

Color Illustration of Diagnosis and Control for Modern Sugarcane Diseases, Pests, and Weeds

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Abstract

Sugarcane is the main sugar crop in China; in the process of promoting the modern sugarcane industry, effective control of sugarcane diseases, pests, and weeds is an important part of “high yield and high sugar” sugarcane cultivation technology. Practice has proven that focus on the management of diseases, pests, and weeds can not only significantly improve sugarcane yield and quality, but can also lead to greater social and economic benefits from sugarcane production.

This book, with clear color pictures and scientifically accurate text, systematically describes the 20 diseases, 40 pests, and 7 natural enemies of pests and weeds that commonly occur in sugarcane production. The content includes details of:

- the occurrence and damage, identification of symptoms, and characteristics of epidemic infections of sugarcane diseases, as well as control measures for these diseases;
- the occurrence and damage, morphological identification, and life cycles of sugarcane pests, and control measures for these pests;
- the parasitic (predation) characteristics, morphological identification, occurrence, and life cycles of natural enemies of sugarcane pests, and approaches to the protection and utilization of these entities; and
- the main weeds in sugarcane fields and their distribution and occurrence, as well as chemical control measures for these weeds.

With its novel content, easily understood subject matter, and characteristics of science, accuracy, practicability, and readability, this book is suitable for use in the sugarcane scientific research, teaching, production, and management communities, as well as being a source for reading and reference by relevant people, such as teachers and students in agricultural colleges and universities.

Introduction

Sugarcane, the main source of sugar, is one of the most important economic crops in the world. In China, sucrose yield accounts for more than 90% of total sugar production, making China the third largest sugar producer in the world after Brazil and India. The sucrose industry has become an important pillar of Chinese regional economic development and the main source of increasing farmers' income and local financial growth in remote areas with minority populations. However, with the development of sugarcane production, there have been changes in agricultural farming systems, and the frequent introduction of sugarcane seedcane and the abuse of chemical pesticides, together with the complicated climate and environment, diseases, pests, and weeds, have often caused great losses to sugarcane production, and the occurrence of these problems is becoming increasingly serious. According to still incomplete statistics, there are more than 1770 kinds of organisms in the world that are harmful to sugarcane; among them are more than 120 sugarcane diseases, more than 1000 types of sugarcane pests, more than 600 types of sugarcane field weeds, and more than 50 types of sugarcane field rats (Chen 1982; The Important Sugarcane Diseases Research Cooperation Group 1991; Rott et al. 2000; Huang and Li 2014 2016). The United Nations Food and Agriculture Organization (FAO) statistics have shown that global crops suffer from diseases, pests, and weeds, with the average yield loss before harvest being 30%–35% (An and Guan 2009). The potential rate of sugarcane production loss caused by harmful organisms was shown to be 15%–30%. In the process of promoting the modern sugarcane industry, variety is the basis; cultivation is the key; and diseases, pests, and weeds are the greatest threat. The management of sugarcane diseases, pests, and weeds is an important part of sugarcane cultivation. Practice has proven that, if we concentrate our efforts on the management of diseases, pests, and weeds, this can not only significantly improve sugarcane yield and quality, but can also lead to great social, economic, and ecological benefits from sugarcane production (Li 2010). Over the years, according to practical production, personnel in Chinese sugarcane research institutes and those dealing with sugar industry technology systems have carried out systematic research on, and have ascertained, the distribution, occurrence, and

characteristics of the decreases and increases of the main diseases, pests, and weeds in different sugarcane areas. Practical integrated control techniques have been summarized and implemented, much basic information and real pictures have been accumulated, a series of accomplishments have been made in these fields, and strong technical support has been provided for the improvement of sugar industry efficiency in China in regard to the reduction of the loss caused by the diseases, pest and weeds and the increase of economic benefits (Lu et al. 1997; Zhou et al. 1999; Wang 2007; An and Guan 2009; Xion et al. 2010; Li et al. 2010, 2013; Li and Huang 2012; Wei et al. 2012; Shan et al. 2014). However, the broad masses of workers and sugarcane growers in China often have difficulty in identifying some sugarcane diseases, pests, and weeds during sugarcane production, and do not know how to control them, thus missing appropriate times for control, eventually causing major disasters and serious losses affecting the development of the sugar industry in this country. Against this background, with encouragement and substantial support from relevant institutions, and combined with findings on the scientific and technological development of sugarcane and the actual production of sugarcane areas in China, we have carefully summarized and sorted many years' scientific achievements and pictorial materials, and finally wrote this book, entitled, "Color Illustration of Diagnosis and Control for Modern Sugarcane Diseases, Pests, and Weeds".

The book targets existing questions regarding the control of diseases, pests, and weeds in current sugarcane production, in order to help the broad masses of sugarcane producers and technicians to understand and grasp the following factors:

- the species and distribution of diseases, pests, and weeds in sugarcane areas, and the damage they cause;
- ways to improve the level of scientific control of sugarcane diseases, pests, and weeds;
- ways to effectively control the occurrence of diseases, pests, and weeds;
- ways to enhance their own capabilities for disaster reduction and prevention; and
- ways to ensure the quality of sugarcane varieties and sugarcane production safety.

This book, with clear color pictures and scientifically accurate text, systematically describes the 20 diseases, 40 pests, and 7 natural enemies of pests and weeds that commonly occur in sugarcane production. The content includes details of:

- the occurrence and damage, identification of symptoms, and characteristics of epidemic infections of sugarcane diseases, as well as control measures for these diseases;
- the occurrence and damage, morphological identification, life cycles, and control measures for sugarcane pests;
- the parasitic (predation) characteristics, morphological identification, occurrence, and life cycles of natural enemies of sugarcane pests, and approaches to the protection and utilization of these entities; and
- the main weeds in sugarcane fields and their distribution and occurrence, as well as their chemical control measures.

The book, entitled “Color Illustration of Diagnosis and Control for Modern Sugarcane Diseases, Pests, and Weeds”, is edited by the Yunnan Key Laboratory of Sugarcane Genetic Improvement, Sugarcane Research Institute, and Yunnan Academy of Agricultural Science, and is supported by the Earmarked Fund for Sugar Crop Research System (CARS-170303) and the Earmarked Fund for Yunnan Province Agriculture Research System. During the compiling of this book, some relevant materials and pictures from our peers were referred to and referenced, and we herewith express our sincere thanks to those individuals.

Owing to the limited time taken for the compilation of this book, we hope that the readers will make suggestions if there are some shortcomings and mistakes. We believe this book is suitable for people involved in sugarcane scientific research, teaching, production, and management, as well as for reading and reference by interested people and relevant teachers and students in agricultural colleges and universities.

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