What is a Flora?

The word "flora" refers to the plants occurring within a given region as well as to the publication of scientific descriptions of those plants. In order to distinguish between the two, the word is often capitalized when a publication is meant. A Flora may contain anything from a simple list of the plants occurring in an area to a very detailed account of those plants. Floras are different from popular manuals in that they attempt to cover all of the plants, rather than only the most common or conspicuous ones.

A Flora almost always contains scientific names, and it may also include common names, literature references, descriptions, habitats, geographical distribution, illustrations, flowering times, and notes. Less often, Floras include such specialized information as data on plant chemistry, reproduction, chromosome numbers, and population occurrences. Sometimes the plants are listed alphabetically, and sometimes they are represented within a classification system that indicates which plants are most similar or are thought to be related. Floras often also include devices called "keys" that enable the user to identify an unknown plant.

Botanists have been writing Floras since the early 1600s. Physicians used Floras for information on medicinal plants while horticulturists used Floras to identify plants that might be brought into cultivation. Floras have documented plants collected in exotic places as well as plants growing in a botanist's own area. The form of Floras--lists of plants with associated information about them--has changed very little over the centuries, but in the last two decades the use of computers to store and organize such information has increased dramatically.

Early Floras usually were written by individuals, based on observations of the plant samples and literature available to them, both of which were quite limited. More recently, Floras of large scope have been written by collaboration of many authors who collectively have examined thousands of plant samples and evaluated and incorporated information from dozens, or even hundreds, of publications.

Interest in tropical areas and concern about the environment have stimulated increased efforts to inventory and document the plants of the world. The growing realization that we must both conserve our rapidly dwindling resources **and** use them more wisely provides an added urgency to these efforts. Thus, the amount of time and money needed for floristic work is increasing, as are the diversity and importance of ways in which floristic information is being used and the number of people who have a direct interest in floristic data.

Name of some Flora and eFloras

1. Hooker, J.D. (1872-1897). The flora of British India, Vols. 1-7

2. Kurz, S. (1877). The Forest Flora of Brma, Calcutta

3. Prain, D. (1903) Bengal Plants, Calcutta vols2 (Rep 1903, 1963)

eFlora:- This list of electronic Floras is arranged by country within continent. An electronic Flora is an online resource which provides descriptions of the associated plants, often also providing identification keys, or partial identification keys, to the plants described. Some Floras point to the

literature associated with the plants of the region (flora Malesiana), others seek to show the plants of a region using images (flora of India), others give an inventory of the region's plants (flora of Pakistan).
Ex- 1. India , Flora of India
2. Japan, Database of Japanese Flora
3. China, i) Flora of China ii) Moss Flora of China
4. Pakisthan, Flora of Pakisthan

Taxonomic Keys
A taxonomic key is a simple tool used to identify a specific object. A taxonomic key is one of the most useful tools available to scientists trying to identify an unknown organism. Systematists rely on keys to help identify known organisms and determine whether they have discovered a new organism entirely. Taxonomic keys are useful tools guiding researchers towards the known name of an organism. However, all taxonomic keys are not created equally. They are often created on a regional level or for a particular group of organisms (i.e., Plants of the Great Lakes Region, Argentinean Monocots etc.). So it is important to pick a key that represents the diversity of the region or group of organisms you are interested in examining.
Important aspect for making a key-
    •Consider only one characteristic at a time.
    •Use morphological or observable characteristics as much as you can.
    •Use major characteristics when dividing the organisms in the beginning and use lesser or less obvious characteristics to divide them into smaller groups.
    •When writing contrasting statements, rely on similar word formats (i.e. have feathers and don't have feathers).
    •Be specific in your statements and avoid repeating the same characteristics.
    •Use questions that lead to yes or no answers rather than statements.

DICHOTOMOUS KEYS allow the user to determine the identity of items using a sequence of alternative choices. Dichotomous comes from the Greek root *dich-*, meaning "two" and *temnein*, meaning "to cut." Dichotomous keys always give two, mutually exclusive choices in parallel statements. The pair of statements is referred to as a **couplet** and each 1/2 of a couplet is a **lead**. At each couplet of a dichotomous key the user is presented with two choices about a specific **character** present in the group of organisms, a specific **character state** is described for each lead. Sometimes the characters are **quantitative** (i.e., measurements) and sometimes the characters are **qualitative** (e.g., texture). As the user makes a choice about a particular characteristic of an organism s/he is led to a new branch or couplet of the key. Each couplet provides characteristics that become progressively more specific until the final step is reached and identification is made. Followed correctly, keys will lead you to the correct name of an unknown organism or object. Dichotomous keys can be developed to identify anything in any sort of classification.

Dichotomous Keys:
A dichotomous key presents two contrasting choices or couplet at each step. The key is designed so that one part of the couplet will be accepted and the other rejected. The first contrasting characters in each couplet are referred to as the primary key characters. These are usually the best contrasting characters. Characters following the lead are secondary key characters.
The dichotomous keys are of two types, viz., Indented key (Yoked key) and Bracketed key (Parallel key).
Indented key or Yoked key:
A dichotomous key in which the first part of a contrasting couplet is followed by all subsequent couplets; each subordinate couplet being indented one step further to the right for clarity of presentation. The indented key is the one most widely used in manuals for the identification of

vascular plants. In the indented key, each of the couplets is indented a fixed distance from the left margin of the page.

Bracketed or Bracket Key or Parallel Key:

A dichotomous key in which contrasting parts of a couplet are numbered and presented together, without intervening couplets, although the brackets joining each couplet are now omitted.

Example:

The plants used in the example are common genera of the family: Ranunculaceae, viz., Clematis, Anemone, Ranunculus, Aquilegia and Delphinium.

A. Indented Key:

Sepals usually 4; involucre none	*Clematis*
Sepals usually 5; involucre present	*Anemone*
Petals present	*Ranunculus*
Fruit a group of follicles; flowers spurred	
Flowers regular; spurs 5	*Aquilegia*
Flowes irregular; spur 1	*Delphinium*

The first choice, with in the above genera is between "Fruit a group of achenes; flowers not spurred" and "Fruit a group of follicles; flowers spurred", these paired statements being given the same indention.

If the latter choice is taken, the next choice, shown of the indention, is between "Flowers regular, spurs 5" and "Flowers irregular, spur '1'. Thus the plant in question has follicles and irregular flowers with a single spur, it must be a Delphinium.

B. Bracketed Key or Parallel Key:

In this the two couplets are always next to each other in consecutive lines on the page.

The same example of bracketed key is given below:

(i) Fruit a group of achenes; flowers unspurred (2)

(i) Fruit a group of follicles; flowers spurred .... (4)

(2) Petals absent.. (3)

(2) Petals present.................. Ranunculus

(3) Sepals usually 4; involucre absent.......... Clematis

(3) Sepals usually 5; involucre present......... Anemone

(4) Flowers regular; spurs 5................. Aquilagia

(4) Flowers irregular; spur 1 .... Delphinium

The number at the right end of a line in the bracket key indicates the next numbered pair of choices to be considered.

The keys use the most conspicuous and clear-cut characters, without special regard to those considered taxonomically the most important. For this reason the sequence of taxa is often quite artificial, and such keys are frequently termed artificial keys. Artificial key is an identification key based on convenient phenotypic characters and not indicating phylogenetic relationships.

Natural key is an identification key constructed from a natural classification and indicating the supposed evolutionary relationships of the group within the branching sequences of the key.
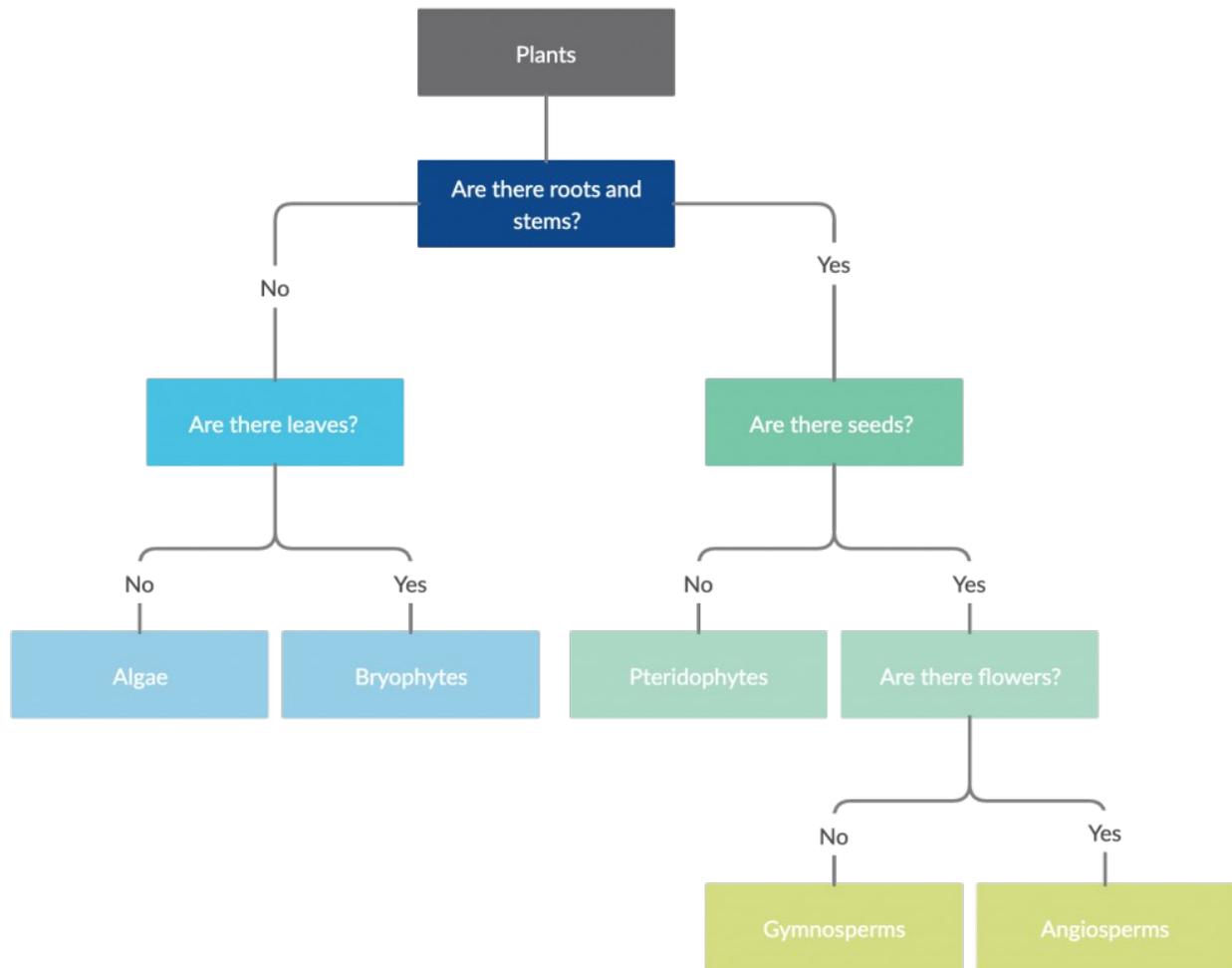
Multiple-access key/POLYCLAVE KEYS are tools used to help identify unknown objects or species. The keys are generated using interactive computer programs. Polyclave keys use a **process of elimination**. The user is presented with a series of choices that describe features of the species they wish to identify. The user then checks off a list of character states present in the organism they wish to study. The program looks to match those character states with all the species they can possibly match. If a species does not have that character state it is eliminated from the list. The more character states listed the more species that are eliminated. This allows the rapid elimination of large numbers of species that the specimen cannot be. The process continues until only one species (or a short list of species) remains. This allows the user to eliminate lots of potential species and identify the species or at least a short list of possible species. This continues until only one species is left. If all went well, *and the key fits your group of organisms*, that is the name of the species you have located! Even the best keys have their limitations, so make sure you verify your identification using multiple tools (image verification, herbarium specimens, expert identification, etc.).

Example polyclave keys:

Advantages/Disadvantages
 The **advantages** of a polyclave (multiple-access) key are:
> 1.easy to use;
> 2.multi-entry - meaning 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;

3.order-free - meaning the user can work in any direction with any character;

4.faster (*sometimes*); and

5.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.

Disadvantages of polyclave keys include: (a) few keys are currently available; and (b) requires a computer be handy when you are making your identification (which is no problem in a lab but may be unwieldy to use in the field).