HYPERMEDIA INFORMATION SYSTEM FOR DIAGNOSING COMMON PROBLEMS OF MACADAMIA NUT

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ABSTRACT

A hypermedia program was developed to help extension personnel and growers diagnose common problems of macadamia nut (Macadamia integrifolia Maiden and Betche). Written to run with HyperCard™ on an Apple Macintosh™ computer, the program enables users to diagnose problems based on illustrations and textual descriptions and to obtain additional information and possible solutions to these problems.

Key words: computer, extension, horticulture, HyperCard™, Macadamia integrifolia

INTRODUCTION

Information on crops for extension personnel and growers is commonly available through several different media, such as extension publications, reports at commodity meetings, and consultations between extension personnel and their clientele. These methods do have shortcomings. Extension publications become outdated or out of print. Information presented at annual commodity meetings may be late. With so many clientele it may be difficult for extension personnel to service everyone adequately, for example, by on-farm visits.

A hypermedia information system called the “Farmer’s Bookshelf” has been developed for crops in Hawaii (Bittenbender and Kobayashi, 1989). The principle of “hypermedia” is the delivery of information that is highly cross-referenced with interlinked facts (Goodman, 1987). The Farmer’s Bookshelf provides up-to-date information on various aspects of macadamia nut, papaya, banana, anthurium, and carnation production. It also helps growers calculate the amount and cost of losses of harvested macadamia nuts (Kobayashi and Bittenbender, 1989).

We wanted to develop a computer driven information system that could present current information to extension personnel and growers in an easy to use format. Information presented via a computer can be updated when new information is available. The objective of this work reported here was to develop an information system to 1) help growers diagnose common problems of macadamia nut and 2) enable growers to obtain information and possible solutions to these problems.

MATERIAL AND METHODS

We chose the software HyperCard™ (Apple Computer, Inc.) with its programming language HyperTalk™ (Shafer, 1988) because it is available free of charge with all Macintosh™ (Apple Computer, Inc.) computers. HyperCard is an information management software based on the principle of hypermedia (Goodman, 1987). HyperCard is built on the Rolodex™ or index card idea with information being stored on “cards” in groups called “stacks”. Each stack is a file. Having information on individual cards allows the user to browse from one card to another card to seek interrelated information. Stacks are designed with functionality and ease of use in mind (Apple Computer, Inc., 1989; Goodman, 1988). Information for this program came from the booklet “Common Problems of Macadamia in Hawaii” (Bittenbender and Hiraë, 1990). Ink drawings were drawn from photographs of the symptoms of the problems, scanned with a scanner (Thunderware, Inc.), and saved as MacPaint™ (Apple Computer, Inc.) files. The images were then edited with MacPaint to enhance specific features. The MacPaint images with the appropriate text were then “pasted” onto individual cards in the HyperCard stack.

1Hawaii Institute of Tropical Agriculture and Human Resources Journal Series No. 3502.
2Cooperative Extension Service, Hawaii County Office, 875 Komohana Street, Hilo, HI 96720.
RESULTS AND DISCUSSION

The user may access the stack on common problems of macadamia nut from the stack on macadamia nut (Bittenbender and Kobayashi, 1989) or from HyperCard's "Open" command in the menu bar. When the first card of the stack (Figure 1) is displayed, if the user does not know the name of the problem, they may click on the "No" button with a mouse. This displays an illustration of a tree (Figure 2). The user clicks on the button with the name of the part of the tree that shows the symptoms. The program presents the user with a sequence of images showing the symptoms of problems that commonly occur on that particular part of the tree (Figure 3). The user then determines if the symptoms shown are what is seen in their orchard. If additional description is needed, the user may move the cursor over the "Description" button that displays a box with additional information (Figure 3).

If symptoms do not match what is seen in the orchard, the user clicks on the "No" button. If the symptoms do match, then the user clicks on the "Yes" button. Clicking on the "No" button displays an image of the symptoms of another problem. If the "Yes" button is clicked, a card is displayed, giving additional information on the problem, such as the cause and possible solutions to the problem (Figure 4). The user then has the option of printing this information or saving it as a text file.

If the name of the problem is known, the user may click on the "Yes" button on the first card of the stack (Figure 1) to display a list of problems. Clicking on the name of the specific problem displays the card showing the information on this problem (Figure 4).

This diagnostic program was written for extension personnel and growers who may not be familiar with HyperCard. This unfamiliarity, still, should not exclude them from using a hypermedia program as a tool to help them diagnose a problem and obtain information on its solution. Thus, the program was written so that only the use of the mouse is necessary. Typing is not necessary except to search the stack for a particular word or phrase. This is done using the "Find" button (Figures 1, 4).

The stack diagnoses most of the problems found in macadamia nut and if it cannot diagnose a problem, it will suggest that the user should contact the local extension office for assistance. It is still recommended that the user contact extension personnel for confirmation of the problem diagnosed by the program.

The images in the stack are of low resolution (Figures 2, 3) because the Macintosh screen has a resolution of only 72 dpi (dots per inch). The MacPaint format is ideal for images displayed on the screen since this format also has a resolution of 72 dpi.

The stack runs only on an Apple Macintosh computer, and we assume the user has the software HyperCard. This diagnostic program has also been written to run on an IBM PC™ with the software LinkWay™ (IBM Corp.). This IBM program is currently undergoing beta testing and evaluation.

A copy of the diagnostic program for the Macintosh is available from the authors by sending them a 3 1/2-inch diskette. The program may be downloaded from "The Coconut Telegraph," the College of Tropical Agriculture and Human Resources' electronic bulletin board (phone number 956-2626) or from the information services CompuServe™ and GEnie™.

A hypermedia information system provides a quick and easy method to help extension personnel and growers diagnose problems of macadamia nut and to obtain readily information and solutions. The printing system allows the extension personnel to obtain the information, get a hard copy, and send it to a grower. Since the stack can be updated and redistributed to users, current information is always available to the user.

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LITERATURE CITED


FIGURE 1. FIRST CARD OF THE STACK ASKS THE USER IF THEY WOULD LIKE THE PROGRAM TO DIAGNOSE AN UNKNOWN PROBLEM OR PROVIDE INFORMATION AND THE SOLUTIONS TO A KNOWN PROBLEM.

**Identifying Common Problems of Macadamia Nut**

Do you already know the name of your problem?

- Yes
- No

Click on "Yes" or "No" button.


Click on the name of the part of the tree that you have the problem.
FIGURE 3. THE CARD DISPLAYS THE SYMPTOMS OF A SPECIFIC PROBLEM. IF THE SYMPTOMS DO NOT MATCH THOSE OF THE PROBLEM OF THE USER, SELECTING THE "NO" BUTTON DISPLAYS AN ILLUSTRATION OF THE SYMPTOMS OF ANOTHER PROBLEM.

Can you find your problem?

Yes  No

Black fungus with a smooth or slightly knobby appearance on exposed roots.

black fungus

Move pointer (hand) over the "Description" button for a description of the symptoms.

Description

Return

FIGURE 4. THE CARD DISPLAYS INFORMATION AND THE SOLUTIONS TO A SPECIFIC PROBLEM.

<table>
<thead>
<tr>
<th>Trunk/Roots Section</th>
<th>Macadamia Root Rot</th>
<th>Page 1 of 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Information</strong></td>
<td><strong>Solution</strong></td>
<td></td>
</tr>
<tr>
<td>This problem is caused by a fungus, <em>Kretzschmaria clavus</em>, which attacks the roots and lower trunk of macadamia nut trees, eventually killing the tree.</td>
<td>No fungicides are registered nor likely to be effective.</td>
<td></td>
</tr>
<tr>
<td>Orchards in high rainfall areas near forests or on recently cleared forest land are most susceptible to this disease. The disease doesn't spread rapidly.</td>
<td>This is what you can do. Remove dead trees and roots from the orchard. Don't plant in the same hole or nearby until the diseased roots have decomposed. When preparing new orchard sites in forested areas, remove forest trees completely. Don't bury or chip trees in the orchard, as they may be diseased and infect the orchard.</td>
<td></td>
</tr>
<tr>
<td>The symptoms are poor growth and few leaves. Young shoots and suckers may be seen growing around to the trunk (click on &quot;Suckers&quot; button below). The obvious sign is</td>
<td>Don't leave large rocks near the base of a tree when planting. As trees grow, cut and remove on</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Suckers</th>
<th>Fungus</th>
<th>In trunk</th>
</tr>
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</table>

| Next | Find | Print | Save | Return |