Biodiversity: variety/complexity of organisms in a defined area (e.g., at genetic, species, and community level). This can include the patterns of insects diversity and the processes that generated the pattern. Diversity has been defined quantitatively in a variety of ways; many commonly used formulas or metrics include several components (e.g., Shannon-Weaver diversity index)

Species richness: the number of species per unit individuals is called species richness.

Relative abundance: distribution and relative densities of the species in an area. As species are added, diversity increases, are species become more evenly distributed diversity increases; often in a low diversity situation one or more species will be dominant.

The number of described species (all organisms) is estimated at ca 1.75 million which is thought to be only about 1% of all species. About one half of described species are insects. Almost 40% of described insect species are Coleopteran. Hymenoptera, Diptera, Lepidoptera, and Hemiptera and the other insect orders with a relatively large number of described species, the total number of insect species has been estimated to range between 2-30 million. Many recent publications estimate the number around 5 million insect species. Insect and plant diversity tends to change in responses to many different gradients in time and space e.g., Time: plant succession; Spatial heterogeneity; complexity of habitats and micro environment; Climate stability; Complexity of food webs (competition/predation/productivity); Size/stability of habitat area.

Insects vary greatly in size and morphology which partially enables them to fit into many habitat niches. The length of some of the largest extant insects range from 80-310mm (e.g., some dragonflies (Aeshnidae), walking sticks (Phasmida) dobsonflies (Corydalidae), Hercules beetle (Scarabaedae). The largest known extinct insect was a large dragonfly-like insect *Meganeuropis permiana* Carpenter (wing span up to 750mm, ca 28 inches)

Smallest insect example includes some springtails (Neelidae, 0.27mm) that include fairyflies (Mymaridae <<0.05mm), and Trichogrammatidae (0.18mm)

Biodiversity issues often coupled with conversation efforts, the endangerment and extinction of insect species is a real phenomenon in the world today and is one of the factors that has led to a renewed effort to catalogue and preserve the fauna and flora of the world

The extinction of insects species can be attributed to a variety of factors

1. Unsustainable collecting or harvesting of specific desirable species
2. Habitat destruction and fragmentation
3. Impact of introduced/invasive species
4. Chains of extinctions
5. Side effects of pesticide programs
6. Combination of factors (including possible future effects of climate change)

Bioinformatics: solving problems arising from biology using methodology from computer science. The term bioinformatics is often applied to issues in molecular biology related to gene sequences, structure, and function.

Problem areas, examples: genome and physical maps, protein docking, sequence alignments, metabolic pathways, protein design, structure prediction, models of evolution. Computational techniques, example: representation & visualization of biological knowledge database design for biological resources, data mining, pattern searching & discovery, phylogenetic trees/clustering

Biodiversity informatics: Combination of taxonomy and computer science. Use of computer technology to catalogue species and species distributions, develop interpretative systems to bring together data from sources around the world, develop ways to facilitate taxonomy information exchange, develop better ways to deal with different classifications of the same groups of organisms

Many websites now make available what is known about specific taxa and pertain to biodiversity in some way