Identification of Insects and Diagnosis of Injury

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Effective management of corn insect pests begins with accurate identification of the pests and reliable diagnosis of pest injury. Identification and diagnosis can be based upon three types of evidence: (1) morphology—an insect's form and structure; (2) indications of an insect's presence—e.g., symptoms of injury; and (3) situation—the time of occurrence or location of a pest or its injury in a field or on a plant. A combination of the three types of evidence offers the greatest potential for accurate identification and diagnosis. Descriptions and color photographs of insects and the injury they cause and details about their time of occurrence are provided in the sections pertaining to individual insects in this handbook. However, the list of pests by injury type, the illustrations, and the keys in this section offer a quick method of identifying insects and diagnosing injury in corn.

If the type of injury found in a cornfield can be categorized (e.g., feeding on leaves or tunneling in stalk), the list of corn insects by injury type might provide a first clue about which insect(s) are responsible. The page number after an insect's common name indicates the section in which the insect is discussed in detail.

The keys for diagnosis of injury and insect identification were designed to be used in a stepwise fashion. At each step, two or three choices are presented, one of which should apply to the injury or insect to be identified. The choice made leads to another set of two or three choices, and so on until the name of the insect appears with an illustration. If the illustration does not match the injury or insect, the user should retrace his or her steps to determine where the wrong choice was made. After the injury or insect has been identified with the keys, the color photographs can be studied to verify the diagnosis or identification.

The key for diagnosis of insect injury to corn is presented as a series of choices. Different pests occur at different times of the season, so initial separators are times of the growing season. Other primary separators are the parts of the plants injured. When several insects cause the same type of injury at the same stage of corn development, all of them are listed.

A positive association between the injury to the corn plant and its cause is essential for making accurate pest management decisions. In some instances, injury alone will not distinguish which pest is causing the injury. Every attempt should be made to collect and identify the pest(s). Many species of insects found in corn do not appear in the keys because they are incidental in occurrence. The keys were designed for identification of the most common and important pest insects, and a few unusual corn pests that often are mistaken for more serious pests.

Preceding the key for the identification of insects are generalized illustrations on which certain body regions and structures are indicated. The illustrations of a grasshopper (Mormon cricket), beetle, aphid, caterpillar, and insect leg provide an orientation for some of the terms used in the key. The Glossary provides definitions of these terms.

The key for the identification of insects initially separates pests at or below the soil surface from pests that feed above ground. Other major characteristics used to separate types of insects include the presence or absence, and types of legs and other structures; body shape and general size; types of wings; and color patterns.

After the key for the identification of pests is a series of illustrations of parasitoids and predators of pests. Because a key to the species of natural enemies is impractical, the illustrations provide a representation of these insects' appearance.