

What is Stored Grain Advisor?

Stored Grain Advisor (SGA) is a decision support system for stored grain management. It helps you make decisions about managing insect pests in stored wheat. SGA does this by predicting the likelihood of insect infestation, and by recommending appropriate preventative and remedial action. It also provides advice on how to sample and identify insect pests of stored wheat.

Computer models of insect population growth allow SGA to predict future insect population growth as well as the degradation of insecticides, effects of fumigation, and cooling the wheat with aeration. The ability of Stored Grain Advisor to graphically show population trends also makes it a powerful educational tool.

Requirements

This program requires Microsoft Windows 95, 98, Me, NT, 2000, or XP.

Installing SGA

To install SGA, find the directory where you downloaded the "SGASETUP.exe" file. Double click SGASETUP.exe. This will install SGA on your computer. If you wish to remove SGA from your computer, an uninstall program is available in the SGA program group.

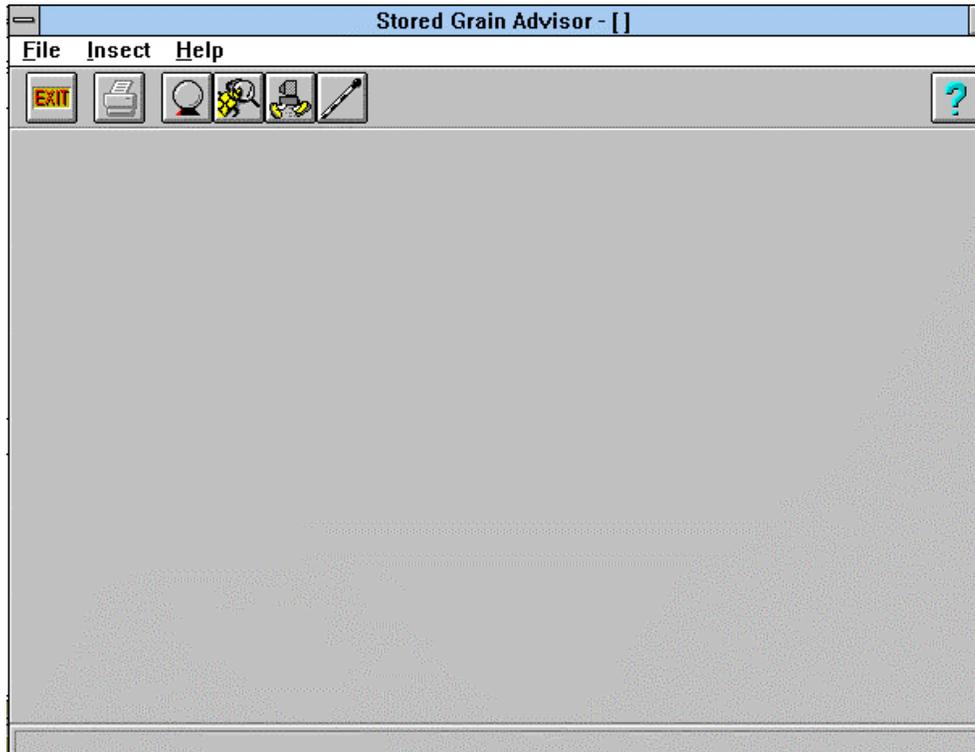
International Users

At this time the current version of SGA may not work on your computer because of the difference in date format. In the U.S.A. we use month day year. Many other countries use day month year. A temporary fix for this is to change the regional settings control panel to English (United States). Remember to change it back to your country after running SGA. For countries in the Southern Hemisphere the natural cooling that occurs in the fall will be 6 months off. For example, our stored wheat begins to cool naturally starting 1 Sept. So you may need to enter a storage date of 1 July if your grain was harvested 1 January. We hope to start on an International version of SGA soon, that will fix the date problem and also allow custom weather data input.



Stored Grain Advisor

To start SGA, double click the SGA icon (the icon should be located in the SGA applications group). Once the program is running you can select the appropriate module by either selecting it under the insect menu or clicking on an icon in the toolbar.





Management Module

This module provides advice on how long you can safely store your wheat under your storage conditions. If you have found insects in your grain, it will tell you if you need to fumigate. This program will ask you a series of questions, such as length of storage, initial grain temperature and moisture. The figure below shows the type of information SGA requires. (note: the accuracy of SGA's predictions depends on the accuracy of the information that you provide, such as initial grain moisture and when you will aerate).

Stored Grain Advisor - [Management]

File Management Help

EXIT [Printer] [Left Arrow] [Question Mark]

Storage Date
June 29, 1995

Sell Date
December 30, 1995

Aerate Date
Aerate

Grain Temperature (F)
+ [Slider] + 90

Grain Moisture (%)
+ [Slider] + 12

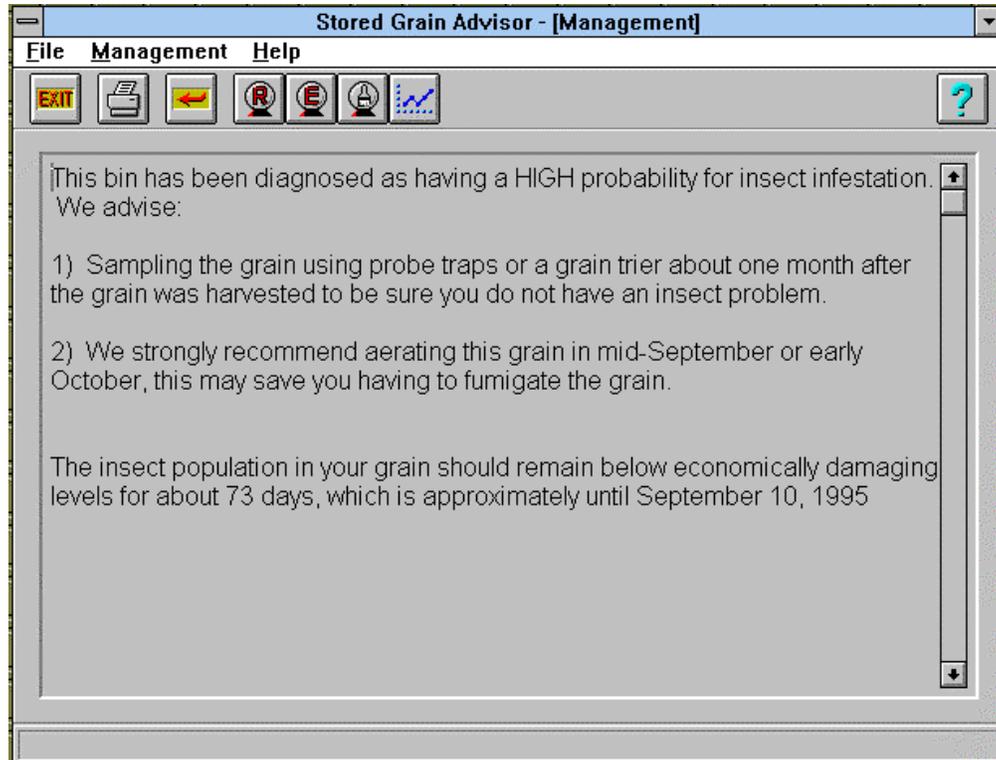
Insecticide
 Malathion
 Reldan
 None

Bin Diameter
 18' or Less
 18' to 22'
 22' or greater

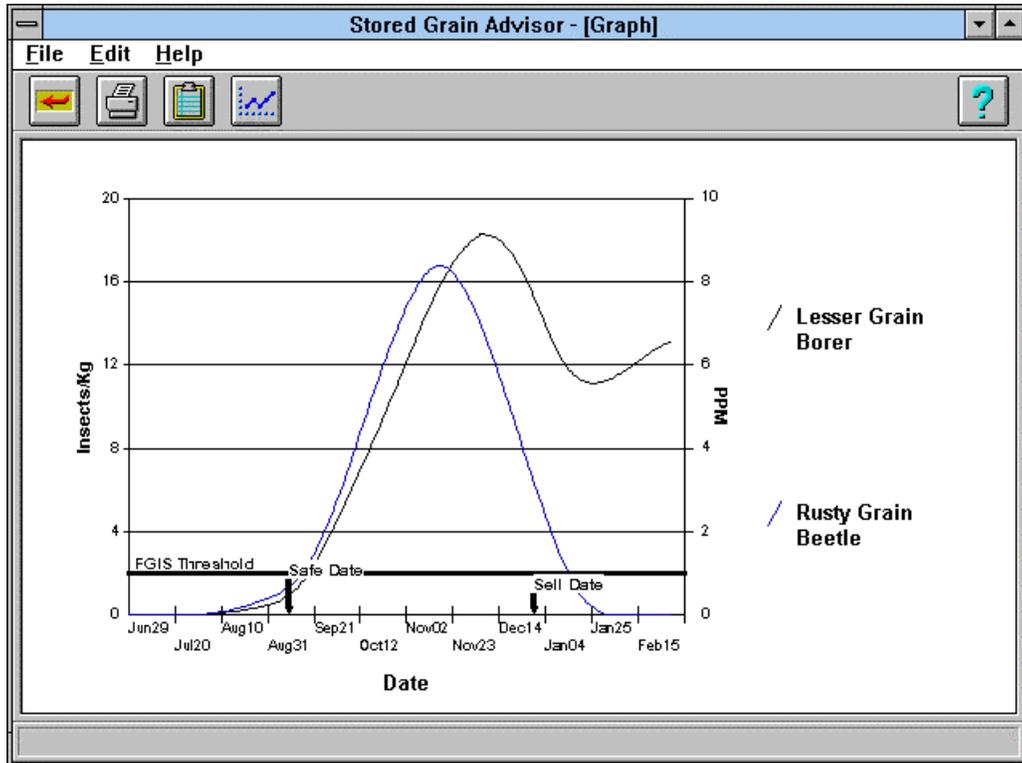
OK

Click on the Aerate button if you are going to aerate your grain

To change the storage date, click on the storage date box and a calendar will pop up. To change the month, move the pointer to the month and select the arrow next to the month. By clicking on the arrow it will move through the months in sequential order. To select a day, simply click on a day in the calendar. When the correct storage date is selected click on *OK*. Select the sell date by using the same method. To change the initial grain moisture content and temperature, move the pointer to the arrows and click on the arrow until the correct temperature or moisture is displayed. If you plan on cooling the grain in the fall using aeration, click on the aerate button and a calendar window will appear. Select the appropriate date (note: this is for fall aeration, not for removing the "heat of harvest" in summer). Sometimes a date may already exist below the aeration or fumigate windows. If you would like to choose no aeration you may do so by selecting "do not aerate." If you have used a protectant on the grain, select the appropriate insecticide on the screen. Once all the data is entered, select *OK*. It may take up to a minute for SGA to make a recommendation. While you are waiting, SGA is busy running a computer model that will predict insect population growth in your grain. After SGA finishes the simulations, it will provide you with a recommendation. The recommendation will tell you whether there is a high, medium or low chance of this grain becoming infested with insects, and how long you can store this grain before insects reach economically damaging levels. It will also advise you on control methods you can use to reduce insect population growth in your grain.



Select the graph icon to view a plot of predicted insect population growth over the storage season. The predictions are for the two most common insect pests of stored wheat: the lesser grain borer and the rusty grain beetle. SGA will display a graph showing insect population growth, insecticide degradation (if you used one), and the Federal Grain Inspection Service (FGIS) threshold of 2 live insects per kilogram. It will also show the safe date and sell date on the graph. You can print anything you see on the screen (including graphs) by using the printer icon on the toolbar. To return to the recommendation screen, select the return arrow icon in the toolbar.

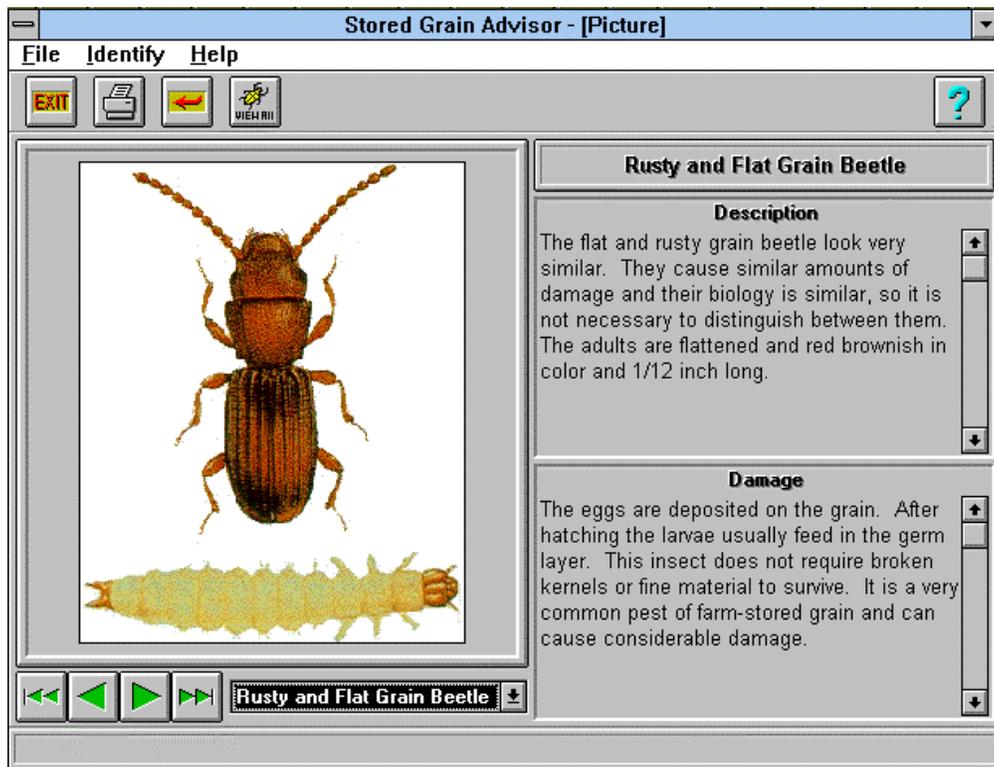


Because SGA is an expert system, it can explain the reasoning behind its recommendations. To see the explanation, select the crystal ball designated "E" (E stands for "explanation"). To evaluate another scenario, you can reset the variables by selecting the crystal ball that contains a broom (think of cleaning out the old information). This will reset all the variables in the system. Select the "R" crystal ball to begin a new recommendation (R stands for "recommendation"). To exit this module select the return arrow icon in the toolbar. Note: don't click the "exit" button unless you want to quit SGA.



Insect Identification Module

Use this module for identifying insect pests of stored wheat. You may need to click on the return arrow in the toolbar if you are inside another module; this will return you to the main screen. To enter the insect identification module, click on the insect icon in the toolbar. The identification module will ask you a series of questions about whether the insect is a moth, its size, if its head is tucked under and the color of the insect. After SGA has narrowed the possibilities down to a few insects, it will provide you with a series of pictures of the most likely insect pests. Use the arrows below the insect picture to page through the insects to select the correct species. SGA provides a description of the insect and the types of damage it causes. You can print a picture of the insect along with its description using the printer icon in the toolbar.

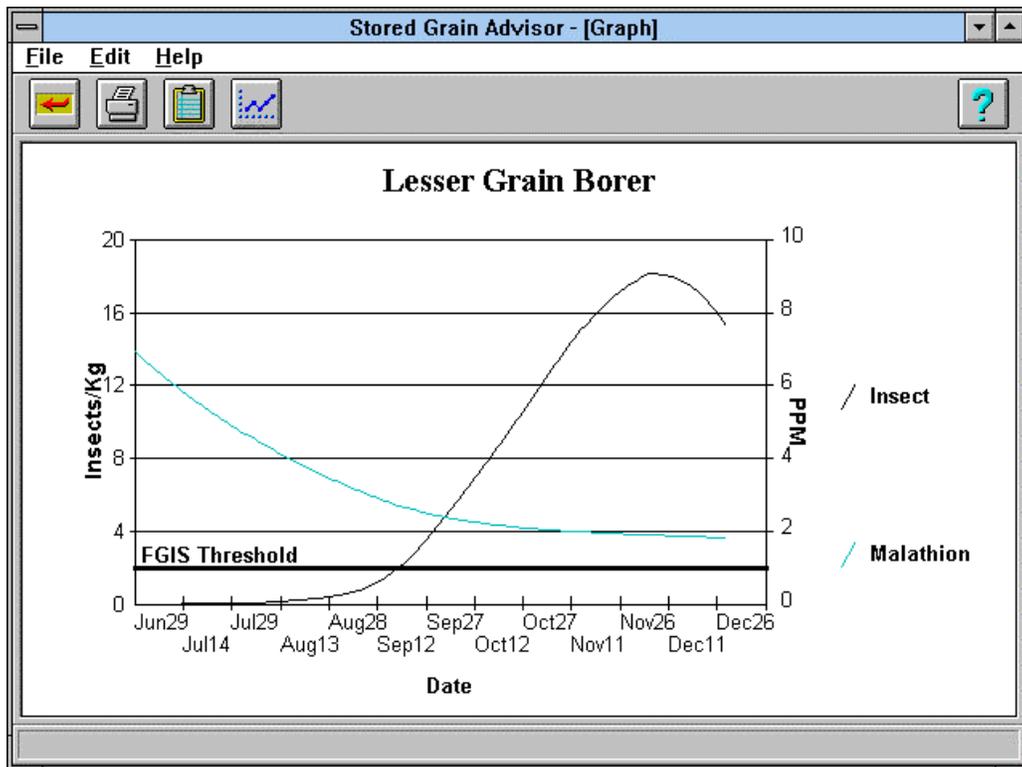


If you would like to view all of the common stored product insect pests at one time, select the *View All* icon in the toolbar. Use the double arrows to go to the beginning or end of the pictures. You can also select an insect by its name by clicking on the arrow next to the insect name and then selecting the species you wish to view.



Run Insect Model

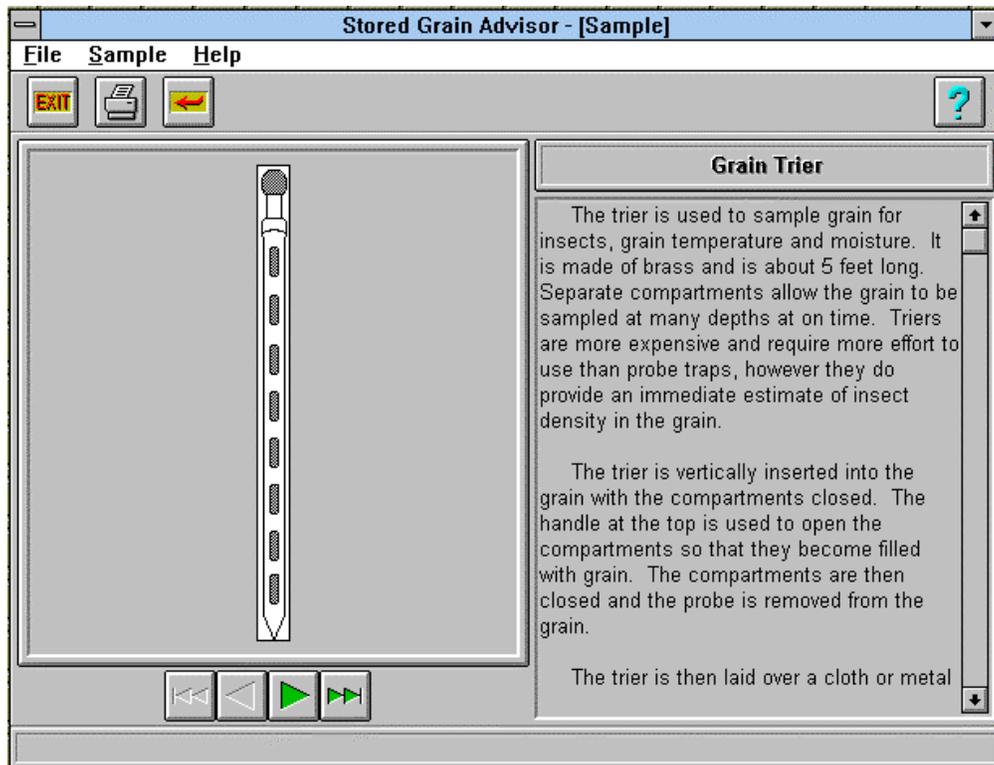
Use this module to learn about factors that affect insect growth in stored grain. This module does not provide advice; its purpose is to let you play with different management controls, such as time of aeration, bin size, time of fumigation, etc. SGA then graphically shows you how changing these variables affects insect population growth. The input screen is similar to the management module except that you can also specify which species and the timing of fumigation. After you have entered all the data you may then select the *OK* button. After a minute or so, a graph will appear on the screen. Once you have finished viewing the graph, click on the return arrow on the toolbar. This will bring you back to the input screen and you are ready to run another simulation if you wish. Note: A 386 with math coprocessor or 486 or higher CPU is recommended; without it the model could take up to 10 minutes to run.





Sampling Module

Use this module for information on how to sample stored wheat for insects. You can view pictures of sampling equipment and get information on where it can be purchased from. This module helps you to develop an insect sampling program for your storage situation. Based on the number of samples you take, it will calculate 95% confidence intervals for insect trap, or probe samples. It can also estimate the probability of detecting insects in your grain based on insect density and the number of samples you take.



Quitting SGA

You can quit SGA at almost any time. The only time that you may not quit is when there is a window asking for specific information (such as the calendar window). Once that question has been answered you may quit SGA by selecting the *exit* button in the toolbar.

Examples

These examples will help you to become familiar with SGA's management module. The other modules are simpler to use and thus, we didn't think it was necessary to provide examples for them. Simply use the bold face text as your answers. If you follow the example cases correctly, you should end up with the same recommendations.

Case #1

First you should select the management module, designated by the crystal ball icon. The following questions will be the same as you will find on your screen (if you have any problems answering the questions, go back to the management module section of this manual for advice).

1. "Have you sampled the grain in this bin?"
NO
2. Enter the storage date.
July 5, 1995
3. Enter the sell date.
December 31, 1995
4. Enter the Aeration date.
November 15, 1995 (the default is no aeration unless you enter a date)
5. Enter the grain temperature.
92°
6. Enter the grain moisture.
12%
7. Enter the Insecticide.
Malathion
8. Enter bin diameter.
18' or less
8. Select:
OK
9. A window will appear showing you the progress of the simulation.

The recommendation should be similar to the following:

This bin has been diagnosed as having a HIGH probability for insect infestation. You should sample the grain using probe traps or a grain trier about one month after the grain was harvested to be sure you do not have an insect problem. You should try to aerate this grain in mid-September or Early October, because it would greatly decrease the chances of having high numbers of insects in the grain. The insect population in your grain should remain below economically damaging levels for about 72 days, which is approximately until September 15, 1995. (note: click on the graph icon to see a graph of the predicted insect growth).

Click on the "E" toolbar icon to get an explanation:

The use of a grain protectant is likely to reduce insect infestation. The Lesser Grain Borer is resistant to both Reldan and Malathion, so you may not get good control if this insect is present in the grain. The fact that you are waiting until November to aerate the grain means that aeration will not be as effective as aerating in early fall.

Case #2

If you have just finished example 1, click the crystal ball broom icon to clear SGA's memory, then click the "R" crystal ball for a new recommendation. If you have just started SGA then click on the crystal ball icon to enter the management module.

1. "Have you sampled the grain in this bin?"

NO

2. Enter the storage date.

July 20, 1995

3. Enter the sell date.

December 31, 1995

4. Enter the Aeration date.

Sept. 15, 1995 (click on the aerate button to enter the date)

5. Enter the grain temperature.

92°

6. Enter the grain moisture.

10%

7. Enter the Insecticide.

None

8. Enter bin diameter.

18' or less

8. Select:

OK

9. A window will appear showing the progress of the simulation.

The recommendation should be similar to the following:

This bin has been diagnosed as having a low probability for insect infestation. However, to be certain, sample the grain using probe traps or a grain trier about one month after the grain was harvested. We strongly recommend aerating this grain in mid-September or early October. All of the major stored grain insect pests cannot reproduce or develop if the grain temperature is below 65°C, so get the grain below this temperature as soon as possible. Insect populations in your grain should remain below economically damaging levels thru the winter until the grain begins to warm-up in March.

Click on the "E" toolbar icon to get an explanation:

Low moisture will inhibit insect growth in the grain. Early aeration of the grain will inhibit insect population growth sooner, so there is less chance they will reach damaging levels.

Case #3

If you have just finished example 1 or example 2, click the crystal ball broom icon to clear SGA's memory, then click the "R" crystal ball for a new recommendation. If you have just started SGA then click on the crystal ball icon to enter the management module.

1. "Have you sampled the grain in this bin?"

Yes

2. Enter the type of sampling device used.

Probe trap

3. Enter the number of probe traps used in this bin.

3

4. Enter the number of days the traps were left in the bin.

5

5. Enter the total number of each type of insect you found in the traps.

1 Lesser Grain Borer, 20 Rusty Grain Beetle, 5 Red Flour Beetle

(note: you can enter the number directly in the text box by double clicking the 0 then typing a number)

6. Now select:

OK

7. A new window will appear: Enter the storage date.

July 20, 1995

8. Enter the Sell Date.

December 31, 1995

9. Enter the Aeration date.

None

10. Is the temperature of the grain lower than 60°F?

No.

11. Click on the "OK" button.

The recommendation should be similar to the following:

You did not catch enough of the primary stored-grain insect pests to warrant fumigation. We advise resampling this grain in one month and then consulting the expert system for advice.

Click on the "E" toolbar icon to get an explanation:

The fact that you have caught some grain-feeding insect pests in your traps or trier indicates that you could have problems in the future, but it is difficult to tell at this time because of the low number of insects caught (it is more difficult to accurately estimate lower numbers of insects than higher numbers of insects). Since you are not aerating the grain, insect infestation is likely to increase.

Stored Grain Advisor

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