FQPA and IR-4 Registrations and their Effect on Minor Vegetable Crops

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The Food Quality Protection Act of 1996 defined minor crops as those grown nationally on less than 300,000 acres. In California, this definition encompasses every vegetable grown, with the exception of tomatoes and sweet corn. These crops had a farm gate value to California farmers in 1996 of $4.6 billion, so they are a major, not minor, contributor to the agricultural economy. The overall economic impact, in terms of rural employment and businesses is even greater than these numbers suggest; one field of lettuce will employ several more people than the comparable amount of a field crop.

The typical vegetable herbicide is an old product (see Table 1). Most were first registered in the 60's or 70's. Over the years, their use on major crops, such as soybeans or corn, has been supplanted with newer herbicides. In many cases, herbicides such as Lorox, Prefar, or Balan, which once had large sales volume on major crops, now are limited to a few specialty markets. This leaves these herbicides in a precarious position without a large national market to justify the cost of new testing that can be required under FQPA. Prefar, for example, is in the process of review by US Environmental Protection Agency (EPA) because it is chemically an organophosphate pesticide, the only herbicide in this class. In August 1998, the EPA issued the draft Reregistration Eligibility Documents (REDs) on the first nine pesticides, which included Prefar, under review. To quote the Prefar draft, "Vegetable uses with a maximum rate of 6 lb ai/A generally pose a high risk to marine/estuarine invertebrates, although this high risk can be avoided by applying one application per year that is both banded and soil incorporated." The draft goes on to say that, "All types of applications to vegetables pose a risk to marine/estuarine invertebrates that may warrant restricted use classification." And, "Since bensulide is an herbicide, risk to all nontarget plants (e.g. endangered or threatened species) must be assumed in the absence of data." In the case of Prefar, and presumably most other pesticides, EPA is equating toxicity with risk. Risk is a complex interaction of toxicity and exposure, a factor that is ignored in these assessments. How likely is it that Prefar will move from a lettuce field in the desert to an estuarine environment or kill an endangered species after being applied by ground to bare soil? Besides, Prefar has a very narrow spectrum of weed control and the presumption that it places all nontarget plants at risk is unjustified. The EPA risk document also proposed a danger to bees from a herbicide used on bare soil before anything has germinated, let alone flowered.

Because of this review, Gowan Company, the manufacturer of Prefar, is being required to fill in "data gaps" by conducting seven new toxicology and environmental fate tests (see Table 2) to retain registration of this herbicide. Fortunately, Gowan Co. is willing to pay the cost of these tests in order to keep Prefar on the market, but it may become a restricted herbicide and be limited to no more than 6 lb ai/A/year. It does not seem likely that most manufacturers are going to go to this much trouble or cost. If this RED is typical of EPA's concerns about herbicides, Prefar is just the tip of the iceberg. Unless data to prove otherwise are available, all herbicides are assumed to pose a risk to all nontarget plants. Few herbicides have been tested against plants

other than crops and weeds. The EPA implies that this information is needed for all of the species of plants present in the US; there are over 8,000 native species in California alone.

Several crop/herbicide combinations vital to growers are at risk because of FQPA (see Table 3). In several cases, the risk exceeds 100% of the crop acreage because of multiple herbicide uses in that crop, either as combinations of 'at risk' herbicides or repeat applications of single herbicides. In most situations, there are no readily available substitutes for the herbicides at risk. If these reviews are conducted as individual actions on herbicides, the situation becomes more problematic. For example, one of the authors (Bell) was asked by US-EPA to list alternatives for Prefar during the review of this herbicide. In lettuce, the principal alternative is Kerb, also scheduled for review in round 1 of FQPA. Is it fair to list one 'at risk' herbicide as an alternative to another 'at risk' herbicide?

Interregional Project 4 (IR-4) has acquired over 4,000 pesticide tolerances for minor crops since its inception in 1963. Since the passage of FQPA in 1996, IR-4 has adjusted their program and goals to deal with the new law. Starting in 1997, IR-4 has become more aggressive in their efforts to seek low risk alternatives to existing pesticides used on minor crops. The new IR-4 Strategic Plan for minor crops/minor uses has four goals: 1) to promote reduced risk pest management, 2) to develop risk mitigation measures for existing pesticide registrations, 3) to assist with the registration of biologically based pest control products, and 4) to register and maintain pesticides essential to IPM. More funds have been made available to the IR-4 program from Congress to aid in this effort, including increased funding for performance evaluation of alternative reduced risk and biologically-based pesticides. In 1996, IR-4 funded 20 field studies with identified reduced risk pesticides; in 1998, that number had increased to 78, which was one half of their studies. The insecticide Spinosad is an example of IR-4's commitment to a more rapid process. IR-4 completed field studies in 1997 and the lab work in May 1998 for Spinosad on potato. The tolerance petition was submitted to EPA in October 1998 and a registration is expected in mid-1999; much faster than the typical five year process from field to tolerance approval. We hope the same efforts will be focused on herbicides in the near future.

Under FQPA, EPA is expected to put together a special minor crops program, which they have yet to do. FQPA also grants special considerations and concessions to manufacturers for registering minor crops, but there is little to show yet for this effort. There are many new herbicides that are or soon will be on the market for major crops such as corn and soybean. However, there is no mechanism at present to identify potential new uses for these herbicides for minor crops. To address this data gap, the authors, along with Milt McGiffen at UCR; Tom Lanini at UCD; and Farm Advisors Bob Mullen and Jesus Valencia have embarked on a project to evaluate several of the newer herbicides on a variety of important vegetable crops in California. Our goal is to identify which of the new herbicides can be used safely and effectively on these vegetables and then submit requests to IR-4 to start the registration process. This research is being funded by a grant from the USDA Pest Management Alternatives Program (which was mandated by FQPA) and has the support of commodity groups and chemical manufacturers. We hope to have some useful results starting in 1999.

Table 1. Year of first US registration for selected herbicides for California vegetables.

Herbicides (year 1st registered in US)	Vegetable Crop
Prefar (1968)	Onion, cole crops, cucurbits
Buctril (1965)	Onions
Dacthal (1970)	Cole crops, cucurbits, onions
Roundup (1974)	Several
Lorox (1961)	Carrot, asparagus
Treflan, etc (1966)	Asparagus, carrot, cole crops, cucurbits, tomato

Table 2. Additional tests required of Gowan Co. to retain registration of Prefar as a result of FQPA review.

Study Type
Freshwater fish early life-stage or life cycle study
Freshwater invertebrate life-cycle study
Seedling emergence study, Tier II
Vegetative vigor study, Tier II
Aquatic plant growth and reproduction, Tier II
Avian reproduction study with the mallard
Acute freshwater invertebrate study

Table 3. Estimated acreage of crops at risk of losing herbicides through FQPA. Acreage values in excess of 100% indicate either multiple applications of single herbicides or combinations of herbicides at risk.

Crop	Percent of acreage at risk: herbicides at risk from FQPA
Dry bulb onion	363: Dacthal, Prefar, Buctril, Prowl, Methyl Bromide, Goal, Gramoxone, Treflan
Snap beans	221: Lasso, Dacthal, Eptam, Sonalan, Dual, Goal, Gramoxone, Prowl, Treflan
Artichoke	149: Goal, Kerb, Princep
Green Onion	138: Buctril, Methyl Bromide, Goal, Dacthal
Spinach	133; Roneet, Antor
Tomato	118: Dacthal, Eptam, Methyl Bromide, Dual, Sencor, Gramoxone, Tillam, Treflan
Cole crops	89: Treflan, Dacthal, Prefar, Goal, Gramoxone, Methyl Bromide
Carrot	78: Goal, Treflan, Methyl Bromide, Eptam
Asparagus	53: Princep, Treflan, Gramoxone, Methyl Bromide, Sencor
Bell Pepper	45: Prefar, Methyl Bromide, Goal, Gramoxone, Treflan, Dacthal
Melons	41: Treflan, Dacthal, Prefar, Sonalan, Prowl, Gramoxone