

All solved grand quiz of bt201 5 july 2020 by Farina

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REPRODUCTION

Sexes are usually separate with gonads occurring in each segment. Some species have gonad specific segments. Breeding is usually seasonal (spring or fall). As gametes mature they fill the coelom and are released by the nephridia. Fertilization can be internal or external. Trochophore larvae develop, which are remarkably similar to the Molluscs

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At that time the accepted criterion for completion of a genome sequence, namely that only a few gaps or gaps of known size remained to be sequenced and that the error rate was below 1 in 10 000 bp, had not been met by far. The euchromatin part of the genome was not completed until mid-2004, although that milestone was again considered by some to be only the end of the beginning (stein 2004). Nevertheless, the human genome project can be regarded as one of the most successful scientific endeavours in history and the assembly of the 3.12 billion bp of DNA, requiring some 500 million trillion

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Urban ecology

For ecologists, urban ecology is the study of ecology in urban areas, specifically the relationships, interactions, types and numbers of species found in urban habitats. Also, the design of sustainable cities, urban design programs that incorporate political, infrastructure and economic considerations.

Conservation Biology

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List of complete and published genomes (not including viruses) by June 2005

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		H
Animals: total	16	
Eukarya: total	47	
Total	279	

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Possibility for genetic manipulation

- Foreign DNA can be introduced using transposons; for example, modified p-elements that can 'jump' into the DNA of drosophila, or bacteria such as agrobacterium tumefaciens that can transfer a piece of DNA to a host plant. DNA can also be introduced by physical means, especially in cell cultures, using electroporation, microinjection, or bombardment with gold particles. Another popular approach is root

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phylum Echinodermata

Brittle star, also called **serpent star**, any of the 2,100 living **species** of marine invertebrates constituting the subclass **Ophiuroidea** (**phylum** Echinodermata). Their long, thin arms—usually five and often forked and spiny—are distinctly set off from the small disk-shaped body.

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- **Ex situ:**

Conserving species in isolation of their natural habitat E.g. zoos, botanical gardens, seed banks

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of space (merges with atmosphere, lithosphere, hydrosphere...).

Biome: Large scale areas of similar vegetation and climatic characteristics.

~~Ecosystem: Set of organisms and abiotic components connected by the~~

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Cladistics groups organisms by common descent

A **clade** is a group of species that includes an ancestral species and all its descendants

A valid clade is **monophyletic**, signifying that it consists of the ancestor species and all its

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Species diversity

A combination of the number of species and their relative abundance defines species diversity.

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Consequences of deforestation

The consequences of deforestation are

- Increase in the temperature and pollution level on the earth.
- Increase in the level of carbon dioxide in the atmosphere leading to gl

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- Lowering of ground water level.
- Disturbs the balance in nature.
- Decrease in rainfall leading to draught.
- Soil erosion and decrease in soil fertility leading to desertification.
- Decrease in the water holding capacity of soil leading to floods

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- Fitness: contribution of an individual's genotype to the next generation

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Map shows the spatial distribution of mammal species richness in North and South America. The highest number of mammal species, 179-228 per square kilometer, occurs in the Amazon region of South America. Species richness is generally highest in tropical latitudes, and then decreases to the north and south, with zero species in the Arctic regions.

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1. Notochord

The notochord is a flexible, rod-like structure derived from mesoderm. It appears in an embryo. Place for muscle attachment. In vertebrates, the notochord is replaced by the vertebral column. Remains of the notochord may persist between the vertebrae.

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Vestigial Structures

- **Features that have no apparent function**
 - Typically have an important function in related spp.
 - Ex: Hindlimb joints in whales and snakes
 - In humans Wisdom teeth, Tail bone, Appendix are vestigial structures.

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Protozoan Characteristics

- ✓ No cell wall
- ✓ Free-living or parasitic
- ✓ Consumers
- ✓ Habitat – aquatic (ponds, lakes, oceans)
- ✓ Examples: amoeba, paramecium, **dinoflagellates**

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Showing results for *cyanobacteria introduced* significant amount of v
into atmosphere

Search instead for cyanobacteria intorduced significant amount of which gas into atmos

oxygen

The answer is tiny organisms known as cyanobacteria, or blue-green algae.

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A polyphyletic grouping consists of various species that lack a common ancestor

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bilateral symmetry

Although adult **echinoderms** possess pentaradial, or five-sided, **symmetry**, **echinoderm larvae** are ciliated, free-swimming organisms that organize in bilateral **symmetry** which makes them look like embryonic chordates.

en.wikipedia.org › wiki › Echinoderm ▼

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Flora and fauna

Flora are the plants found in a particular area.

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awkward ones

- such as saccharomics (the study of all the carbohydrates in the cell) and

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ongoing genome sequencing projects.

List of complete and published genomes (not including viruses) by June 2005

Taxonomic group	No. of genomes	Remarks on species
Bacteria total	211	Many common laboratory models and pathogens
Archaea total	21	Several methanogens and extremophiles
Eukarya*		
Myxomycota	1	Dictyostelium discoideum (slime mould)
Entamoeba	1	Entamoeba histolytica (amoeba causing dysentery)
Apicomplexa	6	Four Plasmodium and two Microsporidium species

Taxonomic group	No. of genomes	Remarks on species
Kinetoplastida	2	Trypanosoma brucei, Leishmania tropica (parasites)
Cryptomonadina	1	Guillardia theta (flagellated unicellular alga)
Bacillariophyta	1	Thalassiosira pseudonana (marine diatom)
Rhodophyta	1	Cyanidioschyzon merolae (small unicellular red alga)
		Chlamydomonas reinhardtii (green alga), Populus trichocarpa
Plants	4	(black cottonwood), Arabidopsis thaliana (thale cress),
		Oryza sativa var. japonica, var. indica (rice)

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ongoing genome sequencing projects.

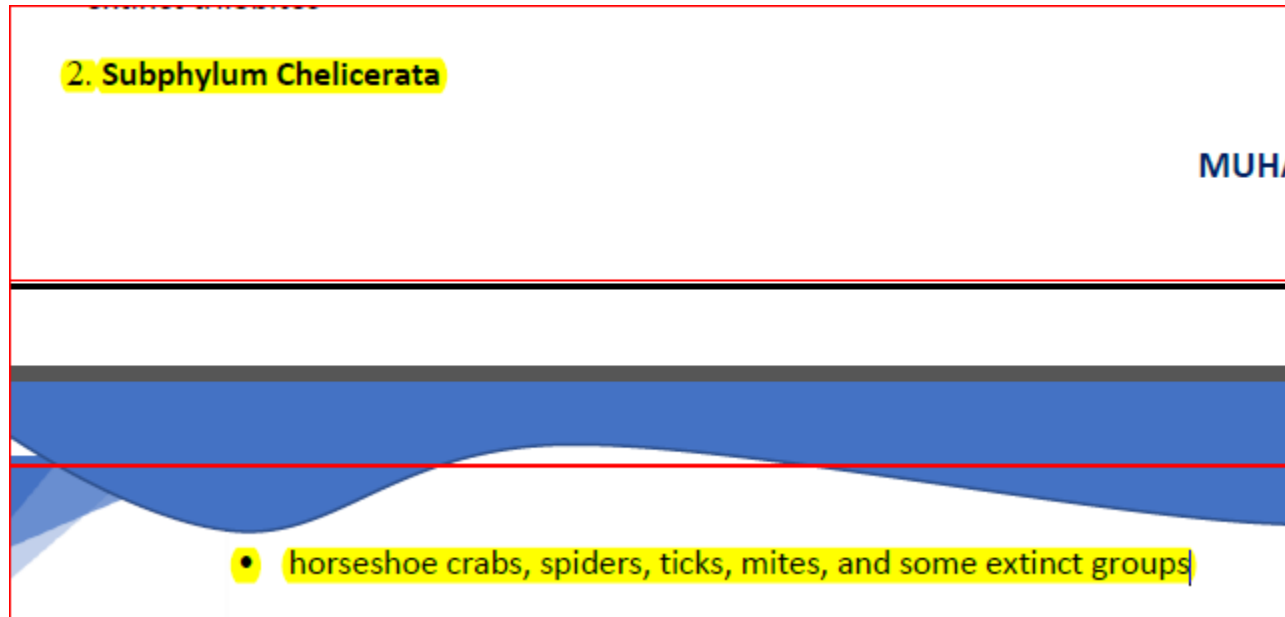
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- Molecular systematics uses DNA and other molecular data to determine evolutionary relationships

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Ecosystem: Set of organisms and abiotic components connected by the exchange of matter and energy (forest, lake, coastal ocean). Or, "the smallest units that can sustain life in isolation from all but atmospheric surroundings."

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The study of transcriptomes is part of functional genomics, because it does not look at the DNA as such, but at its functions.

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chapter will deal with the ecological genomics of microorganisms.

Different ecological communities can be pretty different in terms of the types and numbers of species they contain. For instance, some arctic communities include just a few species, while some tropical rainforest communities have huge numbers of species packed into each cubic meter.

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- ✓ Some species are cursorial predators
- ✓ stalk and ambush their prey
- ✓ they usually have well-developed eyes
- ✓ Some are web-building spiders
- ✓ Eyes not as well developed
- ✓ sensory hairs for detecting vibrations
- ✓ Many spiders (and mites) producing silk
- ✓ trapping Used for prey, building nests, forming egg cases
- ✓ silk glands that open to the exterior part of the abdomen through spinnerets
- ✓ Many species have evolved poison glands associated with the **chelicerae**
- ✓ Spider venom is used to subdue prey
- ✓ Venom liquifies tissues with a digestive fluid
- ✓ Spider sucks up soupy prey

• Spiders: Class Araneae

- Spider love: Spiders, like most arthropods, are dioecious: Mating habits
- Pheromones- chemicals that elicit behavioral change: Rituals- males pluck female's web specific)
- Male builds small web, deposits sperm: Collects sperm in cavities of pedipalps
- Pedipalps have ejaculatory duct + embolus: inserts pedipalps into female genital opening
Carried, attach to web, bury.
- Wolf spider parental care- after the eggs hatch, the young ride on mom for several days.
- Young spiders disperse by silk lines (**ballooning**)

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Mass spectrometry may also be used to determine the amino acid sequence of a protein.

For this application, the protein is cleaved with a protease, for example trypsin, which generates a collection of fragments characteristic of the protein.

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ongoing genome sequencing projects.

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Endemic species are those species of plants and animals found only in a particular area and not found anywhere else.

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Echinoderms Skeleton

Have an internal skeleton of calcium carbonate. Ossicles vary in size and structure and are manufactured by specialized cells

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Phanerozoic

Yet the Phanerozoic, consisting of

- Paleozoic,
- Mesozoic,
- Cenozoic eras,

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Designed for flying

- Ornithologist – zoologists that study birds

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Genetic diversity, means that the population contains most of the possible alleles for each particular gene locus. Provides a mechanism for populations to adapt to their changing environment. The more variation, the better the chance that at least some of the individuals will have an allelic variant that is suited for the new environment, and will produce offspring with the variant that will in turn reproduce and continue the

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Different individuals carry different genetic information. The sum of the variation of an interbreeding population is called **Gene pool**

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Transcriptomics is the study of all the transcripts that are present at any time in the cell.

In principle the transcriptome includes messenger RNAs (mRNAs) in addition to ribosomal RNAs (rRNAs), transfer RNAs (tRNAs), and small nuclear RNAs (snRNAs), but transcriptomics is usually limited to mRNA, the template for translation into protein.

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Order Chelonia

Turtles and tortoises

Shell consists of fused bony plates: Carapace (dorsal, top) and Plastron (ventral, lower).

Earliest fossils dated to 200 m.Y.A. 250 species worldwide, Variety of habitats, Most speci

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them in a different sequence during human evolution.

Origin of Homo sapiens: *Australopithecus afarensis* = first bipedal hominid, found in east Africa about 3.0-3.2 MYBP. Later forms became more slender (= "gracile"). Homo habilis and H. erectus (~1.5mybp) came later.

~~The evolution of bipedalism may have freed the hands for use in other functions, carrying tools. The~~

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Designed for flying

- Ornithologist – zoologists that study birds

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The following characteristics equip birds for flying:

- Compact, lightweight, and very strong skeleton
- Lightweight beaks and skulls.
- A nearly rigid backbone that gives a solid support for the strenuous movements of flight.
- Hollow spaces in the skeleton that provide room for air sacs and make the bird lighter.
- Bipedal ("two-footed") anatomy, which leaves the wings free for flight.
- A prominent ridge, or keel, on the breastbone to allow for the attachment of powerful flight muscles.
- Three bones in the shoulder to support each wing.
- An efficient circulatory system, including a four-chambered heart.
- Powerful muscles to power the wings during flight.
- Three toes pointing forward and one toe pointing backward.
- Leg has a special design that allows the bird to stay on their feet.

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The laborious edman degradation technique has now been replaced mostly by sequencing using mass spectrometry, in which masses are estimated for peptides generated from proteolytic digests of the protein, while the fragment pattern obtained is compared with entries in a database that include sizes

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Habitat destruction is a major cause for biodiversity

abitat loss is caused by deforestation, overpopulation, pollution and global warming. Species that are physically large and those living in forests or oceans are more affected by habitat loss.

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The first hereditary information

- RNA was probably the first hereditary molecule having the ability to copy itself
- RNA shows enzymic (catalytic) properties – called ribozymes
- Polynucleotides are very good molecules at storing and transmitting information but they lack the versatility for all the chemical functions of a cell.

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KuDZu , an Example of invasive species

Kudzu is one dramatic example of what can happen when a species gets introduced into a new ecosystem where it has abundant resources and few predators. The kudzu plant was introduced to the united states

MUHAMMAD IMRAN

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from asia in the late 1800s as an ornamental plant, and it and was planted widely in the south in the early

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Habitat loss is caused by deforestation, overpopulation, pollution and global warming. Species which are physically large and those living in forests or oceans are more affected by habitat reduction. Some expert's estimate that around 30% of all species on earth will be extinct by 2050. According to the International Union for Conservation of Nature (IUCN), globally about one third of all known species are threatened with extinction. Even it is estimated that 25% of all mammals will be extinct within 20 years.

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The puffer fish, takifugu rubripes, was indeed chosen because of its relatively small genome (one-eighth of the human genome).

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29 Plant biodiversity

Gymnosperm- naked seeds,

Angiosperms- flowering plants

Plant biodiversity, vital to ecosystems, food crops, and

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24 Phylum Arthropoda

- ✓ jointed foot"
- ✓ Largest phylum
- ✓ 900,000 species
- ✓ 75% of all known species

Insects, spiders, crustaceans, millipedes, scorpions, ticks, etc

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Conservation of forest and wildlife

- Forest and wildlife can be conserved by setting up areas like Biosphere reserves Wildlife sanctuaries, National parks, etc.

Biosphere reserves: - are large areas of protected land for conservation of biodiversity and the traditional life of the tribals living there.

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25 Phylum Annelida

Class Polychaeta • Class Clitellata

Phylum Annelida Annelid Characteristics

Defining Characteristics

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Heterozygosity

- In an individual organism, is the state of possessing different alleles at a given locus in regard to a given character,

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- Systematists use fossil, molecular, and genetic data to

Phylogenies show evolutionary relationships

Taxonomy is the ordered division and naming of organisms

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100 species

See text. **Siboglinidae** is a family of polychaete annelid worms whose members made up the former phyla Pogonophora (the giant tube worms) and Vestimentifera. They are composed of about 100 **species** of vermiform creatures and live in thin tubes buried in sediments at ocean depths from 100 to 10,000 m (300 to 32,800 ft).

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From gene product to gene

In some cases the primary structure of a gene product (a protein) may be the starting point of gene discovery. This holds especially for proteins that can be isolated relatively easily by some marker or bioassay, or proteins that are highly induced by some experimental treatment. As an example we discuss the **isolation** of the metallothionein (mt) gene in a species of springtail, orchesella sancta (hens Bergen et al. 1999). Attempts to pick up the gene by polymerase chain reaction (PCR) using primers from the then-known drosophila mt sequence remained unsuccessful.

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The frequency of disturbances, or disruptive events.

The frequency of disruptive events (including storms, wildfires, and landslides) can affect the structure of a community. The intermediate disturbance hypothesis suggests that communities with a medium (intermediate) level of disturbance may have greater species diversity than communities with very frequent or very rare disturbances.

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Evidence for Eukaryotes

Prokaryotic cells are mostly rather simple spherical or platelike structures. Eukaryotic cells are large much more complex have a well-defined, membrane-bounded cell nucleus, which is lacking in prokaryotes have several internal structures called organelles such as plastids and mitochondria their organizational complexity is much greater than it is for prokaryotes

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Invertebrates:

- Makes up 95% of Animal species
- Don't have a backbone or vertebral column
- Examples: Worms, Insects, Crabs, Starfish & Jellyfish

Vertebrates:

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(intertidal, not spring, wetland).

Population: Group of interacting and interbreeding organisms

- Cell/Organism
- Organelle
- Molecule
- Atom

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Social relations are important since they often directly and obviously impact the reproductive contribution of individuals to future generations, a key component of **evolutionary fitness**, the number of offspring, or genes, contributed by an individual to future generations. One of the most fundamental social interactions between individuals takes place during **sexual reproduction**.

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The number of organisms whose genome has been sequenced completely and published is now approaching **300**

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The genome size of living organisms ranges across **nine orders of magnitude**, from 103 bp (0.001 mbp) in RNA viruses to nearly 10¹² bp (1 000 000 mbp) in some protists, ferns, and amphibians.

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Relationship of humans to African apes (chimps, gorillas) and orangutan DNA hybridization indicates that apes are our closest relatives. Human/chimp/gorilla relationships not proven but chimps are most likely our closest relatives. The molecular clock says ~ 5 million years ago the human-chimp line split.

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Kelp (brown algae) is a foundation species that forms the basis of the kelp forests off the coast of California. Kelps create environments that allow the survival of other organisms that make up the kelp forest community. The corals of a coral reef are another foundation species. The exoskeletons of living and dead coral make up

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The international Human Genome Project

- The international human genome project initiated by the US national institutes of health and the US department of energy, was launched in 1990 with completion due in 2005. However, in the meantime a private enterprise, Celera genomics, embarked on a project with the same aim but a different approach and actually overtook the human genome project. The competition was settled with the historic press

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Transgenic plants

Genetic modification of plants is achieved by adding a specific gene or genes to a plant, or by knocking down a gene with RNAi, to produce a desirable phenotype. The plants resulting from **adding a gene** are often referred to as **transgenic plants**. If for genetic modification genes of the species or of a crossable plant are used under control of their native promoter, then they are called cisgenic plants. Sometimes genetic modification can produce a plant with the desired trait or traits faster than classical breeding because the

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Order and limbs reflect habitat

Order Crocodilia

This includes Crocodiles, **alligators**, caimans, and gaviel. Most closely related to dinosaurs. Heavy bodied, mostly aquatic. Carnivorous

Order Squamata

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Arthropod Groups

1. Subphylum Trilobita

- extinct trilobites

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- example in coelome, the system of body cavities,
- biome, the entire community of plants and animals in a climatic region.

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A valid clade is monophyletic, signifying that it consists of the ancestor species and all its descendants

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- Fitness decreases with reduced genetic variation.
- Populations of endangered species are small and tend to lose genetic diversity.
- When genetic variation disappears the basis for life on earth becomes impoverished

		Canis garus (red jungle)
		Rattus norvegicus (brown)
Mammalia	5	(house mouse),
		Canis familiaris (domestic dog),
		(chimpanzee),
		Homo sapiens (human)
Animals: total	16	
Eukarya: total	47	
Total	279	

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A paraphyletic grouping consists of an ancestral species and some, but not all, of the descendants

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Notochord

(a) Notochord (noton, the back + chorda, cord): This phylum is **named** after the notochord. It is **a supportive rod**. It **extends** most of the length of the **animal into the tail**. It is **dorsal** to the **body cavity**.

[biologyboom.com: phylum-chordata-chorda-cord-](http://biologyboom.com/phylum-chordata-chorda-cord-)