Species Richness:

- Measuring species richness is an essential objective for many community ecologists and conservation biologists. The number of species in a local assemblage is an intuitive and natural index of community structure, and patterns of species richness have been measured at both small and large spatial scales.

- **Species richness** (i.e., the number of species) is the simplest, most intuitive and most frequently used measure for characterizing the diversity of an assemblage.

- **Species richness** possesses intuitive mathematical properties, and features prominently in foundational models of community ecology. In biogeographic studies, **species range maps and local and regional floras and faunas generally provide only species presence-absence information for each locality.** For these studies, species richness thus becomes the only measure that can be used to quantify diversity.

- Even when species abundances are in conservation analyses the actual species count in an area is often the most relevant diversity measure. Available.

- Generally,
- there are two approaches **(an asymptotic approach** via species richness estimation and a **non-asymptotic approach** via rarefaction and extrapolation) to infer species richness and make fair comparisons among multiple assemblages based onpossibly unequal-sampling effort and incomplete samples that miss many species.

- First, the asymptotic approach aims to estimate the asymptote of a species accumulation curve. Then the estimated asymptote is used as a species richness estimate which can be compared across assemblages.
- This approach is based on statistical sampling-theory methods of estimating species richness. Both parametric and nonparametric sampling-theory-based estimation methods are reviewed. We focus on the nonparametric estimators which are universally valid for all species abundance distributions.

- **Species richness estimation** based on sampling data has a long history in various disciplines. In general contexts, “species” can be defined in a broad sense: they may be biological species, individuals of a target population, patients/cases in epidemiology and medical sciences, bugs in software programs, words in a book, genes or alleles in genetic code, or other discrete entities.
- Thus, the topic of species richness estimation and comparison has had a wide range of applications not only in biological sciences but also in many other disciplines.

Second, the non-asymptotic approach aims to compare species richness estimates for equally-large or equally-complete samples. It compares the estimated species richness of standardized samples with a common finite sample size or sample completeness.

Nomenclature

- **Nomenclature** is a system of names or terms, or the rules for forming these terms in a particular field of arts or sciences .The principal of naming vary from the relatively informal conventions of everyday speech to the internationally agreed principles, rules and recommendations that govern the formation and use of the specialist terms used in scientific and any other disciplines.

- Naming "things" is a part of general human communication using words and language: it is an aspect of everyday taxonomy as people distinguish the objects of their experience, together with their similarities and differences, which observers identify, name and classify. The use of names, as the many different kinds of nouns embedded in different languages, connects nomenclature to theoretical linguistics, while the way humans mentally structure the world in relation to word meanings and experience relates to the philosophy of language.

- Onomastics, the study of proper names and their origins, includes anthroponymy (concerned with human names, including personal names, surnames and nicknames); toponymy (the study of place names) and etymology (the derivation, history and use of names) as revealed through comparative and descriptive linguistics.

- The scientific need for simple, stable and internationally accepted systems for naming objects of the natural world has generated many formal nomenclatural systems. Probably the best known of these nomenclatural systems are the five codes of biological nomenclature that govern the Latinized scientific names of organisms.

- Modern scientific taxonomy has been described as "*basically a Renaissance codification of folk taxonomic principles.*"[Formal scientific nomenclatural and classification systems are exemplified by biological classification. All classification systems are established for a purpose.

- The scientific classification system anchors each organism within the nested hierarchy of internationally accepted classification categories. Maintenance of this system involves formal rules of nomenclature and periodic international meetings of review. This modern system evolved from the folk taxonomy of pre-history.[

- Folk taxonomy can be illustrated through the Western tradition of horticulture and gardening. Unlike scientific taxonomy, folk taxonomies serve many purposes. Examples in horticulture would be the grouping of plants, and naming of these groups,

- according to their properties and uses: annuals, biennials and perennials (nature of life cycle); vegetables, fruits, culinary herbs and spices (culinary use); herbs, trees and shrubs (growth habit); wild and cultivated plants (whether they are managed or not), and weeds (whether they are considered to be a nuisance or not) and so on.

- Folk taxonomy is generally associated with the way rural or indigenous peoples use language to make sense of and organise the objects around them. Ethnobiology frames this interpretation through either "utilitarianists" like Bronislaw Malinowski who maintain that names and classifications reflect mainly material concerns, and "intellectualists" like Claude Lévi-Strauss who hold that they spring from innate mental processes.[

- The literature of ethnobiological classifications was reviewed in 2006.[Folk classification is defined by the way in which members of a language community name and categorize plants and animals whereas ethnotaxonomy refers to the hierarchical structure, organic content, and cultural function of biological classification that ethnobiologists find in every society around the world.[

- Ethnographic studies of the naming and classification of animals and plants in non-Western societies have revealed some general principles that indicate pre-scientific man’s conceptual and linguistic method of organising the biological world in a hierarchical way.Such studies indicate that the urge to classify is a basic human instinct.[

- in all languages natural groups of organisms are distinguished (present-day taxa)
- these groups are arranged into more inclusive groups or ethnobiological categories
- in all languages there are about five or six ethnobiological categories of graded inclusiveness
- these groups (ethnobiological categories) are arranged hierarchically, generally into mutually exclusive ranks

- rarely used in folk taxonomies but loosely equivalent tothe ranks at which particular organisms are named and classified is often similar in different cultures
- The levels are — moving from the most to least inclusive:
- level 1 - "unique beginner" ---e.g. *plant* or *animal*. A single all-inclusive name an original living thing, a "common ancestor"

- level 2 - “life form” ---------------e.g. *tree*, *bird*, *grass* and *fish* These are usually primary lexemes (basic linguistic units) loosely equivalent to a phylum or major biological division.
- level 3 - "generic name" ------e.g. *oak*, *pine*, *robin*, *catfish* This is the most numerous and basic building block of all folk taxonomies, the most frequently referred to, the most important psychologically, and among the first learned by children.

- These names can usually be associated directly with a second level group. Like life-form names these are primary lexemes.
- level 4 - "specific name" -------e.g. *white fir*, *post oak* More or less equivalent to species. A secondary lexeme and generally less frequent than generic names.
- level 5 - "varietal name"--------e.g. *baby lima bean*, *butter lima bean*.

- In almost all cultures objects are named using one or two words equivalent to "kind" (genus) and "particular kind" (species).[10] When made up of two words (a binomial) the name usually consists of a noun (like *salt*, *dog* or *star*) and an adjectival second word that helps describe the first, and therefore makes the name, as a whole, more "specific", for example, *lap dog*, *sea salt*, or *film star*.

- The meaning of the noun used for a common name may have been lost or forgotten (*whelk*, *elm*, *lion*, *shark*, *pig*) but when the common name is extended to two or more words much more is conveyed about the organism's use, appearance or other special properties (*sting ray*, *poison apple*, *giant stinking hogweed*, *hammerhead shark*).

- These noun-adjective binomials are just like our own names with a family or surname like *Simpson* and another adjectival Christian or forename name that specifies which Simpson, say *Homer Simpson*. It seems reasonable to assume that the form of scientific names we call binomial nomenclature is derived from this simple and practical way of constructing common names - but with the use of Latin as a universal language.

- **Nomenclature, classification and identification[]**

Taxonomy (biology) and Identification (biology)

- In biological science, at least, nomenclature is regarded as a part of (though distinct from) taxonomy. Taxonomy can be defined as the study of classification including its principles, procedures and rules,[while classification itself is the ordering of taxa (the objects of classification) into groups based on similarities or differences.[

- Doing taxonomy entails identifying, describing] and naming taxa,[so nomenclature, in this strict scientific sense, is that branch of taxonomy concerned with the application of scientific names to taxa, based on a particular classification scheme and in accordance with agreed international rules and conventions.

- Identification determines whether a particular organism matches a taxon that has already been classified and named – so classification must precede identification.This procedure is sometimes referred to as "determination".[
- The precision demanded by science in the accurate naming of objects in the natural world has resulted in a variety of international nomenclatural codes.

Although nnaeus' Li system of binomial nomenclature was rapidly adopted after the publication of his Species Plantarum and Systema Naturae in 1753 and 1758 respectively, it was a long time before there was international consensus concerning the more general rules governing biological nomenclature. The first botanical code was produced in 1905, the zoological code in 1889 and cultivated plant code in 1953. Agreement on the nomenclature and symbols for genes emerged in 1979.

QUESTIONS