## IPM in the Palm of Your Hand
### Portable Database Makes Information Convenient

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Wouldn't it be nice to have all the information you needed to make complex integrated pest management (IPM) decisions available to you while you were in the field? Wouldn't it be great if plant-specific, pest-specific data were accessible, along with each control option's application rate, effective crop stage, toxicity, post-harvest interval, and re-entry interval? And what if all that data fit in the palm of your hand? That was the vision that prompted our project.

## The Need for Data

The goal of our 2002 IPM database program was to take advantage of the unique opportunity afforded by the current state of hand-held computing (a.k.a. palm computers, pocket computers, personal digital assistants/PDAs) by developing software that would assist growers, field personnel, and consultants in making complex pest management decisions in the field.

IPM programs are typically more complex than simple, pesticide-based management systems. The very nature of "integrating" multiple methods of pest management means that each situation calls for several pieces of information. Unfortunately, this complexity makes it almost inevitable that decisions are made with inadequate or out-of-date information.

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Educational materials such as manuals, bulletins, Websites, and audio-visual presentations are key factors in helping growers assimilate the increasingly complex range of data involved in newer IPM systems. But we can't always carry all these materials on our backs when we head into the field, where so many decisions are made. In response to this dilemma, we felt that the current state of hand-held computing offered a unique opportunity. The computers are inexpensive ($150-$500), have relatively powerful software packages (including relational databases), connect and backup easily to desktop computers, and are small and light enough to fit in a shirt pocket for field use.

## Pilot Project: Deciduous Fruits

Deciduous fruits offer a good proving ground for an IPM project. The impact of the Food Quality Protection Act (FQPA) on organophosphate (OP) insecticide use and the shift toward mating disruption of key pests has exacerbated the complexity of integrated pest management in these crops. For example, mating disruption increases the role of natural enemies, but it also increases the diversity of pests encountered because broad-spectrum OPs are no longer providing suppression of secondary and rare pests. Adding further to the complexity of the situation, many consultants are unfamiliar with some of the aspects of the newer pesticides, such as their effects on natural enemies, timing for optimal efficiency, and relative efficacy.

We used the Palm OS platform to develop a relational database based on the current crop recommendations in the Crop Protection Guide for Tree Fruits in Eastern Washington (Washington State University publication EB0419, available at http://pubs.wsu.edu/). The database ties together pesticide recommendations and rates for the different pests, relative efficacy of the materials (when known), and the effects of the pesticides on natural enemies. In addition, it lists any precautions, restrictions on re-entry, pre-harvest intervals, and pesticide use patterns. These data are searchable and can be updated by linking to the WSU Tree Fruit Research and Extension Center Website (http://www.tfrec.wsu.edu/), where complete documentation is also available.
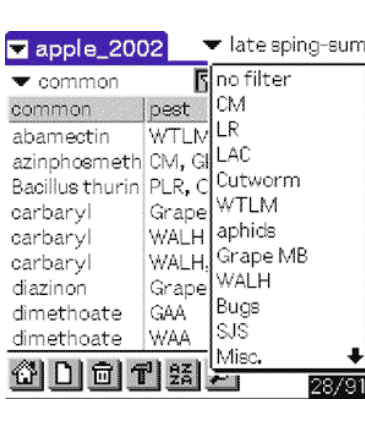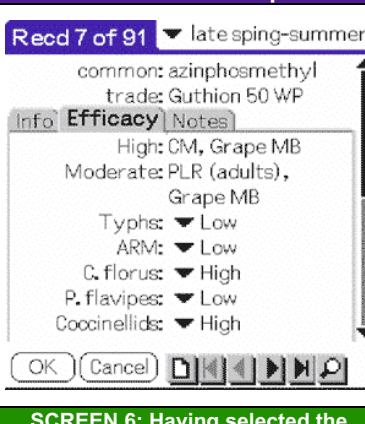
## Future Applications
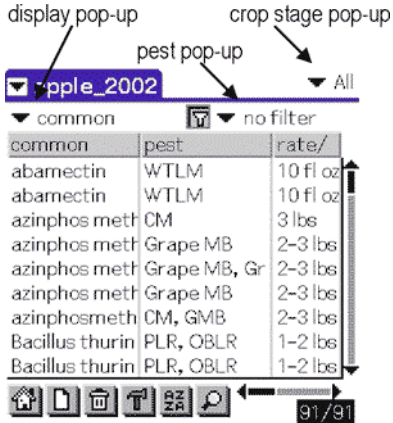
In our 2002 pilot project, we provided the insecticide and fungicide recommendations for apple, pear, cherry, peaches and nectarines, and apricot. The databases were available for Palm OS computers, and for Windows (using Microsoft Access and FileMaker Pro) and Macintosh (using FileMaker Pro) operating systems. The data files can be shared between systems and the interfaces are set up to be as similar as possible.

The database format is very adaptable; it could be used readily on almost any crop where pesticide recommendations and data on effects of the pesticides on natural enemies are available. To adapt it to another crop, one would replace the crop stage names (e.g., delayed dormant, petal fall) with those appropriate for the new crop and change the pest and natural enemy names to those pertaining to the new crop. Such changes could be input by a
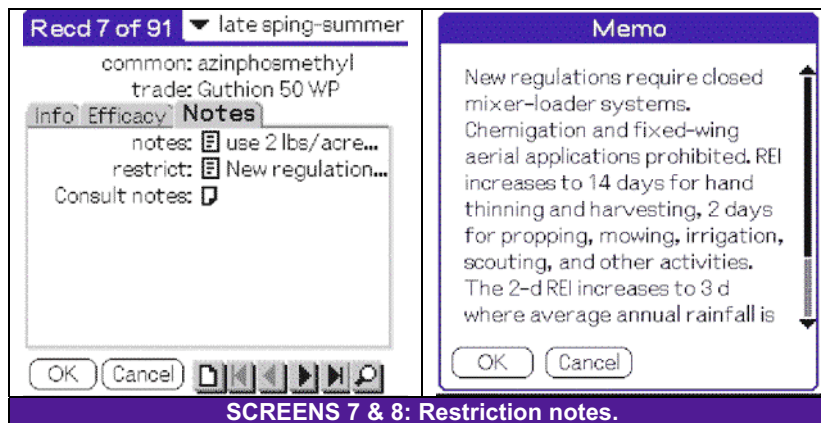
knowledgeable programmer in a matter of minutes. Beyond that, one would enter the pesticide information specific to the new crop, each pest, and each of the natural enemies. In our pilot project, we used the framework we developed for insects to enter the disease recommendations, with very few changes.

Following are a number of screen shots showing our system in action. We hope this project leads others to utilize this convenient technology to make IPM data available in the field.

## Example of Hand-Held Computer Screens Using Tree Fruit Database



**SCREEN 1:** Start screen with arrows showing pop-ups for crop stage, pest, and display.



**SCREEN 2:** Pop-up window for crop stage is shown.



**SCREEN 3:** Having selected "late spring-summer" for crop stage, this pop-up window allows selection of pest.



**SCREEN 4:** Having chosen "CM (codling moth)" for pest, four control options are shown as being available.



**SCREEN 5:** Having selected control option "azinphosmethyl," a variety of information including trade name, rates, use period, pests controlled, toxicity, REI, and PHI are shown.



**SCREEN 6:** Having selected the "efficacy" tab on the previous screen, this screen shows which pests are controlled and how effective this control is on each, plus the effect on natural enemies.

SCREENS 7 & 8: Restriction notes.

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**The work described in this article is just one of many integrated pest management (IPM) efforts underway in Washington State. Several other Washington IPM projects are detailed in the March and April issues of *Agrichemical and Environmental News,* available on the Internet at http://aenews.wsu.edu . For additional information on IPM in Washington State, please consult the following resources:**

| | |
|---|---|
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| **CSANR** | **WSPRS** |
| **Center for Sustaining Agriculture** | **Washington State Pest Management** |
| **and Natural Resources** | **Resource Service** |
| **Chris Feise** | **Catherine Daniels** |
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