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REVIEW OF SIMPLIFIED TECHNIQUES FOR TAXONOMIC STUDIES OF PLANTS

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Abstract

A plant is a complex of integrated systems (leaves, leaf groups, stems, roots, inflorescences), coexisting side by side or superimposed on each other to produce the life form (or physiognomy) of the individual. The classic Raunkiaer classification based fundamentally on one character (apex position) is insufficient for the purpose of a functional classification. the plant silhouette or general shaperesulting from a combination of other systems, with 11 categories proposed. the leaf group, with 14 categories. the stem, with 27 categories. the root, with 5 categories and the inflorescence, with 3 categories. Each plant can be named according to the category or model of each of the five different systems that they most resemble, or by using only the name(s) of systems which are more conspicuous than others. Characters are selected primarily for their influence on form and secondarily on size. This scheme allows for detailed studies of a flora in terms of morphological characteristics (alone or in systems), expressed as frequency of occurrence of each character in the flora. Characters can be analysed separately. as a combination of characters (e.g. leaf groups) or as a combination of systems (e.g. rosettes without stems). Thus correlations between environmental variables and plants can be made with more precision than in previous classification schemes. The classification also serves as the framework for including additional morphological data and incorporating new models.

Introduction

The exact definition of taxonomy varies from source to source, but the core of the discipline remains. the conception, naming, and classification of groups of organisms.[1] As points of reference, recent definitions of taxonomy are presented.Theory and practice of grouping individuals into species, arranging species into larger groups, and giving those groups names, thus producing a classification[2] A field of science (and major component of systematics) that encompasses description, identification, nomenclature, and classification[3] The science of classification, in biology the arrangement of organisms into a classification[4]"The science of classification as applied to living organisms, including study of means of formation of species, etc."[5]"The analysis of an organism's characteristics for the purpose of classification"[6]"[Systematics] studies phylogeny to provide a pattern that can be translated into the classification and names of the more inclusive field of taxonomy" (listed as a desirable but unusual definition)[7] The varied definitions either place taxonomy as a sub-area of systematics (definition 2), invert that relationship (definition 6), or appear to consider the two terms synonymous. There is some disagreement as to whether biological nomenclature is considered a part of taxonomy (definitions 1 and 2), or a part of systematics outside taxonomy.[8] For example, definition 6 is paired with the following definition of systematics that places nomenclature outside taxonomy:[6]*Systematics*: "The study of the identification, taxonomy and nomenclature of organisms, including the classification of living things with regard to their natural relationships and the study of variation and the evolution of taxa". A whole set of terms including taxonomy, systematic biology, systematics, biosystematics, scientific classification, biological classification, and phylogenetics have at times had overlapping meanings – sometimes the same, sometimes slightly different, but always related and intersecting.[1][9] The broadest meaning of "taxonomy" is used here. The term itself was introduced in 1813 by de Candolle, in his *Théorie élémentaire de la botanique*.[10]

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Plant taxonomy is concerning grouping plants. the first goal of a plant taxonomer is to undertake and summarize the variation within the plant world and specific it during a manner that reflects the phyletic relationships among the varied taxa discovered. allow us to consider the last sentence in additional detail. Taxonomists would really like to incorporate all aspects of a plant's variation in their issues however, in follow, most target a specific set of characters. Those involved with munition and identification square measure apt to fret the variation in morphological and ecological characters; those concerned in plant breeding can usually concentrate on body numbers, sizes, and shape. those involved most with evolution presently concentrate on variation in sequence. that's as a result of most of the well-liked ways of numerical phyletic analysis aren't similar temperament to examination of morphological characters.

Subspeciftc Taxonomy

Another method used by taxonomists to deal with the variation within species is the use of "infraspecific" or "subspecific" taxonomy. Many species are not uniform in appearance throughout their distribution, a by assigning subspecies and varietal names to the identifiable populations scientists are able to catalogue and name this variation. Populations that are approaching species status are typically categorized as subspecies (often written as "ssp." or "subsp."), especially when these forms have discrete geographic distributions. F example, in the species Salix reticulata (net-leaved willow) individuals occurring throughout the mountain ranges of the interior of the provin with hairy capsules and a strong net-like pattern of venation on the leaves are named S. reticulate ssp.reticulata, while the populations on the Queen Charlotte lslands that have hairless capsules and a weaker net-like venation pattern on the leaves are known as S. reticulata ssp.glabeilicarpa. These two subspecies have different geographic ranges and represent evolutionary lines that are fairly well defined, but are similar enough to be classed within the same species.

What is Aspecies

At the lowest level of the classification hierarchy is the “species”, a human-derived concept that, to this day, is still not completely understood by scientists. The general consensus in past decades has been that a “species” is a group of similar individuals which can reproduce successfully with each other while at the same time being reproductively isolated from other similar species (known as the “Biological Species Concept”). This interpretation worked reasonably well when it was first proposed, but the more we learn about ecological systems the more apparent it becomes that nature is by no means so simple. The evolutionary process is a continuum whereby a portion of the population of one entity gradually becomes more and more distinctive and discrete, eventually reaching a state in which it is reproductively isolated from its parent “species.” The infinite range of variation between the two ends of this evolutionary process means that many populations are difficult to assign to either a parent species or a new, independentspecies.

A newer species concept, known as the “Phylogenetic Species Concept”, attempts to give speciiic status to any identifiable populations that have a unique evolutionary history and differ collectively in some characteristics from other populations. This system, which places more weight on the evolutionary process and genetic differences between populations, naturally results in a far greater number of recognizable species than the more conservative Biological Species Concept. In truth, however, neither of these widely accepted concepts appears to fully represent the extraordinary complexities of the natural world, and perhaps the most effective current method of species classification is a combination of both systems.

How Do We Classify Plants

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Plants, and indeed all organisms, are classified in a hierarchical system that attempts to illustrate the evolutionary relationships between the various groupings within the hierarchy. This concept of related ness forms the back bone of modern classrfication schemes. Scientists who attempt to Classify organisms and place them Within an evolutionary framework are called Taxonomists, the most famous of which would be Linnaeus himself. At the broadest level, all organisms on the planet are classified into 5 Kingdoms: Animaiia (animals), Plantae (plants, some

multicellular algae), Emmi (fungi). Monet; (prokaryotic bacteria), and ' rotista (eukaryotic bacteria, most algae, etc.), representing the most ancient branches of the evolutionary tree of life."Organismsinany given Kingdom may be separated from organisms in any other Kingdom by many hundreds of millions, if not billions, of years of evolution. Historically, all organisms known were grouped into only two Kingdoms organisms that had finite growth, moved, and ate were grouped into the Kingdom Animalia, while organisms that had indefinite growth, didn't move, and didn't eat were grouped into the Kingdom Plantae. of course, as science progressed, it became increasingly evident that such a simplistic approach to taxonomy was ineffective and many species werefound that did not fit either grouping particularly well. The proposal to move to an eight-Kingdom system suggests that our current classification system. With its five Kingdoms, may yet change again as our understanding of the diversny of organisms around us continues to grow. Within each Kingdom, the organisms are grouped into several Phyla (Sing. Phylum), also known as Divisions, which represent smaller groupings of more recognizable forms. Although the Kingdom Animalia contains a large number of Phyla (such as chordates [including vertebrates], echinoderms, annelids, arthropods, etc.), Kingdom Plantae contains only ten. The Phylum Bmoghiaa (mosses, liverworts, hornworts), the most primitive of all true plants, differs from other plant Phyla in that it is non-vascular, meaning that it lacks water-conducting tissues which bring water from the roots of the plant up into the crown, and that the gametophyte (vegetative) generation predominates over the sporophyte (reproductive) generation.

Alpha and beta taxonomy

The term "**alpha taxonomy**" is primarily used today to refer to the discipline of finding, describing, and naming taxa, particularly species.[11] In earlier literature, the term had a different meaning, referring to morphological taxonomy, and the products of research through the end of the 19th century.[12]William Bertram Turrill introduced the term "alpha taxonomy" in a series of papers published in 1935 and 1937 in which he discussed the philosophy and possible future directions of the discipline of taxonomy.[13] there is an increasing desire amongst taxonomists to consider their problems from wider view-points, to investigate the possibilities of closer co-operation with their cytological, ecological and genetical colleagues and to acknowledge that some revision or expansion, perhaps of a drastic nature, of their aims and methods may be desirable … Turrill (1935) has suggested that while accepting the older invaluable taxonomy, based on structure, and conveniently designated "alpha", it is possible to glimpse a far-distant taxonomy built up on as wide a basis of morphological and physiological facts as possible, and one in which "place is found for all observational and experimental data relating, even if indirectly, to the constitution, subdivision, origin and behaviour of species and other taxonomic groups". Ideals can, it may be said, never be completely realized. They have, however, a great value of acting as permanent stimulants, and if we have some, even vague, ideal of an "omega" taxonomy we may progress a little way down the Greek alphabet. Some of us please ourselves by thinking we are now groping in a "beta" taxonomy.[13]

Turrill thus explicitly excludes from alpha taxonomy various areas of study that he includes within taxonomy as a whole, such as ecology, physiology, genetics, and cytology. He further excludes phylogenetic reconstruction from alpha taxonomy (pages 365–366).

Later authors have used the term in a different sense, to mean the delimitation of species (not subspecies or taxa of other ranks), using whatever investigative techniques are available, and including sophisticated computational or laboratory techniques.[14][11] Thus, Ernst Mayr in 1968 defined **beta taxonomy** as the classification of ranks higher than species.[15] An understanding of the biological meaning of variation and of the evolutionary origin of groups of related species is even more important for the second stage of taxonomic activity, the sorting of species into groups

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of relatives ("taxa") and their arrangement in a hierarchy of higher categories. This activity is what the term classification denotes; it is also referred to as **beta taxonomy**.

Microtaxonomy and macrotaxonomy

How species should be defined in a particular group of organisms gives rise to practical and theoretical problems that are referred to as the species problem. The scientific work of deciding how to define species has been called microtaxonom[11] By extension, macrotaxonomy is the study of groups at higher taxonomic ranks, from subgenus and above only, than species.

Conclusions

A brief review of some of the techniques used for the seismic safety evaluation was presented. It is unlikely that a single methodology can be produced which fulfils all of the requirements. cytology, anatomy, embryology, physiology, palynology, phenology, biochemistry and genetics etc. have been found to be useful in solving some of the taxonomic problem. Earlier workers have placed the genera Agave (superior ovary) and Yucca (inferior ovary) under separate families, Amaryllidaceae and Liliaceae respectively. In Ranuncaceae, chromosome number and their morphology have provided basis for more natural arrangement of genera and tribes. Takhtajan (1987) recognized a separate family Biebersteniaceae for Geraniaceae.

The major sub- divisions of the family Gramineae (Panicaceae and Poaoceae) also show variation in chromosomes number. Wijng Betalins are nitrogen containing red and yellow Pigments. They are quite different from anthocyanim which Is With types of pigments do not occur together. Beiahns are of two kinds ed to violet betacyanins an yellow coloured betaxanthins. Cactaceae was often placed in the order of its own it the Cactales or Opuntialea. Alkaloids are a heterogeneous group of organic nitrogen mmpoms. The morphological studies in the labora consisted of identification and naming of the taxa . The number of glumes present in the Agrostidean spikelet is two and this number is constant as a rule. The glumes the species can be grouped on the basis of Glumes equal in size , Glumes unequal in size, Number of nerves, Presence or absence of awn..

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