Plant Varieties

The use of different varieties or cultivars of tomatoes and strawberries had significant effects on residues. Oso Grande, the most frequently reported strawberry cultivar in the survey, served as a base for these variables. Selva and Chandler strawberry cultivars were positively associated with fungicide residues compared to Oso Grande. The relationships were just the opposite for insecticides, where the Selva and Chandler varieties had significant negative impacts. A single base variety could not be used for tomatoes. Six of the ten tomato varieties used by growers had only one to six observations. To help avoid problems with linear dependencies all six of these minor varieties were dropped from the regressions. Thus the base for the tomato variety coefficients is a composite of these six varieties. The Sunbeam tomato cultivar was negatively associated with aggregate residues, but this was not supported by the fungicide or insecticide regressions. SolarSet was positively associated with fungicide and aggregate residues. Given the difficulties representing tomato varieties it is difficult to derive reliable implications from these results.

Weather

Results for the weather variables in the General Practices models were generally consistent with those found in the Attributes Models. Higher temperatures and more rainfall were again positively associated with fungicide residues in strawberries. This time, these results carried over more consistently to aggregated residues although only harvest period rainfall was significant in the insecticide regression. For tomatoes, the results were identical to those of the Attribute model except that both harvest and growing season rainfall were found to reduce fungicide residues. This was unexpected, particularly with respect to the pre-harvest period, since fungus problems are often associated with humid or wet conditions.

Specific Practices Models

Specific Practices were modeled somewhat differently than Attributes and General Practices. Background research indicated that the environmental fate of each type of pesticide was so unique that aggregating residues for this purpose would be inappropriate. To implement this strategy, the bulk brand-name chemical application rates as reported in the specific chemical practices section of the survey were transformed into pounds of the common-name active ingredient applied per acre. As discussed earlier, data on the rate, number, timing, and chemical half-life for each pesticide application were used to derive theoretical weighted active ingredient rates (equation (8c)). Estimates of the chemical half-life of each pesticide were obtained from Hubble and Carlson (1993). The sign for this derived rate variable was hypothesized to be positive, the same as the untransformed rate. Individual data sets were then created for each common-name chemical used on each commodity. Each one consisted of pertinent data on all reported applications of a particular common-name pesticide matched to the corresponding pesticide residue levels found in the laboratory samples. For example, in the regression for the fungicide Captan, each observation of the explanatory variables (the right hand side of the regression) consisted of pertinent data on the applications of Captan that a particular grower made to the field from