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Handheld Applications in Fruit Extension Delivery

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Abstract: The Fruit AdVisor project endeavors to use PDAs as Extension delivery tools, specifically for the dissemination of fruit IPM information and other fruit-related issues. Information on pest biology, monitoring methods, current population activity, pest control recommendations, and updated regulatory issues are installed and automatically updated in the user's PDA. Two-way communication is featured, as pest trapping data collected in individual orchards and vineyards may be uploaded to an IPM specialist's computer, facilitating evaluation of data and creating of a trapping data network.

Personal Digital Assistants

Personal digital assistants (aka PDAs, organizers, handhelds) are small (pocket-sized) computers that have become popular as personal organizers. Many popular models have 8-16 MB of memory; some models possess quite a bit more, but at a higher cost. Basic functions may be adapted for the individual user (address book, date book, expenses, to-do-list, etc.).

Data files are backed up and updated when the PDA is synchronized with a desktop computer. The user may also use backup modules or cards, available at an extra cost. This extra safeguard may easily pay for itself with added security. Several operating systems are available. PDAs using Palm OS were selected for this project because of cost and flexibility.

Use of PDAs in Extension record keeping was proposed earlier (Vergot, Zazueta, & Beck, 2004). In that application, Pocket PC devices were employed. While such devices may be used in the project described here, we used Palm OS devices because they are generally lower in cost and the target audience (fruit

growers) may find this a benefit.

The Virginia Fruit AdVisor Project

The Fruit AdVisor project endeavors to use PDAs as Extension delivery tools, specifically for the dissemination of fruit IPM information and other fruit related issues. Web-clipping software is used to install current versions of selected Web pages onto the handheld devices. The software is provided by AvantGo, installed according to specifications below. Specific applications incorporated into the project are discussed below.

Virginia Fruit Web Site

The Virginia Fruit Web site (Pfeiffer, 2007b) has been on-line since 1997. Multidisciplinary information is available, though the emphasis is on IPM. Some pages are less suitable for the small screen of the PDA. Therefore, streamlined versions of some of these pages have been posted for use with this project (Pfeiffer, 2007a). When the PDA is synchronized with a desktop computer with Internet access, the current versions of selected Web pages are installed on the device. Pages may also be updated using wireless connection. The crop pages (apple, grape, stone fruit, pear, and small fruit) are available as AvantGo channels. Examples of the information included are:

- Population biology and pest identification and monitoring, as seen in the instructions for monitoring codling moth (Figure 1):

Figure 1.

A Screen Shot Providing Instructions for Monitoring Codling Moth in Apple Orchards



- Updates on pest development and regulatory changes (Figure 2) can be announced as soon as they are known to the Extension specialists, updated in the Web page, and installed automatically into the grower's PDA upon the next synchronization, much more rapidly than through the VCE PDF version. This feature has been used to announce planned grower meetings at the beginning of the season, as well as changes in meeting site or date (Figure 3).

Figure 2.

News of Approval of New Pesticide Labels Can Be Distributed Quickly.



Figure 3.

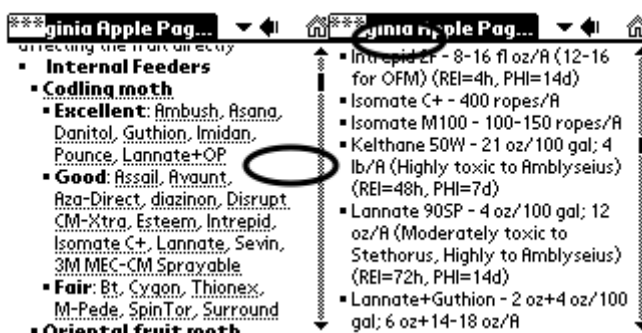
An Announcement of a Location Change of an In-Vineyard Grower Meeting



- Current fruit pest control recommendations (pest recommendations and pesticide information). When a pesticide of desired efficacy for a specific pest is selected by tapping the pesticide name, the user is directed to rates, REI and PHI data (Figure 4).

Figure 4.

When a Pesticide Name Is Tapped On the Screen, Use Rates, REI, and PHI Information Are Presented.



- The following Web pages are installed as AvantGo channels for the project (a grower may select crop pages of interest):
 - Virginia Apple AdVisor - (<http://www.ento.vt.edu/Fruitfiles/VisorApple.html>) (channel size 350k)
 - Virginia Grape AdVisor - (<http://www.ento.vt.edu/Fruitfiles/VisorGrape.html>) (channel size 180k)
 - Virginia Peach AdVisor - (<http://www.ento.vt.edu/Fruitfiles/VisorPeach.html>) (channel size 220k)
 - Virginia Pear AdVisor - (<http://www.ento.vt.edu/Fruitfiles/VisorPear.html>) (channel size 220k)

- Virginia Small Fruit AdVisor - (<http://www.ento.vt.edu/Fruitfiles/VisorSmallFruit.html>) (channel size 170k)
 - **For Virginia fruit pages, select channel size indicated, link depth=2, no images**
 - AccuWeather - package channel at AvantGo
 - Fruit Growers News - (<http://www.fruitgrowersnews.com>) 100k, link depth=1
- Through wireless connectivity, there is also the potential for active Web browsing and access to Fruit AdVisor pages. Several wireless PDA models are available.

Record-Keeping and Data Collection

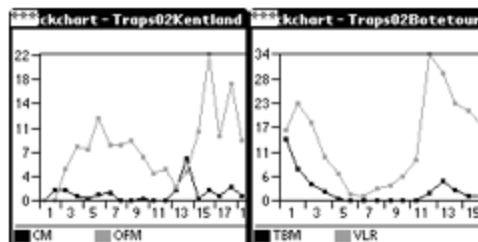
- Enter scouting data and instantly generate graphs of population activity while in field. Quicksheet (also available as a part of QuickOffice) may be used to generate spreadsheets that are compatible with Excel. This may be used to generate graphs (see examples below). Pendragon Forms may also be used as stand-alone software to collect trapping data. Growers participating in the Virginia Fruit AdVisor program may enter trapping data into the PDA, which can be uploaded automatically to a specialist's desktop using Pendragon Forms/SynchServer (see under Networking below).
- Spreadsheet in Quicksheet (Figure 5) is compatible with Excel

Figure 5.
Spreadsheet for Entering Pheromone Trapping Data

	C	D	E
1			
2			
3	OFM	TEM	VLR
4	0.3	14.5	16.6
5	0	7.4	22.5
6	1	4.1	18.1
7	1.7	2.2	10.3
8	0	0.5	6.3
9	1	0	1.6

- Generate line graphs of population activity while still in field (Figure 6):

Figure 6.
Line Graphs for Codling Moth and Oriental Fruit Moth, Tufted Apple Budmoth and Variegated Leafroller, Created with PDA Spreadsheet



- Keep mandated spray records while in the spray shed, automatically backup on synchronization (using either Quicksheet or Pendragon Forms)

Networking

- Networking scouting data with Pendragon SyncServer. A participating grower, agent, or scout may collect field data into the PDA (Figure 7) and, upon synchronization, automatically upload trap data, etc., to an IPM specialist. This will facilitate evaluation of population trends, as well as allowing creation of a trapping data network.

Figure 7.

A Grape Grower Entering Pheromone Trap Data into a PDA Preparatory to Uploading Data to Specialist's Computer



- E-mail capability, uploading and downloading upon synchronization

GIS, GPS

- Several GPS receivers are available for PDAs, e.g., Garmin GPS incorporated into PDA (Garmin iQue 3600).
- Currently can mark locations of individual farms, or key locations on a farm. This will be enhanced by future development of farm-level mapping.
- This technology can be used to track movement of new pest distribution through a state.

Summary

The Fruit AdVisor program allows two-way interactions between growers and specialist. IPM and other Extension information is made available to the grower, and current field data can be easily transmitted to the specialist. Although the current status is as a pilot program for Virginia fruit producers, the final product will lend itself easily to growers in other states and can be adapted to other commodities as well, largely by substituting files contained in the PDA.

References

Pfeiffer, D. G. (2007a). Virginia Fruit AdVisor: PDAs as Extension delivery tools. [On-line]. Available at: <http://www.ento.vt.edu/Fruitfiles/FruitAdVisor.html>

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This article is online at <http://www.joe.org/joe/2007october/tt6.shtml>.

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