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Online IPM Decision Tools In The Northwest



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Summary

We provide an overview of online IPM decision tools for the NW as developed by members of the Oregon Statewide IPM Program, the Integrated Plant Protection Center (IPPC), and collaborators in the PNW IPM Centers Coalition. Our long term

goal is to develop and support truly integrated, interactive pest management decision support system (DSS) tools for a full spectrum of end users.

Developmental stages of online IPM decision support systems

1 st cases	Technology	Direction	User Involvement
1994	Static Text, Graphics	1	click/search only
1997	Dynamic Models, Calculators	1	user input req.
1996	Databases, general search engines		
1990s	Interactive email, chat	2/multiway	user initiated
1998	mail-lists, web conferences Integrated	multiway	user initiated/ customizable
2001	web+email combined		
2002-3	insect, weed, plant disease DSS, GIS, IPM Portals		

A Comprehensive Decision Support System for Insects, Weeds, and Plant Diseases for the Pacific NW

The PNW region (OR, WA, ID) has a long history of collaborating with regard to producing the PNW Insect, Weed, and Plant Disease Management Handbooks (yearly print editions since the 1970s). As these have been revised to allow for dual print/online publication, we envision these Handbooks as a core resource to all PNW online IPM and sustainable/organic PM information tools, comprising a true decision support system.

Currently, the online insect and weed handbooks are delivered via custom open-source Perl conversion and web-serving engines, and retain the same overall structure of the print book, whereas the plant disease handbook was converted to a database format (making online presentation relatively easy and print production more difficult; the use of XML will address this issue soon).



Fig 1. PNW Online Weed and Plant Disease Handbooks (Editors: Ray William, OSU; and Jay Pscheidt, OSU) - showing context specific "related links" (weed handbook) and diagnostic photos (plant disease handbook).



Fig. 2. PNW Online Insect Management Handbook: with ID photos, fact pages, and context-specific links

Online IPM Handbooks - Implemented to date

- In addition to contents of former print-only handbooks (including pest descriptions, crop damage symptoms, chemical control methods, and comments), the format of the insect handbook (Dan McGrath OSU, editor 2001-2003; Dave Bragg WSU, editor 2004) has changed to allow inclusion of new information (beginning 2003 edition): biology and life history, scouting and thresholds, cultural control, biological control, and pesticide resistance management
- Online versions allow more timely updates, are compatible with all browsers, and include these additional features:
 - a) Multiple navigation methods: pull down menus, table of contents, next/previous page, keyword search engine
 - b) Identification and damage photos (insect, plant disease)
 - c) Insect fact pages (pdf files) linked for all available species
 - d) Provision for LINKS section to display context-specific links to additional online resources (Figs. 1 & 2)

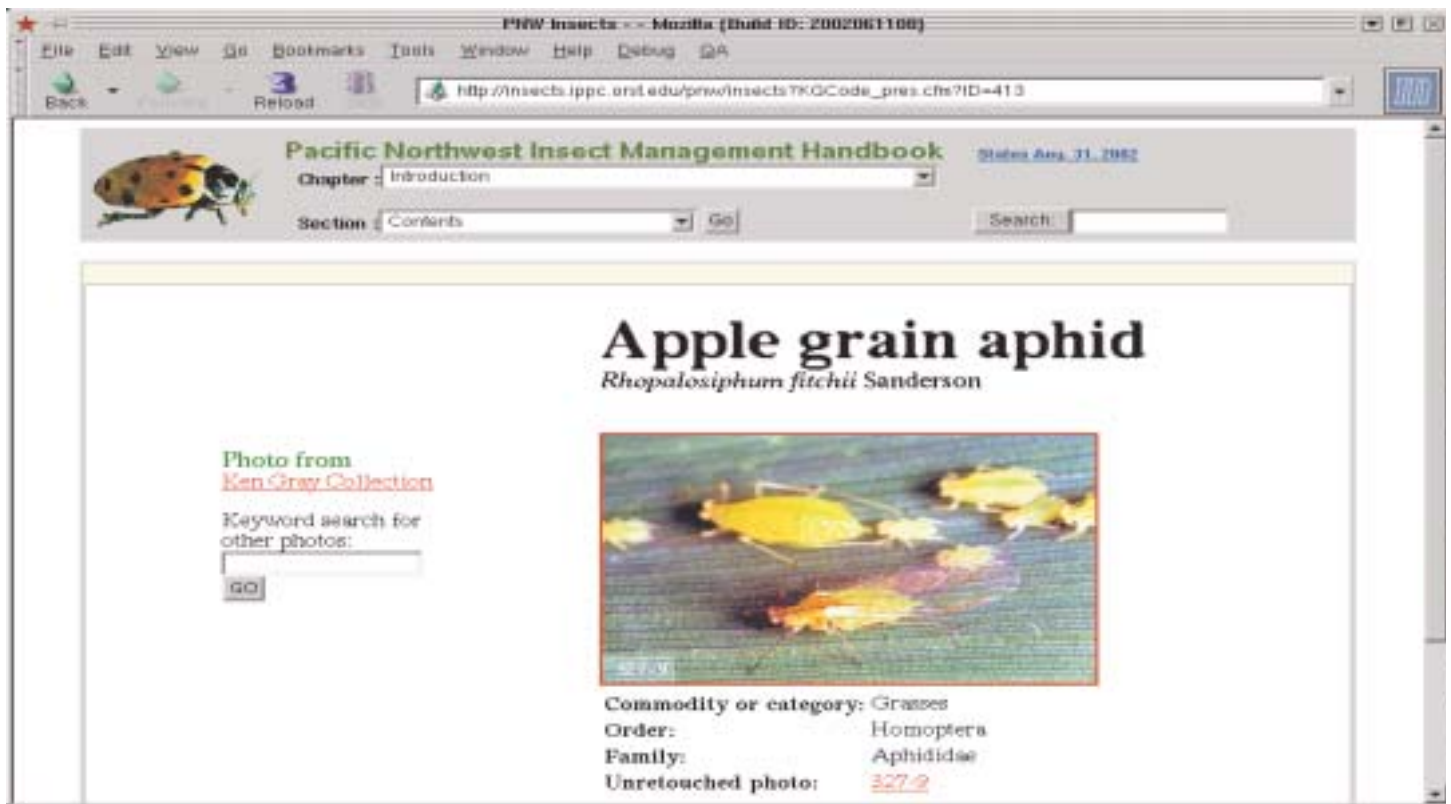


Fig. 3. Online PNW Insect Management Handbook: ID photos

IPM Weather Data and Degree-Days website

In development since 1996, this website combines real and near-real-time weather data (currently 900+ stations), degree-day calculators and models, GIS spatial analysis, and mapping. It provides phenological modeling decision support to 6 states in the NW US plus SW Canada (OR, WA, ID, MT, WY, AK, BC, AB, SK). The site currently receives

over 10,000 model runs yearly (single site degree-day models and calculator), and over 1,400 phenological mapping runs per year. Refer to the poster #P3-P, "Online Site-Specific Degree-Day Predictions Using GIS and Climate Map Technologies" for more details.

none - calculator mode enter your own thresholds

apple scab [apple] Gadoury et al. (1995)

pear scab infection season [pear] Hood River Exp. Sta./Bob Spotts

bertha armyworm [vegetables] Bailey 1976

black cutworm [vegetables] Luckmann et al. 1976

Barley P. Miller, MSU

cabbage looper [vegetables] Toba et al. 1973

corn earworm [sweet corn] Hartstack et al. 1976

western cherry fruit fly [cherry] AliNiazee (1979)

Chick Pea (Desi not Kabuli) P. Miller, MSU

codling moth [apple & pear] Brunner and Hoyt (1987)

Canola (Argentine) P. Miller, MSU

Canola (Polish) P. Miller, MSU

Canary P. Miller, MSU

downy brome Dan Ball, OSU Extension daniel.ball@orst.edu

european pine shoot moth [nursery crops] Regan et al. (1990)

cougarblight (fire blight risk calculator) [apple & pear] Smith (1998)

filbertworm [hazelnut] Aliniazee (1983)

Flax P. Miller, MSU

isomate-c+ Pacific Biocontrol Corporation Data

Lentil (intermediate) P. Miller, MSU

Lygus bug [alfalfa seed] Ben Simko 2000

mint flea beetle Berry et al.

Metaseiulus occidentalis Tanagoshi et al. 1975

mint root borer Berry et al.

Mustard J (Brown and Oriental) P. Miller, MSU

Mustard (Yellow) P. Miller, MSU

Neoseiulus fallacis Dover et al. 1979

Oat P. Miller, MSU

obliquebanded leafroller [tree fruits] Brunner et al. (1997)

obliquebanded leafroller [hazelnut] Gang. and Ali. (1985)

orange tortrix (cold winter) [small fruit] Knight (1988)

orange tortrix (mild winter) [small fruit] Knight (1988)

More...

Fig. 4. All weather stations, 10 day temperature forecasts, and 30-year average weather data, are linked to 44+ models and a generic degree-day calculator for single site predictions

Pest Alert Systems

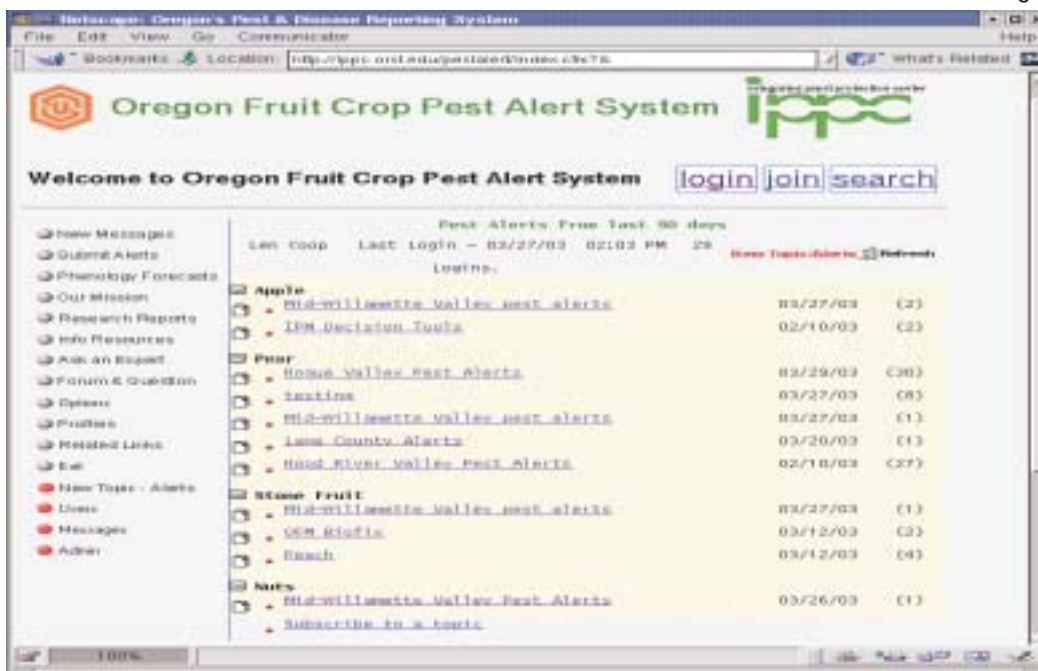


Fig. 5. A new pest alert system is now serving tree fruit & nut growing areas throughout Oregon, and vegetable production in the Willamette Valley. This system allows email and internet posting of pest alert and related notices with key Extension personnel as moderators, without need for programmer support. See poster #G11-P, "A Multi-Region Internet-Based Extension Pest Alert System" for more details

GRASSLinks Open-Source GIS/Web Interface

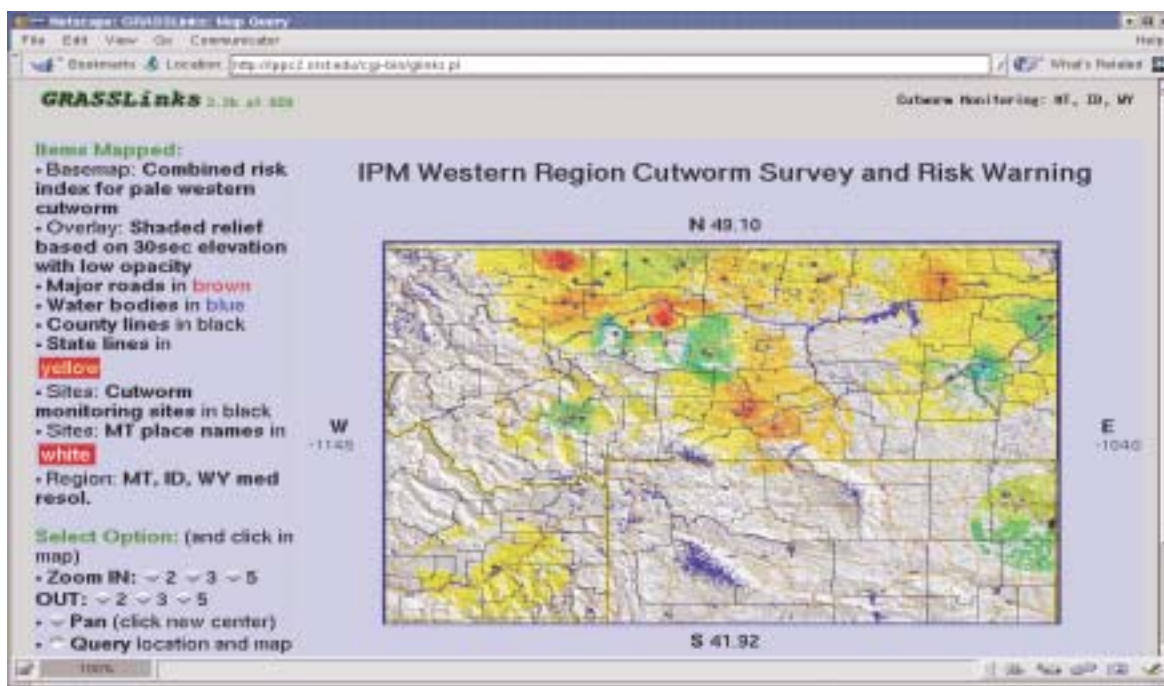


Fig. 6. is also delivering monitoring/risk warning data such as for the WR-IPM Cutworm IPM program led by Montana State University. For more information refer to poster #P7-P, "Regionalization of Cutworm Forecasts and Risk Warnings".

IPMP 3.0, IPM in Peppermint



Fig. 7. An example of a comprehensive, fully integrated Decision Support System for peppermint, an important specialty crop in the Pacific Northwest. Insect, weed, plant disease, and nematode management are all combined at this website.

WR-IPM Centers - Pacific NW Coalition Portal



Fig. 8. WR-IPM Centers - Pacific NW Coalition Portal provides a new way to integrate diverse sources of IPM information. Registered users may select from a variety of IPM and agriculture related channels, and customize layout for their own requirements.

Conclusion

- In the past 8+ years, the world-wide-web has demonstrated excellent potential for delivering dynamic, interactive, and highly integrated IPM information technologies.
- IPM Portals show promise (and considerable challenge) as a means of integrating both dynamic information (news, pest alerts, model & GIS results, and discussions) and more static information (IPM guidelines, ID photos, and fact sheets) in a way that end-users can customize for diverse needs.
- Portals can also provide greater multi-spatial scale and multi-organisation integration, including regional, state, multi-state, national and international sources of information.