

**Zeitschrift:** Acta Tropica  
**Herausgeber:** Schweizerisches Tropeninstitut (Basel)  
**Band:** 19 (1962)  
**Heft:** (7): Pests of crops in warm climates and their control

**Artikel:** Pests of crops in warm climates and their control  
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**Kapitel:** III. Pests of crops in warm climates  
**DOI:** <https://doi.org/10.5169/seals-311035>

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### III. Pests of Crops in Warm Climates

This chapter is devoted to the pests which occur on crops in the tropics, subtropics and the hot parts of the temperate zones. First a description is given of the damage caused by the pest, often accompanied by a photograph. Then follows the *scientific name* of the pest and the *order* and *family* (subfamily) to which it belongs. Whenever a *common name* could be found, this name is given also. Sometimes a pest may be known under several common names in different areas, sometimes one common name may belong to several species.

The *illustrations* showing either the damage, or the pest, or both, and the *short morphological and biological data of the cause of damage* are intended to make the reader familiar with the subject and to help him in recognizing a pest.

The description of the pest is followed by data on its *distribution*. These data are based on information found in entomological literature. Obviously, however, the giving of either too wide or too narrow a distribution range for certain species could not always be avoided.

The list of pests does not follow the order of zoological classification; it is primarily based on the attacked parts of a plant in the following order: pests attacking *roots, rootstocks, stems or trunks or stalks, branches, twigs, shoots, leaves, buds, flowers and pods or fruits*. Under this grouping according to plant parts are given: 1. sucking *plant nematodes*; 2. biting-chewing Isoptera = *termites*, COLEOPTERA = *beetles, weevils and their larvae*, ORTHOPTERA = crickets, locusts, LEPIDOPTERA = caterpillars, DIPTERA = *flies and their larvae*, HYMENOPTERA = *ants, wasps*; 3. sucking THYSANOPTERA = *thrips*, HEMIPTERA = *plant bugs*, HOMOPTERA = *cicadas, leafhoppers, white flies, aphids and scale insects*, ACARINA = *mites*.

The *numbers printed in the margin* should facilitate cross reference. The small numbers indicate that the same species is mentioned elsewhere.

In the following tables are described the *pests of 35 crops*, including both *major and minor pests*. We make a distinction between

major and minor pests. The former are the most important pests, which can occur in almost every area where the crop is found—therefore there is always a serious possibility that they will attack that particular crop. The latter, minor pests are those which appear only sporadically, in certain restricted areas. We have also experienced that major pests may be absent in certain areas, or may be diminished by a change of culture methods, or by the introduction of another variety of the same crop. Obviously, the opposite can also occur—a minor pest can become a major one, because of these changes.

Sometimes a crop shows symptoms which can be attributed to none of the pest species mentioned. In such cases it is advisable to compare the symptoms with the descriptions and illustrations of damage of other crops. In other cases, when pests are present which are not illustrated, the reader can do likewise, and/or also refer to the systematic section of chapter I. It should thus be possible to recognize related types and to undertake the control measures mentioned.

Data on the *effect, toxicity and application range of insecticides*, with *recommendations* as to the *control of pests* of all the crops mentioned here, are given in chapter V as a separate appendix which will be renewed periodically.