FQPA IMPACTS ON INSECT MANAGEMENT IN PROCESSING CROPS.

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Pest management on processing crops in Wisconsin continues to be heavily reliant on pesticides. The ongoing implementation of the Food Quality Protection Act (FQPA) requires a major reassessment of the risks associated with currently registered pesticides. Potential changes in labeled uses and ultimately label cancellations are anticipated to reduce risk and are thus of great concern to the processing industry. In the initial phases of FQPA implementation, regulatory activity is focusing on cholinesterase inhibitors (organo-phosphates and carbamates) with subsequent action encompassing compounds with potential carcinogenic or endocrine disruption activity. The Wisconsin processing industry has proactively addressed these concerns by seeking to reduce reliance on targeted pesticides. The potato industry (65% processing) has achieved this through a collaboration involving WPVGA, the World Wildlife fund and the UW pest management team. The goals of the collaboration, to progressively reduce the use of certain targeted pesticides, have been successful and together with the availability of less toxic alternatives in the marketplace, have enabled the Wisconsin potato industry to develop economical pest management strategies, which will reduce risk and comply with anticipated FQPA requirements.

Prior to 1995, the management of insects and disease on potatoes in Wisconsin required over 1.0 million pounds of pesticide active ingredient that would be targeted by FQPA, including the insecticides azinphos-methyl, carbofuran, dimethoate, and methamidophos (117,162 lbs. a.i.), and the fungicides chlorothalonil, mancozeb and maneb (898,176 lbs. a.i.). Grower concerns over insect resistance and toxicity of insecticides, together with the registration of a new reduced risk insecticide (imidacloprid), enabled growers to reduce use of FQPA-targeted insecticides by 60% by 1997 (46,613 lbs. a.i.). Similarly, use of FQPA-targeted fungicides was reduced dramatically in 1999 following registration of an effective reduced risk alternative (azoxystrobin). Thus the goal of risk reduction is being successfully addressed by the industry with an overall reduction of 37% from 1995 to 1999. As other low-risk pesticides become available (e.g., spinosad, pymetrozine, and thiomethoxam insecticides and strobulerin fungicides), the trend toward reduced reliance on FQPA-targeted pesticides is expected to continue.

The issues faced by the potato industry are mirrored throughout the other processing crops in Wisconsin where alternatives to organophosphate and carbamate insecticides are gradually replacing FQPA targeted materials.

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In snap beans, the organophosphates methyl-parathion (Penncap M) and acephate provided the foundation for European corn borer and earworm control for the past decade. The processing industry proactively pursued registration of bifenthrin as an alternative through the IR4 program and when methyl-parathion was lost as a result of FQPA review, bifenthrin was in place to provide effective control. As a result, anticipated FQPA restrictions on acephate use in snap beans will have a reduced impact.

Sweet corn insect management (with the exception of soil insects) has successfully adapted from carbamate and organophosphate chemistry to a largely pyrethroid-dependent system over the past 5 years. Carbamates such as methomyl, carbofuran and carbaryl and OP's such as chlorpyrifos and methyl-parathion (Penncap M) have retained registrations but pyrethroids such as permethrin, esfenvalerate, lambda-cyhalothrin, cyfluthrin and bifenthrin provide effective and economical alternatives, which represent the bulk of insecticide use currently. New chemistries such as spinosad and new technologies such as transgenic Bt are also effective FQPA alternatives, which have yet to make a significant impact.

Carbamates (e.g. methomyl) and OP's (e.g., dimethoate) remain available for pea insect management but again pyrethroids (e.g., esfenvalerate, bifenthrin) provide effective alter-natives.

Smaller acreage crops vary considerably in availability and use of FQPA-targeted insecticides. Carrots rely heavily on pyrethroids (esfenvalerate, cyfluthrin) for leafhopper control but have no effective alternatives to endosulfan, diazinon and malathion for aphid control. Spinach has a good selection of FQPA alternatives in imidacloprid, tebufenozide, spinosad and permethrin for control of major pests and retains registrations of endosulfan, diazinon, and methomyl. Cabbage has an excellent selection of effective FQPA alternatives for lepidopteran pest control with the pyrethroids permethrin, esfenvalerate, cypermethrin, bifenthrin, lambda-cyhalothrin and zeta-cypermethrin providing effective broad-spectrum control and Bt, spinosad, tebufenozide, emamectin benzoate and indoxacarb also available for specific lepidopteran pest control and resistance management. Cabbage maggot control, however, remains dependant on chlorpyrifos and aphid control has few effective alternatives. Table beets have few alternatives to FQPA-targeted insecticides such as carbaryl, methomyl and diazinon.

Most processing crops thus have alternative chemistries available for FQPA-targeted organophosphates and carbamates, which will mitigate potential label changes and product cancellations in the short-term. The importance of retaining the availability of existing active ingredients, which may be threatened by FQPA implementation, has now switched to concerns over specific pest/crop/pesticide combinations (retaining the ability to control certain pests) and resistance management.

Soil insect control and aphid control are examples of specific pest/crop/pesticide combinations where few alternatives are registered although new chemistries are being developed which may fill these gaps. Thiomethoxam and imidacloprid represent potential alternatives for soil insect control and pymetrozine has registration as a specific aphicide in potatoes.

The importance of retaining availability of traditional pesticides to manage pest resistance to low-risk alternatives is now a major concern. Low-risk alternatives will enable growers to reduce risk in the short-term but without careful resistance management, which may include limited use of existing chemistries, retaining efficacy in the long-term will become increasingly difficult. In processing crops, the examples provided above clearly demonstrate that in many cases where organophosphate and carbamate use has diminished, these chemistries have merely been replaced by pyrethroid and neonicotinyl dependence. Concerns over potential resistance to these and other alternative chemistries, when they are used extensively and/or exclusively, have been proven in the field. The restriction of traditional OP and carbamate chemistries should thus be approached with caution for in many cases these represent important tools in resistance management programs, which will be needed to retain the long-term efficacy of alternatives.