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生态学报

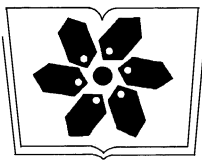
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封面图说: 覆膜-垄作燕麦种植——反映了雨水高效利用和农田水生态过程的优化(详见强生才 P2365)。

彩图提供: 兰州大学干旱与草地生态教育部重点实验室莫非 E-mail: mofei371@163.com

气候变化下旱区农业生态系统的可持续性

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关键词: 气候变化; 干旱农业; 生态系统; 可持续性

农业生产是将自然资源不断转化为农产品的过程。简单的说就是将阳光、空气、水和土壤等无机资源转化为可以供人类消费的有机产物。农业生态系统必须对全球气候变化、市场竞争、自然环境的恶化、经济等政策法规和人民的需求等因素做出灵活的应对策略, 同时还要保证自然生态系统的稳定性。在发展中国家, 有超过 20 亿的人口每天收入低于 2 美元, 他们收入中绝大部分都用于解决温饱。这些人大部分生活在干旱、半干旱地区, 并以农业生产作为生活的主要来源。由于这些地区水资源匮乏、土壤贫瘠, 粮食安全问题一直是该地区人类生存的关键。中澳两国都把干旱、半干旱地区的农牧业发展作为研究的重点。两国的专家都致力于恢复和维护干旱半干旱地区脆弱的农业生态系统。气候变化正在使农业生态系统可持续发展面临严峻挑战。因此, 迫切需要农学, 生态学, 环境学, 社会经济学等多学科的共同发展和融合解决这一问题。

2010 年 7 月 20—25 日在兰州大学举办了以“气候变化和旱区农业生态系统管理”为主题的“第二届生态系统评估与管理(EAM)国际会议”。国内外众多知名专家参与了此次会议, 并共同讨论在全球气候变化背景下如何提高干旱半干旱地区脆弱农业生态系统生产力与可持续性。本次会议的议题是: (1) 半干旱地区旱作雨养农业生态系统评估与管理, (2) 干旱地区绿洲农业生态系统评估与管理。此次会议由兰州大学和澳大利亚西澳大学联合主办, 中国科学院生态环境研究中心协办, 由国家教育部和国家外专局联合支持、兰州大学干旱与草地生态教育部重点实验室承担的“旱寒生态学”学科创新引智基地和西澳大学农业研究院、FAO 属下的叙利亚国际旱地农业研究中心(ICARDA)联合提供资金支持。

会议期间, 25 位专家就干旱、半干旱地区植物土壤互作关系作了报告。另外还有 18 位在干旱半干旱地区科研一线工作的青年学者汇报了研究进展, 并与专家进行了广泛交流。报告会之后, 大会组织专家分别对典型旱区农业进行了考察, 分别是兰州大学黄土高原旱地农业生态实验站(榆中)和甘肃武威市民勤绿洲农业生态系统。此次大会遴选出 35 篇学术论文, 以专刊的形式发表于《生态学报》第 31 卷第 9 期。会议遴选出的其它英文文章将于 2011 年在《Plant and Soil》和《Crop and Pasture Science》上发表, 敬请期待。我们相信, 本专刊的出版将会对气候变化背景下旱区农业生态系统的研究和发展产生重要的推动作用。

Sustainability of agricultural ecosystems in arid regions in response to climate change

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Key Words: climate change; arid agriculture; ecosystem; sustainability

Agriculture can be defined as the process of using natural resources (sunlight, air, water and soil) to produce a consumable product (e. g. food, fuel and fiber), while maintaining sufficient resources for the next generation. Future agricultural production systems will need to be sufficiently flexible to respond to rapid changes in climate, uncertainties in global markets, declining natural resources, and to changing political and economic forces, and population demands, without destroying the ecological resources on which agriculture depend. More than 2 billion people in developing countries survive on less than two US dollars per day, and spend most of it on food. Many of these people live in drought-prone areas. Their livelihood depends on agriculture. But with poor rainfall and a rapidly degrading resource base, food security remains a challenge. Dryland agriculture (both crop and animal production) in fragile arid and semi-arid agro-ecosystems is a theme addressed in both China and Australia. Climate change poses an increasing threat to sustainable food production, requiring urgent implementation of agronomic, genetic, ecological, environmental and socio-economic strategies to address the threat.

The 2nd International Workshop on Ecological Assessment and Management was held at Lanzhou University, Lanzhou, Gansu Province, China, from 20 to 25 July 2010 to address the theme “Climate change and agricultural ecosystem management in dry areas”. The workshop brought together a group of world-renowned scientists from overseas and China to address the topic of how to improve the productivity and sustainable development of fragile arid and semi-arid agro-ecosystems under the threat of global climate change. The objectives of the workshop included: (1) the assessment and management of semi-arid rainfed agro-ecosystems, and (2) the assessment and management of oasis agro-ecological systems in arid areas. The workshop was organized by Lanzhou University and The University of Western Australia, co-supported by the Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences. Financial support was provided by the “111” project Introducing Foreign Talents of Discipline to China Universities (jointly funded by the State Foreign Experts Bureau and the Ministry of Education), the UWA Institute of Agriculture and the International Centre for Agricultural Research in Dry Areas (ICARDA), Syria.

Twenty-five key speakers presented the science of plant-soil interactions in dryland environments. In addition, 18 young scientists reported progress in climate change and dryland agricultural ecosystem management. There were two scientific tours to typical agricultural regions: to the Yuzhong Dryland Agricultural Experimental Station of Lanzhou University on the Loess Plateau, and to the Minqin Oasis Agricultural Ecosystem in Wuwei City that depends on a decreasing water resource from the Qilian mountains. In this special issue, 35 peer-reviewed papers covering the above themes are published in Chinese with Abstracts in English. Other papers presented at the workshop will be published in 2011 in English in special issues of *Plant and Soil* and *Crop and Pasture Science*. We believe that the publication of this special issue will provide significant impetus to further advance dryland agricultural ecosystem research and development under changing and variable climatic conditions.

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2009 年度生物学科总被引频次和影响因子前 10 名期刊★

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4	西北植物学报	4177	4	生物多样性	1.553
5	生态学杂志	4048	5	生态学杂志	1.396
6	植物生理学通讯	3362	6	西北植物学报	0.986
7	JOURNAL OF INTEGRATIVE PLANT BIOLOGY	3327	7	兽类学报	0.894
8	MOLECULAR PLANT	1788	8	CELL RESEARCH	0.873
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10	遗传学报	1667	10	植物研究	0.809

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