

# PRINCIPLES, PROBLEMS, PROGRESS AND POTENTIAL IN HOST RESISTANCE TO STORED-GRAIN INSECTS<sup>1</sup>

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## Introduction

Resistance to stored-grain insects includes resistance to field infestation of field-to-store pests and to post-harvest infestation. Varietal differences in resistance to insects are observed in growing crops as well as in stored grain. While crops growing in the field are subject to unpredictable seasonal changes of growing conditions and--among various other hazards--to exposures to insects, the post-harvest conditions are normally less variable. Grain in storage under optimal conditions does not undergo changes that affect its resistance to insects. It is all the more important, therefore, to know which varieties are the most resistant and under what condition these have to be stored to maintain their resistance to insects throughout storage. Susceptible varieties have to be eliminated, especially when proper attention and control is not available.

Resistance to stored-grain insects may be applied as an independent control method or as an adjunct to chemical or biological control. Escalating costs of insecticides, spreading of insecticide-resistant insects, growing concern about indiscriminate use of insecticides and their undesirable side effects increase interest in crops that resist insects throughout pre- and post-harvest exposure.

## Principles of Breeding for Insect Resistance

The first step generally has been to screen commercial and locally adapted varieties to separate susceptible from resistant ones. According to the intensity and funding of the program, it may proceed from recommending the less susceptible or more resistant varieties, if available, to searching for resistance in exotic varieties and related wild species, if resistance could not be found near at hand.

Successful selection for resistance to insects has been carried out in the field, greenhouse, laboratory and storage facilities, using either natural or artificial infestation. The latter is, of course, easier to achieve under confined greenhouse and laboratory conditions. However, the possibility of selecting local insect strains in greenhouse and laboratory cultures has to be considered. Resistance has to be tested to the most aggressive strains known.

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