Multiple Access or Synoptic or Poly Clave Keys

In biology or medicine, a **multi-access key** is an identification key which overcomes the problem of the more traditional single-access keys (dichotomous or polytomous identification keys) of requiring a fixed sequence of identification steps. A multi-access key enables the user to freely choose the characteristics that are convenient to evaluate for the item to be identified. It is relatively a new alternative to dichotomous keys and becoming increasingly popular, especially because of the ease of computerizing them, is termed *multiple access* or *poly clave* or *synoptic key*. The advantage of these keys is that they allow the user to enter the key at any point.

This key is based on the identification of organisms by a process of elimination. In a written poly clave key, there is a series of characters and character states. Each state is followed by a number or code for the species that possess that feature. The user needs to select any character and then copy down the list of species that possess the feature. Then the user has to select another character and eliminate any species that is not common to both lists. This process has to be continued until the specimen is identified.

Interactive multi-access keys are a high-tech descendant of poly claves ("card keys"). Historically various styles of encoding features of species (such as flower color) on punch cards were used. Holes or notches in these cards would allow the user to choose cards based on characters observed in a specimen until only one card remained, yielding a tentative identification.

How it works

It's easy to imagine how these keys are computerized. Consider a series of standard playing cards. Imagine each card has four holes punched into it along the top margin. If the card is a spade, cut the first hole through the margin; if a club, the second hole is notched to the margin; a heart the third hole is notched; and finally, if it is a diamond the fourth hole is notched.

Further imagine that along the bottom of the card we punch 14 holes (2 – 10, J, K, Q, A) and cut a notch for the appropriate number. Thus, the Queen of Hearts will have a notch cut into the third hole on the top of the card, and the Queen notch on the bottom of the card.

Now, let's use our punch card deck of cards to identify an unknown card. Shuffle another deck of cards and pick any card. Let's assume that this "**unknown**" card is the Ace of Spades. To identify this unknown, we analyse the characters and two are obvious, suit and number.

Let's start with suit – take a long needle and stick it through the **spades hole**. Since, only spades are notched, the other suits will remain on the needle and spades will drop out of the deck.

Now, collect the spades cards and put a needle through the next character, the Ace and, viola, the Ace of Spades falls out. This is the general principle of how the computerized version of poly clave keys work. The main difference is that a computer allows for countless holes (characters) and notches (states) to be included and does the needlework for us.

Example:

Poly clave Key to Pollination Type:

Pollination is the process of transferring pollen from one flower to another. Since plants can't move, they utilize vectors such as wind, water and animals to accomplish this process for them. Flowers are specialized by shape, colour, door, nectar etc. in order to maximize the chance that a certain vector will accomplish pollination. These flower adaptations are collectively known as pollination syndromes or systems.

Plants differ in the degree of their specialization for a particular pollination system. For example, many orchids are pollinated by only a single type of bee.

Other flowers are not as specialized and may be pollinated by a variety of bees or perhaps beetles. In other cases, insects may visit flowers without actually transferring pollen. These factors make it difficult to determine with absolute certainty the pollination system by the poly clave key.

Advantages of Poly clave Keys:

I. They are easy to use.

II. They allow multi-entry i.e. the user can start anywhere. This is a significant advantage because the user can rely on characters that are most easy to observe, rather than having to deal with characters that may not be present in the specimen or are poorly developed.

III. They are order-free i.e. the user can work in any direction with any character.

IV. They are faster.

V. They are easily computerized. In fact, these keys are most commonly used in this form. Paper versions are typically large and unwieldy because each character needs to list all possible taxa.

How to use a Multiple Access Key:

I. Read through the list of characters to become familiar with the possibilities.

II. Scan the list to find a character with a state that you observe in your specimen. Start with a readily identifiable character that has only a few numbers (taxa) associated with it.

III. Write a brief description of the character and state and the numbers of the taxa that can be described by this state.

IV. Choose another character and state that describes your taxa. Write a brief description of this state below the name of the first state chosen. Then, scratch off the original list of any taxon that doesn't appear in the second.

V. Continue this process until just one taxon remains for all of the states. If there is no single taxon described by the states chosen, and two or more remain, go back and check for errors.

VI. Read the name of the taxon after its number in the list of taxa. Check your identification with a description in a manual or the herbarium.