

The Observer supports manual computer-aided recording of the behavior of animals. In many cases automatic event recording is helpful and advantageous compared to conventional direct observations (1,2). It is not only time-saving but it also prevents disturbing influences from the human observer. In many behavioral experiments it is sufficient to record the location and locomotor activity of animals with simple and relatively cheap sensors, e.g. light barriers. However, until today there is no interface available to connect such sensors to The Observer for automatic event recording.

Since 1993 we have used The Observer to record the behavior of fishes, insects, parrots and mammals. We perform choice-preference tests in which we record the time the animals spend in particular sectors of a given terrain. However, we missed the ability to measure the locomotor activity of the animals tested. For that purpose we installed a 20-channel infrared (IR) light field. Next, we developed a technique to hook up the field of IR light barriers directly to the PC and to record the events with The Observer.

AUTOMATIC EVENT RECORDER

We developed our system, named AutoKey, using an I/O card with 24 programmable pins (figure 1). The card is compatible to TTL signals on input, i.e. the card reacts to high-low voltage signals. Based on this hardware device we developed software to record events automatically in combination with The Observer 3.0 for DOS. To each of the 24 channels a particular key of the keyboard was assigned (a through x). The state of each channel is checked 18 times per second. The change of state from 0 in case of >no signal= (low) and 1 in case of >signal= (high) is written into the keyboard buffer. Therefore changes in the state of any channel result in the same effect as if one of the keys is pressed manually. All incoming signals for all channels are displayed on the screen by the assigned letters (a-x).

USING THE AUTOKEY

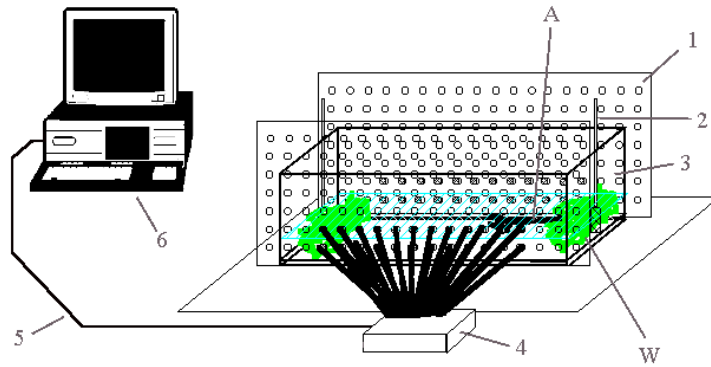
While testing the AutoKey (i.e. I/O card, field of IR light barriers and the AutoKey software), we found that data collection was most efficient when The Observer was set up in such a way that each light barrier was defined as a focal subject. This configuration provides the possibility to record the number of beam crosses and the total interrupt time for each channel separately. These data allow us to assess the preferred home range of the test animal, the intensity of its locomotor activity, and how this varies in time. Figure 2 shows an example in which we tested the activity of a waterscorpion.

OTHER APPLICATIONS

There are several other applications of the AutoKey. For instance, it allows remote operation of The Observer. A unit with up to 24 keys may be used as remote control wired to the I/O card. The signal can also be transferred via IR light or radio wave (FM). This technique offers a way to collect data from another room than that where the computer is installed, or even from under water!

REFERENCES

1. Gattermann, R. (1990). *Verhaltensbiologisches Praktikum*. VEB Gustav Fischer Verlag, Jena.
2. Martin, P. & Bateson, P. (1993). *Measuring Behaviour: An Introductory Guide*. 2nd Edition. Cambridge University Press, Cambridge.



Sketch of the AutoKey setup with 24-channel IR-barrier field, used for measuring the activity of a waterscorpion (Nepidae). The light of the barriers will be interrupted if the animal (A) leaves the shelter of water plants (W) placed on the right and left side of the tank. 1 = punched panel (2 cm grid) with 24 IR transmitters, 2 = air tube with bubble stone, 3 = tank with ground of gravel and 2 cm water level, 4 = connector box for the receivers, 5 = cable to the I/O card, 6 = computer.

CONTACT INFORMATION

Massoud Yasseri. Ethology Department, Zoological Institute and Museum, University of Hamburg, Germany
 E-mail: myasseri@rrz-cip-1.rrz.uni-hamburg.de