ESA releases position statements on managing insect resistance to pesticides and GMOs

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Insects that damage crops and transmit diseases can have a devastating impact on food security and human health. Insecticides are a critical tool for mitigating insect pests, as are crops that have been genetically modified to be resistant to certain insects. However, continuous exposure to insecticides with the same mode of action can lead to reduced effectiveness if the insect population develops resistance. Likewise, insects can become resistant to genetically modified crops if resistance management programs are not implemented.

The Entomological Society of America (ESA) recently released position statements that offer recommendations on how to avoid insect resistance to pesticides and to genetically modified crops.

"The health and well-being of humans around the world depends on a limited set of tools for preventing insects from transmitting diseases or damaging crops, yet the ability of insects to acquire resistance rapidly to these tools, including pesticides and genetically modified crops, can reduce their effectiveness or render them entirely useless," said ESA President May Berenbaum. "By understanding how resistance evolves, entomologists have developed a powerful new strategy—resistance management—to extend the useful lifetime of these tools."

INSECTICIDE RESISTANCE MANAGEMENT

The goal of insecticide resistance management (IRM) is to delay resistance by developing effective resistance management strategies, investigating and documenting emerging resistance problems, and educating stakeholders on best management practices in order to minimize the negative impacts of insecticide resistance on the environment and society. In its recent statement, ESA offers the following recommendations:

1) Develop insecticides with different modes of action - Resistance is most likely to occur when insecticides with the same mode of action (MOA) are used repeatedly. A streamlined regulatory process that includes reasonable and predictable regulatory requirements and review timelines would promote the timely development of insecticides with novel MOAs, and a comprehensive reevaluation of the current pesticide regulatory process could identify bottlenecks and improve registration efficiency for new insecticides. Improved funding support for the IR-4 Program is also needed to close existing budget shortfalls and to advance pesticide residue research to effectively address the requirements of changing domestic and international regulatory environments.

2) Develop resistance detection tools - Early detection of resistance is critical for evaluating the success and making modifications in an IRM program. Development of rapid diagnostic tools to detect resistance and improve decision making by pesticide users may reduce widespread resistance development in pests. Expansion of IRM funding sources within existing federal programs (e.g., USDA NIFA, NIH NIAID) and coordination between public institutions, private companies, and regulators will enable early detection of resistance in key pests of crops, livestock, and humans.

3) Continue IRM education and outreach - Grower incentives and education about the basic principles of integrated pest management (IPM) and IRM are essential to optimize pest management. Continued

support of Cooperative Extension, IPM-related research, extension grants programs, and resistance-related Extension projects through the Farm Bill are crucial for IRM education, outreach, and adoption.

IRM FOR GENETICALLY MODIFIED CROPS

Genetically modified crops have been grown for two decades, resulting in higher crop yields, a decrease in insecticide use, and an increase in farmer profitability. Given the importance of GM crops in meeting the demand for agricultural production, ESA recommends the following:

1) Encourage cooperation among private developers, public institutions, and regulators to promote practical, science-driven IRM practices within IPM programs based on near-term grower needs. This should include coordination on monitoring programs that enable early detection and economically proportionate responses to emerging resistance situations.

2) Education, incentives, and assistance should be provided to growers so they can implement IRM tactics within IPM programs. This infrastructure should include strong public university research and extension networks, as well as locally driven out reach to farmers to encourage IRM programs in ways that are relevant for local conditions and cultures.

3) Develop predictable and reasonable regulatory requirements and review timelines for new genetically modified crops that possess insect-resistant traits, and associated IRM programs that reduce the risk of resistance and promote sustainable use.

4) Support cross-disciplinary research into approaches to overcome the economic and sociological barriers to successful IRM and IPM. It is critical that entomologists in the public and private sectors, supported and enabled by government regulators and policymakers, create and

promote educational programs to teach farmers that IRM is essential to maintain effective insect control and that it is in their own economic interests.

More information: www.entsoc.org/PDF/2016/EntSoc … ideResistanceMgt.pdf
www.entsoc.org/PDF/2016/EntSoc … llyModifiedCrops.pdf

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