicaments, raw materials for industrial and agricultural production, and recreational opportunities. Hence the synthesis researches of marsh, establishment and development of marsh science have important theoretical and practical significances, and it is also necessary for the development of wetland science.

Marsh science studies marsh on its formation, development, types, features, ecological processes, structures and functions, and protection and utilization. There have been many monographs about marsh science, marsh hydrology, forest marsh, and peatlands published abroad. While in China, there has not been such a monograph about the freshwater marsh.

The book tends to explore basic issues in marsh science, and summarize authors' of investigation and research results about freshwater marsh for several decades and theoretical research achievements in recent years, and other researchers' studies. The book has six parts including the objectives and missions of marsh science, distribution and types of marsh and their formation and development, features of hydrology, soils, climate, and bio-geochemical processes within

marsh, flora and fauna of marsh, services and health assessment and valuation of marsh, and eco-conservation and sustainable utilization of marsh resources.

The book is supported by the key pilot project of Knowledge Innovation Program of CAS (Study on material cycle within typical mire and marsh in the Sanjiang Plain, KZCX3—SW—332) and the National Natural Science Foundation Program (Modeling study on water flux in the typical mire—interfaces of Sanjiang Plain, 40171017), and some research results of these projects are adopted in the corresponding sections of the book.

The chief editors of this book are Liu Xingtu, Deng Wei, and Liu Jingshuang. The authors for the book are: Chapter 1, Liu Xingtu; Chapter 2, Liu Xingtu and Wang Jifu; Chapter 3, Liu Xingtu; Chapter 4, Ma Xuehui, Liu Xingtu, and Huang Chulong; Chapter 5, Deng Wei, Luan Zhaoqing and Hu Jinming; Chapter 6, section 1, Zhang Yangzhen, section 2, Liu Xingtu; Chapter 7, Liu Jingshuang, Yang Jisong, Sun Zhigao, Song Changchun; Chapter 8, Zhao Kuiyi; Chapter 9, Li Xiaomin; Chapter 10, Lu Xianguo, Jiangming; Chapter 11, Liu Zigang, Yang Yang and Liu Xianghua; Chapter 12, Liu Xingtu.

In 2006, some chapters in the original version of this book (2005 version) were revised and supplemented. This book is the first attempt on the marsh science system. For the potential improper expression, any suggestion will be welcome.

Authors for this book
December, 2006



河漫滩沼泽（中国三江平原）（倪宏伟 摄）



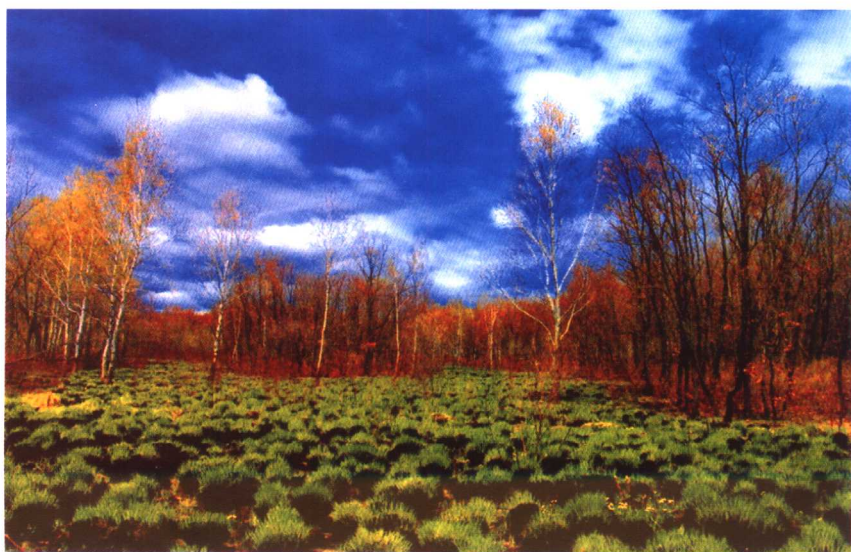
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（刘兴土 摄）



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（倪宏伟 摄）



苔草沼泽（上部）
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（刘兴土 摄）



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泥炭藓沼泽
(大兴安岭)
(赵魁义 摄)



木里苔草 - 乌拉苔草高原沼泽 (中国四川省红原县, 海拔 3500m) (赵魁义 摄)



藏北蒿草沼泽（中国西藏，背景为卓莫拉利峰，海拔7314m）（赵魁义 摄）



芦苇沼泽（中国新疆，博斯腾湖滨）（李崇喆 摄）



海滨沼泽与飞翔的白鹭（中国江苏盐城）（邓伟 摄）



红树林沼泽（中国香港米埔）（刘兴土 摄）



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(中国黄河三角洲)
(刘月良 摄)



红树林沼泽
(中国海南东寨港)
(陈桂珠 摄)



热带富营养泥炭沼泽 (印度尼西亚, Rieley)



高低位镶嵌的泥炭沼泽（芬兰，Lappalainen）



冻土区的泥炭沼泽（芬兰北部，Lappalainen）



垅岗 - 湿洼地泥炭沼泽 (俄罗斯圣彼得堡) (马学慧 摄)



森林泥炭沼泽
(瑞典)
(吕宪国 摄)



贫营养泥炭沼泽 (挪威, Lappalainen)



火口湖沼泽（日本北海道神仙沼）（刘兴土 摄）



红树林沼泽（斯里兰卡，Illicki）



过度性的森林泥炭沼泽
(波兰, Ilnicki)



木本沼泽
(澳大利亚)
(邓伟 摄)



湖滨沼泽
(澳大利亚)
(邓伟 摄)

湖泊沼泽化 陡岸“浮毯”
(加拿大, 安达略湖滨)
(赵魁义 摄)



湖泊沼泽化 缓岸水生、沼生植物带 (美国, 威斯康星州) (赵魁义 摄)



最古老泥炭地
(卢旺达, Pajunen)