The Grasslands of Inner Mongolia: A Special Feature

Xingguo Han,[1] Keith Owens,[2] X. Ben Wu,[1,3] Jianguo Wu,[1,4] and Jianhui Huang[1]

Authors are [1]Professors, Institute of Botany, Chinese Academy of Sciences, Beijing 100093, People's Republic of China; [2]Professor and Head, Department of Natural Resource Ecology and Management, Oklahoma State University, Stillwater, OK 74078, USA; [3]Professor, Department of Ecosystem Science and Management, Texas A&M University, College Station, TX 77843, USA; and [4]Professor, School of Life Sciences and Global Institute of Sustainability, Arizona State University, Tempe, AZ 85287, USA.

Grasslands of northern China are of great ecological, economic, and cultural importance (Kang et al. 2007). These immense grasslands cover 400 million ha or 40% of the land area of China and stretch 4 500 km northeast–southwest (lat 28°N to lat 51°N). They extend from the northeastern plains adjacent to Mongolia to the southern Tibetan Plateau and consist of four major types: meadow steppes, typical steppes, desert steppes, and alpine steppes (Sun 2005; Kang et al. 2007). Inner Mongolia has 87 million ha of natural grassland, which is a significant constituent of the Eurasian Steppe—the largest contiguous biome in the world (Li 1962, 1979; Wu and Loucks 1992). From east to west, meadow steppe, typical steppe, and desert steppe zones occur in response to the decreasing moisture gradient (Fig. 1).

Substantial land use change and ecosystem degradation have occurred within the Inner Mongolia grassland over the last half century, which has resulted in significant ecological and socioeconomic consequences at both local and regional scales (National Research Council 1992; Tong et al. 2004; Jiang et al. 2006). The primary ecological problem is land degradation, which is attributable mainly to overgrazing and land conversion. Land degradation has led to the deterioration of biodiversity and ecosystem function and services as well as a myriad of environmental and economic problems such as sand storms and poverty. Overgrazing, as the primary cause of land degradation, is a result of improper land management practices and the exceedingly large population density of domesticated animals (Jiang et al. 2006).

Substantial research has been conducted on the ecology and management of China's grasslands (see a recent review by Kang et al. 2007), including early vegetation surveys by Russian, Japanese, and Western explorers (pre-1950s); systematic natural resource inventory through surveys of vegetation, soils, and topography by the Chinese Academy of Sciences and collaborating institutions (1950–1975); long-term monitoring and studies of grassland ecosystem structure and function through the establishment of field research stations (1976–1995); and most recently (since 1996) the expansion of experimental studies of community dynamics, ecosystem function, and global change that are increasingly multiscale and multidisciplinary in nature (National Research Council 1992; Kang et al. 2007). These studies should be of great interest to the readers of *Rangeland Ecology & Management* in other parts of the world. A large number of these studies, however, have been published in Chinese and are not readily accessible to non-Chinese readers, although the number of papers published in English journals has increased rapidly in recent years (e.g., Niu et al. 2003; Yamano et al. 2003; Zhang et al. 2003; Bai et al. 2004; Chen at al. 2004; Kang et al. 2004; Wang et al. 2006; Zhou et al. 2006). The expanse and diversity of these grasslands make them significant ecologically and their management has large regional and global implications. A great deal more research is needed for better understanding the dynamics of the social–ecological systems in these areas and for improving policy and management measures to achieve grassland sustainability.

We present this special feature with a small sample of the grassland research in China and hope that it will promote greater awareness of these vast rangelands. This has grown out of the efforts of a symposium at a Society for Range Management (SRM) annual meeting on "Grasslands of Northern China: Ecology and Contemporary Issues" cosponsored by the SRM International Affairs Committee and the Institute of Botany of the Chinese Academy of Sciences (CAS), with partial support from Dow AgroSciences. Through both the symposium and this special feature, we want to encourage additional research collaboration on the ecology and management of the grasslands of China. The special feature includes six studies conducted in the grassland regions of Inner Mongolia, China. Most of these studies were conducted at field research stations operated by the Institute of Botany of the CAS.

Four of the studies focused on the ecology of the typical steppe grassland and the effects of rangeland management practices. Ping Liu et al. (this issue) investigated decomposition rates and nutrient dynamics of leaf, stem, and root litter of five common plant species in the typical steppe and explored the potential impact of grazing-induced changes in plant species composition on ecosystem function at the Duolun Restoration Ecology Research Station. Baoyin and Li (this issue) reported the results of a long-term (24-yr) monitoring study, at the Grassland Ecosystem Research Station of CAS, on the effectiveness of rangeland management practices (shallow plowing and harrowing) on the restoration of degraded *Leymus chinensis* grassland. Huajie Liu et al. (this issue) evaluated the effects of grazing intensity on the cover, species composition, and nitrogen fixation of biological soil crusts in a 16-yr grazing study also conducted at the Grassland Ecosystem Research Station. The study of Liang et al. (this issue) focused on grazing impacts on the vegetation dynamics along a grazing gradient radiating from residential areas around the Keshiketeng Banner, Chifeng Prefecture, in northeastern Inner Mongolia.

The other two studies were conducted at the Ordos Sandland Ecological Research Station of CAS, focusing on fragile grassland ecosystems and the desertification process. Zhu et al. (this issue) investigated the responses of seed germination and seedling growth to sand burial of two dominant perennial

Correspondence: Dr X. Ben Wu, Ecosystem Science and Management, Texas A&M University, College Station, TX 77843, USA. Email: xbw@tamu.edu

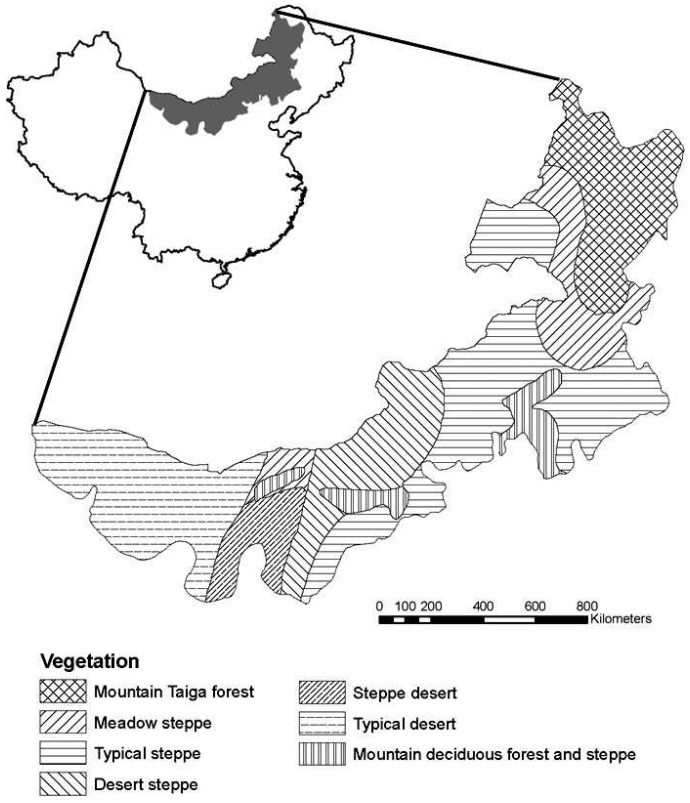

Figure 1. The types and spatial extents of grassland ecosystems and other vegetation types in Inner Mongolia, China.

grasses in Mu-Us sandland. Li et al. (this issue) explored the environmental constraints on the productivity of the sandland plant communities dominated by *Artemisia ordosica* on sand dunes of different mobility. Both contributed to the knowledge base essential for combating desertification and for ecological restoration of the sandland ecosystems.

We hope that the papers in this special feature will be followed by many quality publications in *Rangeland Ecology & Management* addressing the grasslands of China. It is also our hope to encourage greater international collaborations of rangeland and social scientists leading to better understanding and sustainability of these and other rangeland ecosystems throughout the world.

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