



Insecticide Resistance Action Committee

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Resistance Management for Sustainable Agriculture & Improved Public Health



Who is IRAC & its Members ?

- ▶ **IRAC is the Insecticide Resistance Action Committee**
- ▶ **IRAC** formed over 20 years ago to provide a coordinated industry response to the development of resistance in insect and mite pests.

▶ **IRAC Mission**

- Facilitate communication and education on insecticide and acaricide resistance.
- Promote the development of resistance management strategies in crop protection and vector control to maintain efficacy and support sustainable agriculture and improved public health.

▶ **IRAC International Members:**

BASF, Bayer CropScience, DuPont, Dow AgroSciences, FMC, Makhteshim, Sumitomo, Syngenta. Many other companies are members of the IRAC Country Groups



What is the role of IRAC ?

IRAC implements comprehensive strategies to confront resistance by:

- ▶ Identifying the scope of resistance problems
- ▶ Developing methods for detecting and monitoring resistance
- ▶ Discovering how resistance occurs
- ▶ Devising programmes to counter the loss of pest susceptibility
- ▶ Developing susceptibility management strategies that incorporate all practical pest management methods into a crop protection programme
- ▶ Disseminating information on management strategies
- ▶ Interacting with regulatory authorities responsible for insecticide registration
- ▶ Actively researches resistance management strategies for public health programmes in close association with WHO
- ▶ Actively promotes and supports IRAC country groups



What is Insecticide Resistance ?

▶ **Resistance is defined** as a heritable characteristic that permits an insect or mite to survive exposure to a full field rate of a properly applied insecticide. It may lead to field failure. It is most likely to arise as a result of poor application technique or failure to follow resistant management guidelines.

▶ **Mechanisms of Resistance** include:

Metabolic Resistance - the insect has an enhanced ability to destroy or eliminate the insecticide. A number of types are known.

Target Site Modification - the site where the insecticide acts is modified to reduce the effect of the product. These mechanisms are specific to particular classes of insecticide with given modes of action.

Delayed Penetration – entry of the insecticide is delayed in comparison to the susceptible types.

Behavioural Resistance – resistant insects may detect or recognize and avoid the insecticide.

▶ **Mode of Action Classes**

IRAC has developed a mode of action classification based upon the known ways in which different products act. Effective resistance management (IRM) is dependent on reducing selection pressure and IRAC has developed and recommends strategies that involve using different modes of action. IRAC promotes product labeling to help growers practice effective IRM through the use of alternations or sequences of modes of action. IRAC is investigating the value of rotational programmes in managing resistance in malaria transmitting mosquitoes.



What is the Key to Managing Resistance ?

The key to managing resistance is to reduce selection pressure. Consistent with modern pest management principles, IRAC recommends the following resistance management guidelines to keep valuable protection tools for crop pests and vectors working effectively and keep costs down:.

Recommendations:

- ▶ Consult an adviser for regional insecticide resistance and IPM strategies
- ▶ For crops, consider options for minimizing insecticide use by selecting early maturing or insect-resistant varieties. Manage the crop for 'earliness'
- ▶ Include efficient cultural and biological control practices in pest control programmes
- ▶ Carefully select crop protection tools not only for cost & effectiveness but also for ability to maintain beneficial insects
- ▶ Follow label recommendations for rotating or mixing products from different classes based on modes of action
- ▶ Where there are multiple applications per year, alternate products of different classes
- ▶ Use insecticides and acaricides at labelled rates and spray intervals
- ▶ Calibrate equipment for accurate application: use recommended spray volumes and pressures
- ▶ Monitor pest or vector populations during the growing season and gauge effectiveness of controls
- ▶ Time applications against most susceptible stages based on local economic thresholds
- ▶ In the event of a control failure that can be linked with resistance do not re-spray with an insecticide from the same class

