Biodiversity and Pest Control

By Li Zhengyue, M. A. Altieri, Zhu Youyong. Beijing Science and Technology Press, 16 Xizhimen South Street, Beijing, China, 100035. 2009. 269 pages. 68.00 CNY.

In agro-ecosystems, either as artificial or semi-artificial ecosystems, their biological diversity directly affects the level of sustainable development of agricultural production. Their relationship with pest control has been a concern of ecologists for a long time. The species diversity in agricultural insect communities is based on the multi-level food chains and food webs linked by nutrition. With the intensification of modern agricultural management, the structure of agricultural landscapes and the biodiversity of agro-ecosystem become simplified, resulting in the failure of natural pest control in many countries or areas. Simple biological diversity of agro-ecosystem caused instability of the relationships among crops, pests and natural enemies, lead to the outbreaks of pests becoming more and more serious. FAO estimated that grain and cotton production loss 14% and 16% respectively each year due to the damage of pests in the world. China losses billions of dollars annually due to agricultural pests. In the past, simple chemical pesticides were widely used to control pest populations, as do many areas even nowadays. In China, the control of agricultural pests mainly relied on chemical pesticides for many years, consuming large amount of pesticides. According to the statistics, only the active ingredient in the chemicals annually produced is more than 200 000 t in China. Wide application of chemical pesticides inevitably leads to serious environmental problems, such as so called “3R-problem” (resistance, resurgence and residue). In order to manage agricul-
tural pests, in addition to the rational use of chemical pesticides, protection and use of the self-pest-control mechanism in nature is very important, since it is a more effective or natural way to control pests. In agricultural production, more and more people have recognized that by changing the surrounding environment, adjusting the cropping systems, arranging the crop distribution pattern can increase the species number and population size of natural enemies, change the composition of biological communities, improve community diversity and stability, and suppress the number of pests. Although conservation and use of natural enemies in agro-ecosystem is not only beneficial to the ecological pest control, but also helpful to reduce the use of pesticides, improve crop yield and quality, and contribute to the management of agro-ecosystem, however, using natural enemies to control pests in a single-crop-species agro-ecosystem has been challenged practically in the past.

The success of migration and colonization of pests in crops depends on the probability of individual pest finding, feeding and reproducing on host plants, which will be affected by increase of biodiversity in agro-ecosystems. The diversified agro-ecosystem will cause complex visual and olfactory stimulations to pests, and thus disrupt their ability to find host plants. Biological diversity in agro-ecosystems can play the role of shifting the target crops when inter-cropped crops or weeds are similarly suitable for pests, reducing the level of damage of pests to the main crops. This can be applied to a wide area to control pest populations. As opposed to the 1-year-crop habitat, the non-crop habitat types with less disturbance and longer time of vegetation cover have stable heterogeneous environments. Thus they can become suitable sites for the reproduction of parasitic and predatory arthropods due to adequate provision of shelter and/or resources such as prey, pollen and nectar and so on. These natural enemies of crop pests can easily move into the adjacent crop habitats, playing the role of regulation and control of pest populations. Thus, in order to increase the biodiversity of agro-ecosystem and the natural enemies of crop pests, conservation of the biodiversity of crop pests, and the biodiversity of agro-ecosystem and the natural biodiversity of pest habitats, playing the role of regulation and control of pest populations. Thus, in order to increase the level of damage of pests to the main crops in agro-ecosystems, discussed inter-cropping, tillage layer coverage, weed management, techniques of crop surrounding plant control and so on. The main contents are: Chapter 1, ecological functions of biodiversity and its relationship with agricultural production; Chapter 2, relationships between plant diversity and stability of insect community in agro-ecosystems; Chapter 3, the survey and sampling method of insect diversity; Chapter 4, insect management in complex cropping agro-ecosystems; Chapter 5, biodiversity and sustainable control of insect pests in rice field; Chapter 6, cultivation of ground cover plant and pest management in orchard; Chapter 7, impacts of surrounding environment of farmland on the insect populations; Chapter 8, weed control and pest population control; Chapter 9, pests dynamics in agroforestry ecosystems; Chapter 10, vegetation diversity and pest population control in agro-ecosystems; Chapter 11, agricultural biological diversity and invasion of alien insects.

The book is well written with few errors and strong readability. It may be used as a good reference for entomologist or ecologists or persons who engage in agricultural or biological research, education, production and management, or other persons who are interested in these fields.

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Comprehensive Research on Ecosystems of China

By Sun Honglie. 2009. Beijing Science and Technology Press, 16 Xizhimen South Street, Beijing, China, 100035. 388 pages, 89.00 CNY.

The territory of China spans a vast area, extending from tropical to cold regions from south to north, and from humid or rainy to arid or semi-arid regions from east to west, covering diversified types of ecosystems. Obviously, clear understanding the structures, functions and dynamics of these complex ecosystems need integrative and long-term investigations. In-depth and systematic research on these ecosystems can provide essential information for the scientific assessment of their health status and successional trends, which can also reflect the changes of the local environmental conditions.

Ecosystem research in China was rather late compared with other developed countries, and 20 years ago, such research was also rather scattered and isolated without common objectives and unified scientific methods of observation and measurement. This made it hard to make scientific and systematic comparisons.
Erratum The Canadian Field-Naturalist 126(4)

In response to the review of Contributions to the History of Herpetology. CFN 126(3): 344-345, the book’s editor Kraig Adler pointed out (personal communication to FRC 12 May 2013): “Only one small correction. Mrs. Martof used a kitchen knife, not a gun. She told the police she slipped while cutting some pizza. But Bernie was stabbed up under his rib cage several times!”

Erratum The Canadian Field-Naturalist

It has come to our attention that sections of many of the book reviews by Li Dezhi and Qin Aili were copied from sources without attribution. The journal and the authors apologize for this oversight.