

II. Pome Fruits

f. Implementation

Codling moth

San Jose scale

Phytophagous mites

APPLE

Decision-Making Computer Software for Apple Pest Management

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Our computer program, AppleMgr, has been designed as a prototype to demonstrate the application of computer technology to a complex process of decision-making. Fig. 1 shows the flow of information through the management module. Over the past year we have focussed on construction of the mite management section, development of spreadsheets to show both positive and negative side effects of pesticides, and improvement of the user interface.

For spider mites, the program determines the probability of biocontrol based on current pest and predator mite densities and calculates combined accumulated mite-days for three species. If desired, the user may then select a miticide from a list appropriate for the species present. The benefit in dollars per acre of an application of this miticide is calculated, assuming that a fruit size reduction of one box size would occur with no treatment.

At the end of a session a user may choose to see two spreadsheets with bar graphs. The first of these shows the relative effectiveness of the user's selected pesticide vs. other pesticides on four additional pests that may be present. The second spreadsheet shows relative adverse side effects of pesticides: hazard to applicator, bee toxicity, toxicity to western predator mite and risk of resistance. Both spreadsheets allow the user to adjust relative weights of the four factors considered.

In developing our prototype we have experienced many difficulties in linking together different types of software such as expert system shells, database management systems and spreadsheets. The first shell we worked with did not allow any linkage to other programs. The commercial shell in our current version contains built-in functions for access to DOS programs and DBASE. However, use of the DBASE access functions results in a very disjointed series of displays. We expect that future development of agricultural software will be done using a hardware platform such as Macintosh with a common interface or software systems such as Microsoft Windows that support applications under them in a consistent interface.

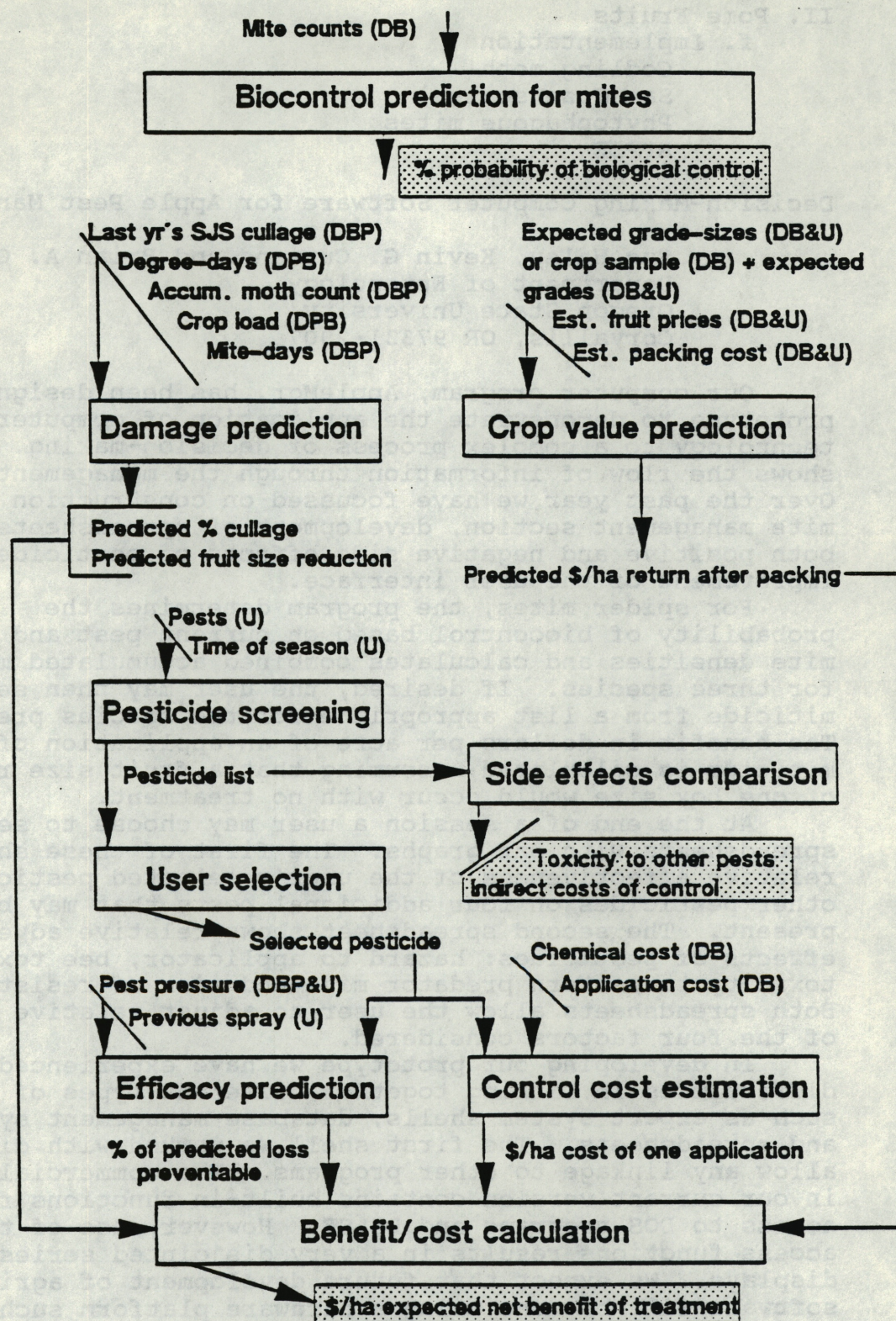


Figure 1. Structural diagram of treatment decision module showing flow of information. U = user, DB = database, DBP = database program. Boxes represent information processing steps and shaded phrases indicate goals.