Pesticide Risk Mitigation Engine

Policy on Pesticide Resistance Risk Management

Goal: Provide end users with guidance on pesticide mode-of-action classes, to identify potential resistance selection pressure risks for herbicides, fungicides and insecticides.

Purpose: Pesticide resistance is a severe and increasing problem in all agricultural systems where pesticides are applied. There is evidence that knowledge of mode-of-action classes for pesticides can assist in the rotation of pesticide modes-of-action, and that this practice can delay or prevent the emergence of resistance for certain pests (depending on the diversity of tolerance genotypes in the population, access to unsprayed reservoirs that harbor susceptible genotypes, multiplication rates, dispersal rates, and the use of non-pesticide management alternatives).

General Policies:

1. Our initial goal will be to provide information about mode of action class in the model outputs, to enable alternative selections to be made where resistance selection pressure could theoretically occur. In addition, we will provide links to the Internet-based, industry-sponsored listings of resistant species to specific herbicides, insecticides and fungicides. Mode-of action class data can be obtained and added as a qualifier to many of the pesticides that are within the CIG project databases. In some cases chemical class information is directly linked with pesticide names and identity codes. In other cases, this information would need to be added by hand.

2. At a later stage of the project, we will consider the need for additional steps, information, and tools to facilitate effective resistance management. These could include calculating a diversity index of pesticide modes of action based on the applications made to a given field for control of a given pest. In cases where a grower or pest manager reports, or is exploring a pattern of chemical use that results in dangerously low diversity in terms of pesticide mode of action, the system could alert the user to the need to consider resistance management and/or monitor pest populations for any changes in susceptibility. The resources required to develop and adopt more sophisticated pesticide resistance risk management advice and tools is hard to predict, as is where and how resistance will emerge as a major driver of changes in IPM systems and pesticide use.

3. In cases where resistance has already become established, rotations may still be employed, but to be effective and to avoid increasing selection pressures, local knowledge of the pattern and intensity of resistance and of the occurrence of cross,

multiple and negative cross resistance in the pest population will be required. We will explore opportunities to provide high quality, low risk, resistance management information through the website, via the development of educational information, web-links and various tools and services that provide access to this information.

4. Pesticide labels, particularly those for fungicide mixtures, increasingly contain sophisticated advice regarding their uses in circumstances where resistance may exist to one or more of the modes of action that are represented in the mixture. In some cases, use is no longer recommended if resistance is present to either mode-of-action class. To provide responsible and relevant advice, we would need to liaise with EPA, manufacturers and the resistance action committees, in order to include this information.