Federal pesticide regulatory update: Moving to a national framework with local adaptations?

Steven P. Bradbury
Iowa State University, spbrad@iastate.edu

Follow this and additional works at: https://lib.dr.iastate.edu/icm
Part of the Agriculture Commons, and the Entomology Commons

https://lib.dr.iastate.edu/icm/2014/proceedings/13
Federal pesticide regulatory update: Moving to a national framework with local adaptations?

Steven P. Bradbury, Visiting Professor, Entomology, Iowa State University

Introduction

Recent US Environmental Protection Agency (EPA) pesticide regulations are establishing national performance expectations with varying degrees of flexibility for implementation at the state and local level. For example, EPA decisions concerning pesticide resistance management and pollinator, endangered species and water quality protection create opportunities for designing and specifying regional, state and/or local pesticide use requirements and practices consistent with conditions specified in Federal pesticide registrations. The regulations are highlighting the role Integrated Pest Management (IPM) and site-specific pest management decisions could play in this evolving paradigm.

Pesticide resistance management

Over the last 10 years the nature and extent of pesticide resistance impacts in crop production systems have been documented. In response, the National Research Council (NRC, 2013), Iowa State and other land grant universities have engaged in reviews, research and extension efforts that have contributed to resistance management recommendations (e.g., Gassmann et al., 2012; http://www.weeds.iastate.edu/mgmt/2013/progeval.pdf; http://store.extension.iastate.edu/Product/wc94-pdf). The development and implementation of effective and practical approaches for managing pesticide resistance is also being addressed by numerous professional societies, industry and commodity groups (e.g., http://wssa.net/2014/10/summit-on-the-wicked-problem-of-herbicide-resistance-now-available-online/; http://www.hracglobal.com/; http://www.irac-online.org/; http://www.frac.info/; http://takeactiononweeds.com/).

Under current interpretation of relevant Federal statutes, EPA has the primary regulatory responsibility for addressing resistance management through the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). The US Department of Agriculture's (USDA's) primary role is to advance research and outreach to promote resistance management practices. In this regard, USDA recently announced an initiative to support advances in herbicide resistance management (http://www.usda.gov/wps/portal/usda/usdamediafb?contentid=2014/10/0227.xml&printable=true&contentidonly=true).

EPA’s oversight of resistance management is based on FIFRA’s requirement that EPA ensure that the registration and use of a pesticide does not cause ‘any unreasonable risk to man or the environment taking into account economic, social and environmental costs and benefits of the use of any pesticide.’ In this context, EPA has determined that advisory language on pesticide labels, enforceable label language and/or conditions of registration can be employed to help protect the long-term viability of safe and effective pest control technology. An example of EPA’s efforts to facilitate voluntary efforts includes encouraging registrants to provide pesticide mode of action information on pesticide labels, which can support mode of action rotations as a component in a multi-faceted resistance management program (http://www.epa.gov/PR_Notices/pr2001-5.pdf).

With the advent of western corn rootworm resistance to Bt toxins (e.g., see Gassmann et al. 2011; 2014) and Palmer amaranth resistance to glyphosate, EPA’s efforts to establish viable resistance management as part of the conditions of pesticide registration has advanced on several fronts. For example, the Agency has requested external scientific peer review on refuge requirements for Bt plant incorporated protectants (e.g. http://www.epa.gov/scipolicy/sap/meetings/2013/december/120413minutes.pdf) and has required greater specificity in associated resistance management requirements in registration agreements, which could influence local agronomic practices (http://www.regulations.gov/#/docketDetail;D=EPA-HQ-OPP-2011-0922).

In the context of herbicide resistance management, the recent EPA registration of 2,4-D Enlist is illustrative of the combination of label language and terms of registration that establish required resistance management measures (e.g., scouting before and after application; rotation of crops and herbicide modes of action; mechanical weed control, equipment cleaning). However, the lack of specificity associated with some of these measures
(e.g., scouting) seemingly provides flexibility for state or local implementation (http://www.regulations.gov/#!docketDetail;D=EPA-HQ-OPP-2014-0195).

The evolving EPA approaches to address resistance management reflects the challenge that arises when resistance pests can move across farms. In these instances, maintaining pest susceptibility (i.e., minimizing pest resistance development) is a shared, or common, resource for groups of farmers. Consequently, multiple farms need to undertake coordinated management practices to successfully reduce the rate of resistance development (Ervin and Jussaume, 2014). These practices could be required through enforceable label language and registration conditions that require specific agronomic practices, or through voluntary programs that meet resistance management performance goals, or a combination of required and voluntary measures. A more flexible, voluntary approach for addressing resistance management, consistent with Federal pesticide registration decisions, will likely require states, working with farmers, crop advisors, agricultural retailers, and pesticide and seed companies, with support from Land Grant institutions, to develop tailored implementation approaches.

**Pollinator protection**

An NRC report of 2007 (NRC, 2007) reviewed the nature and extent of North American pollinator declines and the associated causes. This review has served as a foundation for much of the research and management activities of the past several years. Consistent with the NRC report, a 2012 USDA/EPA facilitated workshop concluded that the causes of honey bee and native pollinator declines are multi-faceted and likely inter-related (http://www.usda.gov/documents/ReportHoneyBeeHealth.pdf). Significant stressors to pollinators include: disease/parasites; nutritional quality and extent of forage habitat; agricultural practices; urbanization; bee management; and pesticide exposure. The release of the Federal Government’s pollinator health strategy in June of 2014 recognizes the efforts of numerous organizations, in partnership with Federal and state agencies, to address declines in honey bees and other pollinators (http://www.regulations.gov/#!docketDetail;D=EPA-HQ-OPP-2011-0922).

Within the Federal strategy, EPA’s primary role is to evaluate the risks of pesticides to honey bees and other pollinators and, to the extent new scientific data modifies current risk projections, revise pesticide registrations to mitigate risks consistent with FIFRA. The EPA’s efforts to date include advancing pesticide testing requirements and risk assessment techniques; engaging stakeholders to provide input on pesticide/bee management practices, and, as appropriate, implementing new risk mitigation requirements (see http://www2.epa.gov/pollinator-protection).

Advances in pesticide testing and risk assessment techniques were initiated by EPA several years ago and were based, in part, on the results of a 2011 international/multi-stakeholder workshop organized by the Society of Environmental Toxicology and Chemistry (SETAC, 2014). In 2012, the Agency, in partnership with the Canadian Pest Management Regulatory Agency and California’s Department of Pesticide Regulation, subsequently proposed for external scientific peer review a series of new testing requirements and risk assessment approaches (http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OPP-2012-0543-0047). These new methods, which include sub-lethal toxicity testing for larval bees and semi-field and full field studies within a tiered risk assessment paradigm, were formally implemented in 2014 (http://www2.epa.gov/sites/production/files/2014-06/documents/pollinator_risk_assessment_guidance_06_19_14.pdf). These methods are being employed in the re-evaluation of the neonicotinoid insecticides and, on a case-by-case basis, in the evaluation of new active ingredients.

In addition to advancing pesticide testing and risk assessment methods, the Agency has also engaged a wide range of stakeholders through its Federal Advisory Committee to gain advice in best pesticide use and bee management practices; improvement in pesticide label language; and enforcement guidance for investigating bee kills (see http://www2.epa.gov/pollinator-protection/epa-actions-protect-pollinators).

EPA is also beginning to implement, through labeling and/or voluntary efforts, pollinator protections based on existing scientific information and the availability of practical risk mitigation measures. Of note is the required changes in advisory and enforceable label language for foliar uses of specific neonicotinoid insecticides (http://www2.epa.gov/sites/production/files/2013-11/documents/bee-label-info-ltr.pdf). These changes, in some instances, will require the use of IPM to determine when legal neonicotinoid applications on pollinator attractive crops are possible. It is likely that EPA will propose similar label language for all foliar insecticide uses, including those registered for use on corn and soybeans. As part of the neonicotinoid re-evaluation, EPA is also reviewing the benefits of seed treatments to determine whether risks to pollinators due to fugitive dust exposure at planting, or exposure in nectar or pollen due to systemic translocation, is consistent with FIFRAs cost-benefit standard (http://
As with the advancement of pesticide resistance management requirements, pollinator protection use directions on pesticide labels will likely require the development of state-based practices (e.g., IPM thresholds) to meet Federal requirements that are consistent with local agronomic practices.

**Endangered Species Act (ESA) compliance**

EPA pesticide registration decisions are Federal actions covered under Section 7 of the ESA. Due to concerns in the 1980s that EPA-proposed pesticide risk mitigation measures to protect listed species were too conservative, Congress required the Agency to establish a voluntary program to protect listed species that limited impact on agriculture. Because of scientific challenges in establishing spatially- and temporally-explicit risk assessments, and associated risk mitigation measures when needed, the Agency was only able to initiate a limited number of ESA-compliant decisions over the ensuing years. Consequently, in the early 2000s law suits were brought against EPA for failure to ensure pesticide re-registration decisions were compliant with the ESA. These suits resulted in court-supervised schedules for EPA to undertake risk assessments for dozens of pesticides and species across the US. Through these risk determinations, EPA subsequently requested the US Fish and Wildlife Service and/or the National Marine Fisheries Service (the Services) to initiate consultations as required under the ESA (see [http://www.epa.gov/oppfead1/endanger/litstatus/effects/](http://www.epa.gov/oppfead1/endanger/litstatus/effects/)).

Given the growing challenge to ensure ESA compliance with pesticide registrations, in the mid-2000s the executive branch established 'counterpart regulations' that provided EPA the independent means to reach certain ESA determinations and to streamline formal consultations with the Services when needed. The regulations were based on an agreed risk assessment methodology between EPA and the Services. Most of the regulation was subsequently overturned by the courts, which resulted in continued litigation and stakeholder pressure on both EPA and the Services to complete EPA effect determinations and Services' consultations.

With concerns that failure to address litigation pressure would compromise the long term stability of the FIFRA and ESA programs, the executive branch resumed efforts to develop coordinated risk assessment methods and regulatory processes. Through 2013, EPA, Services and USDA, working with stakeholders, modified the registration review steps and public participation processes to ensure current pesticide use and pest management information and practices was employed in risk assessments and in the development of reasonable and practical risk-mitigation measures, when needed (http://www.epa.gov/oppfead1/endanger/litstatus/effects/).

The EPA, Services and USDA also requested a review by the NRC to provide guidance on advancing a consistent and coordinated risk assessment methodology. The NRC published its report in 2013 (NRC, 2013). The EPA, Services and USDA subsequently released their initial implementation plan (http://www.epa.gov/espp/2013/nas.html). The NRC recommendations include: a common risk assessment process based on the EPA’s ecological risk assessment framework; spatially and temporally-explicit exposure modeling consistent with species habitat locations; approaches to address sub-lethal effects and population modeling; methods for evaluating mixtures of pesticides and other chemicals; and implementation of probability-based risk estimates and a more robust characterization of uncertainty.

Several of these recommendations build upon current and emerging capability to employ site-specific methods to assess pesticide exposure and effects in aquatic ecosystems, as noted in the on-going EPA oversight of atrazine use (see [http://www.epa.gov/pesticides/reregistration/atrazine/atrazine_update.htm#ewmp](http://www.epa.gov/pesticides/reregistration/atrazine/atrazine_update.htm#ewmp)) and in new spatially-explicit, exposure modeling capability (http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OPP-2014-0686-0001). These developments are serving as a foundation for further implementing several aspects of the NRC's recommendations.

The EPA, Services, and USDA are collaborating in the implementation of the new risk assessment methods and risk mitigation measures through the registration review program. In some instances these new approaches are being implemented in decisions for new active ingredients (e.g., the recent 2,4-D Enlist registration; [http://www.regulations.gov/#!docketDetail;D=EPA-HQ-OPP-2014-0195](http://www.regulations.gov/#!docketDetail;D=EPA-HQ-OPP-2014-0195)). While litigation pressure continues, and now involves crops and pesticide use patterns within the Midwest, a foundation to resolving this longstanding challenge is emerging. To reach a viable, long-term solution, there remains, however, the need to fully establish a harmonized
FIFRA/ESA risk assessment methodology as well as the need to resolve policy and regulatory issues concerning the use of local agronomic practices to devise practical and effective risk mitigation measures when required.

Conclusion

Increasingly, EPA's decisions under FIFRA are embedded within broader National issues, either explicitly or implicitly, as reflected in pesticide resistance management and pollinator, endangered species and water quality protection goals. Non-governmental parties, and governmental agencies related to EPA, have a significant role in shaping the emerging and future FIFRA regulatory decisions that incorporate local practices and flexibility to meet agriculture, environmental protection and sustainability goals.

References


