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筑坝扩容下高原湿地拉市海植物群落分布格局及其变化

Distribution patterns and changes of aquatic communities in Lashihai Plateau Wetland after impoundment by damming

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中文摘要:

基于遥感与地理信息系统技术、结合实地调查与验证,对高原湿地拉市海筑坝扩容13a来湿地植物群落类型、物种组成、空间分布格局进行研究,对比分析筑坝扩容前后植物群落变化特征。结果表明,拉市海当前分布有水葱 (*Scirpus tabernaemontani*)、两栖蓼 (*Polygonum amphibium*) 等2个挺水植物群落,鸭子草 (*Potamogeton tepperi*)、菱 (*Trapa bispinosa*) 等2个浮叶植物群落,穗状狐尾藻 (*Myriophyllum spicatum*)、篦齿眼子菜 (*Potamogeton pectinatus*)、菹草 (*Potamogeton crispus*)、穿叶眼子草 (*Potamogeton perfoliatus*)、小叶眼子菜 (*Potamogeton pusillns*) 等5个沉水植物群落,草甸植被分布于湖周。湿地植物物种共计61种,隶属于25科、48属,物种丰富度随沉水→浮叶→挺水→草甸逐渐增加。沉水植物群落分布面积最大(615.08 hm²),其次是草甸(214.60 hm²)、浮叶植物群落(140.01 hm²),挺水植物群落分布面积最小 (9.34 hm²),群落垂直层次随沉水→浮叶→挺水呈复杂化的趋势。筑坝13a来,拉市海植物群落类型从单一的沉水型植物群落发展成为由沉水、浮叶、挺水型组成的、水平空间多样化配置的湿地植被系统,其中穗状狐尾藻、篦齿眼子菜、小叶眼子菜等植物群落在筑坝蓄水13a后没有发生演替得以保留,而扇叶水毛茛 (*Butrachium bungei*)、马来眼子菜 (*Potamogeton malaianus*) 和轮藻 (*Chara* spp.) 群落发生演替而消失。研究掌握了筑坝扩容下拉市海湿地植物群落分布格局及其变化特征,为科学评估筑坝蓄水对湿地生态系统的影响提供了基础性数据,同时也为水文改变下高原湿地生态系统的保护、管理以及资源可持续利用提供了一定的理论依据。

English Summary:

Damming could alter hydrological cycle in a region rapidly and produce profound influences on ecosystem structures and functions of wetlands. Plants are the essential composition of the wetland ecosystem and the alteration of hydrological conditions caused by damming can directly affect spatial distribution, ecosystem structures and functions of wetlands. The impacts of impoundment by damming on wetland ecosystems have become a worldwide concern.

Lashihai, a typical closed and semi-closed wetland in the northwestern Yunnan Plateau, belongs to the Jinsha River catchment and is also one of the 12 wetlands of international importance in the plateau region. Since 1994, Lashihai has changed from a seasonal flooding wetland to a lake with relatively stable water level after a dam establishment. To study the distribution patterns and changes of aquatic communities in Lashihai after impoundment by damming can provide a sound basis for scientific assessment of impacts of dam establishment on wetland ecosystems. By using the RS and GIS technologies combined with field surveys, the plant communities, species composition and their distribution patterns in the plateau wetlands of Lashihai were studied over 13 years following impoundment by damming. The results of a comparative analysis of changes in plant communities from 1994a to 2006a showed that 13 years after dam establishment, there were two emergent communities (*Scirpus tabernaemontani* and *Polygonum amphibium*), two floating-leaved communities (*Potamogeton tepperi* and *Trapa bispinosa*), five submerged communities (*Myriophyllum spicatum*, *Potamogeton pectinatus*, *Potamogeton crispus*, *Potamogeton perfoliatus* and *Potamogeton pusillns*) and lakeside meadow community in Lashihai. The number of species was 61, belonging to 25 families and 48 genera. Plant species richness was the lowest in the submerged communities and increased gradually in the floating-leaved communities and emergent communities, and reached the highest in the lakeside meadows. The current distribution area of the submerged communities amounted to 615.08 hm², the meadows and floating-leaved communities covered 214.60 hm² and 140.01 hm², respectively, and the emergent communities was only 9.34 hm². In the past 13 years after impoundment, the plant communities in Lashihai changed from a simple submerged community to a diverse system of submerged, floating-leaved and emergent communities, where the submerged plant communities of *Myriophyllum spicatum*, *Potamogeton pectinatus* and *Potamogeton pusillns* remained, and *Butrachium bungei*, *Potamogeton malaianus* and *Chara* spp. communities had disappeared. Damming altered the natural hydrological conditions and changed greatly species composition, community structure and spatial patterns of wetland vegetation in Lashihai. The key driving force for the changes in wetland vegetation was dam construction, as the wetland plants with different strategies of renewal and spreading responded to hydrological changes by damming. Lashihai wetland has been designated to a wetland of international importance, with a main conservation object of *Ciconia nigra* and other wintering waterfowl, as well as their habitats. The diverse plant communities and regular spatial distribution of wetlands in Lashihai could provide crucial habitat, shelter and food for waterfowl. The number of winter waterfowl increased significantly as compared to that before dam construction. The present stable relationships among hydrology-vegetation-waterfowl provided a foundation to maintain the wetland ecosystem structures and functions. A scientific assessment of dam establishment on wetland ecosystems could provide sound information for plateau wetland conservation, management and wise use.

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