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The Home Computer, VisiCalc, and Bird Banding Data

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Many backyard bird banders know that a home computer would help with the mountains of data that they have accumulated, but are not sure how. Just what can the computer do? How does one learn how to use it? Is it necessary to learn to program the computer? These are the kinds of questions that will be addressed in this article.

First, you should know that you can do a great deal with your banding records on a home computer *without* learning to write your own programs for the computer. Programs can be purchased that will allow you to analyze your data without knowing anything at all about how the computer works. One of the most versatile of these programs is VisiCalc. VisiCalc was the first of a group of programs called electronic spreadsheets and was the biggest seller of all nongame programs. VisiCalc (or FlashCalc, the most recent version) or a similar program is available for every home computer.

Before purchasing any program, you should think carefully about what you would like to do with your banding data on a home computer. It is not very practical to store every piece of information gathered on every bird, simply duplicating the information on field sheets (although some computer users do this, using programs called data management database programs). Some banders use a computer to prepare banding schedules at the end of the year; however, this use will not be addressed in this article (write the Banding Lab for information). Perhaps the simplest way to get started with a computer is to use it to analyze certain portions of your data, such as your spring or fall migration banding of one species. This kind of analysis can be done using VisiCalc.

VisiCalc is an extremely versatile program that was created to be used in business accounting. It is a large "electronic spreadsheet" consisting of 254 rows and 63 columns. (Most other spreadsheet programs are very similar, and the following description of VisiCalc will apply with minor modifications.) Each row is assigned a number, and each column a letter (see Figure 1). The intersections of the rows and columns are called *cells*. Cells are identified by their column-row coordinates (for example, cell B4 is outlined in Figure 1). These cells can be filled with three kinds of information: labels, numbers, or mathematical formulas. A lighted block called a *cursor* can be moved around the screen, allowing you to type information into the cells. While the computer screen shows only a small portion of the spreadsheet at one time, the sheet can easily be moved to bring any other portion into view.

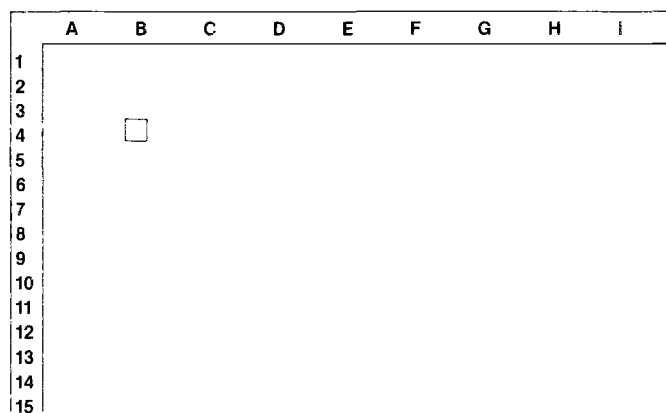


Figure 1. A portion of the VisiCalc screen.

Electronic spreadsheets allow mathematical relationships to be created between cells. For example, if a cell named C1 contains the formula $C1 = A1 + B1$, then C1 will display the sum of the contents of cells A1 and B1. If new numbers are entered in A1 and B1, cell C1 will show their new total.

Figure 2 illustrates a simple use of VisiCalc to analyze hypothetical fall banding data for one species. A portion of one month is shown here. The fall banding season is divided into five-day periods across the top of the sheet, and the numbers of HY and AHY birds banded are entered below each five-day period. Formulas are entered so that the computer automatically calculates the total numbers of HY and AHY birds caught and the percent that were HY (column G, H and I). Special commands are used by typing the symbol "@". For example, when the command @SUM() is typed in, the computer will total all the numbers contained in the cells specified in the parentheses. Cell G4 contains the formula @Sum(B4...F4) and cell G5 contains the formula @Sum(B5...F5). (Formulas appear at the top of the screen but not in the cell; their results appear in the cell.) Cell I4 contains the formula $(G4/H4) \times 100$, dividing the number of HY's by the total caught, then multiplying by 100 to produce the percent of HY's. It is easy to determine the total number of HY and AHY birds caught during each time period for all years combined (as in cell B16, containing the formula @Sum B4, B7, B10, B13). VisiCalc also has several other built-in functions similar to "@Sum." For example, it can determine the highest number (@MAX) or the average number (@AVERAGE) of Catbirds banded during any given time period.

	A	B	C	D	E	F	G	H	I	J
1	Catbirds			August						
2	Banded	1-5	6-10	11-15	16-20	21-25	Sub-	Total	%	
3							total	HY+AHY	HY	
4	1978 HY	2	3		6	8	19	24	79.17	
5	AHY	1		2	1	1	5			
6										
7	1979 HY	7	3	2	5	5	22	26	84.62	
8	AHY	2		1	1		4			
9										
10	1980 HY		10	6	9	2	27	32	84.38	
11	AHY	1	2	1	1		5			
12										
13	1981 HY		4	7	5	8	24	29	82.76	
14	AHY		1	2	2		5			
15										
16	TOT HY	9	20	15	25	23	GRAND TOTAL,	HY'S:		92
17										
18	TOT AHY	4	3	6	5	1	GRAND TOTAL,	AHY'S:		19
19										
20	TOTAL:	13	23	21	30	24	OVERALL %	HY'S:		82.88

Figure 2. VisiCalc used to summarize fall banding of one species.

A great advantage in doing this on the computer rather than on paper is evident when you make an error. Using a computer, you simply type in the correct number and it automatically recalculates all the formulas. Changing a formula is also easily done.

If you had to create this form for every species, the computer wouldn't be much help. This, however, is another way the computer can save work. A master form, or template, is created and is saved on the diskette with no data entered. This form consists of the dates and labels across the top of the sheet, the labels in column A, and the appropriate formulas in each cell where calculating will be done. Once this form is saved on your disk (perhaps under the name "template"), it may be used repeatedly to enter data for as many species as you like. When used for Gray Catbird, the name is entered in cell A1, the data are entered, and the form is saved on the disk (perhaps under the name "Catbird"). Now you have two spreadsheets on your disk ("template" and "Catbird") and can use the template again for another species. The same form could be used for groups of species (all flycatchers, for example) or for your total catch each season. By modifying the form you could easily produce monthly totals. Or the time periods could be shortened or lengthened; if daily totals are required, the individual dates could be listed down the left side with the years across the top.

It is not necessary to include room for future years when planning your spreadsheet. VisiCalc allows you to insert rows (or columns), so this form can be used for many years. The program will automatically recalculate the totals at the right and on the bottom after data from a new

banding season are entered. The only restrictions to be considered are the dimensions of the spreadsheet (you're not likely to run out of rows with 254, but the number of columns—63—can be restrictive).

Another limit is posed by the amount of memory in your computer. A great deal can be accomplished using a computer having 64K (about 64,000 bytes of memory—roughly that many individual characters), and I recommend that you use a computer with at least that much memory. The VisiCalc program itself uses about 34K, so you are left with about 30K for your data entry. The spreadsheet illustrated here uses about 12K when data from 3 months for each year from 1970 to 1982 are entered.

VisiCalc can be used to look at your banding data in other ways. You might choose to study banding returns to determine the minimum age of each bird and the percent of returns in each age group. Some of the spreadsheet programs have a calendar function (as in Advanced VisiCalc) which will automatically calculate the age in days or months when you enter the banding and return dates.

When you have become familiar with the spreadsheet program, you can use it to calculate simple statistics for you. For example, it is not difficult to produce a program that shows the mean, standard deviation, and variance for a group of wing lengths. You can also find the correlation coefficient between any two groups of numbers, such as wing length and weight, or numbers caught and net-hours. Perhaps one of the most satisfying uses of VisiCalc is in producing graphs directly from your data. (This requires a separate graphing program, such as VisiPlot.)

In order to get started using a home computer to analyze some of your data, you will need the following: a computer having at least 64K of memory, a disk drive, and VisiCalc or some other spreadsheet program. A printer is highly desirable. Excellent references on any of the spreadsheet programs are available at any bookstore.

Many newer spreadsheet programs such as FlashCalc or Multiplan have greater capabilities than the original VisiCalc, and other programs (Appleworks, Lotus 1-2-3, Jazz, SuperCalc 3) contain word processing, graphics, database, and other programs along with the spreadsheet. Unfortunately, these are more expensive, require more computer memory, and are harder to learn. If you have the opportunity to begin with either a new or an older version, take it—the amount you can do with either is almost unlimited.

(Eastern)