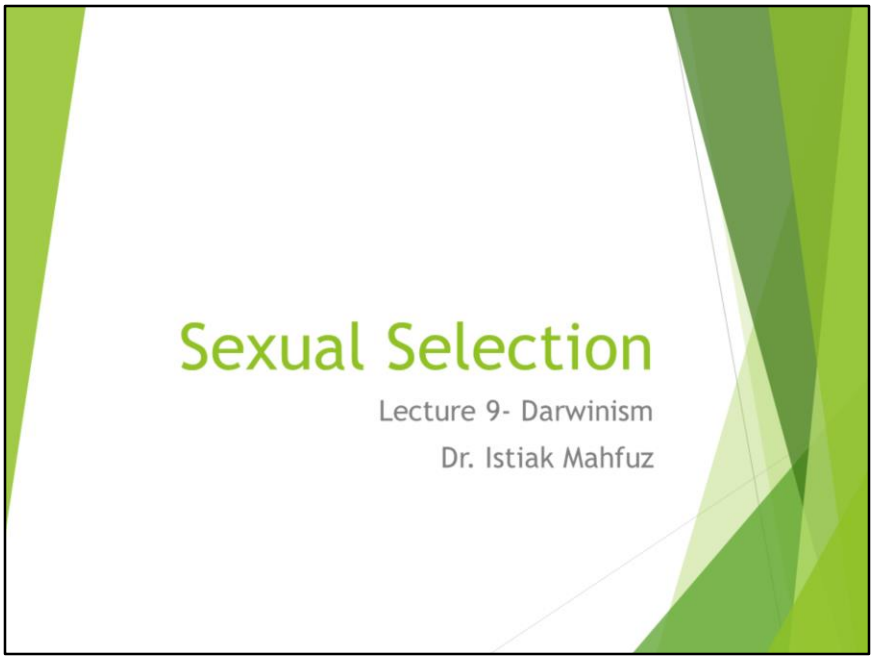
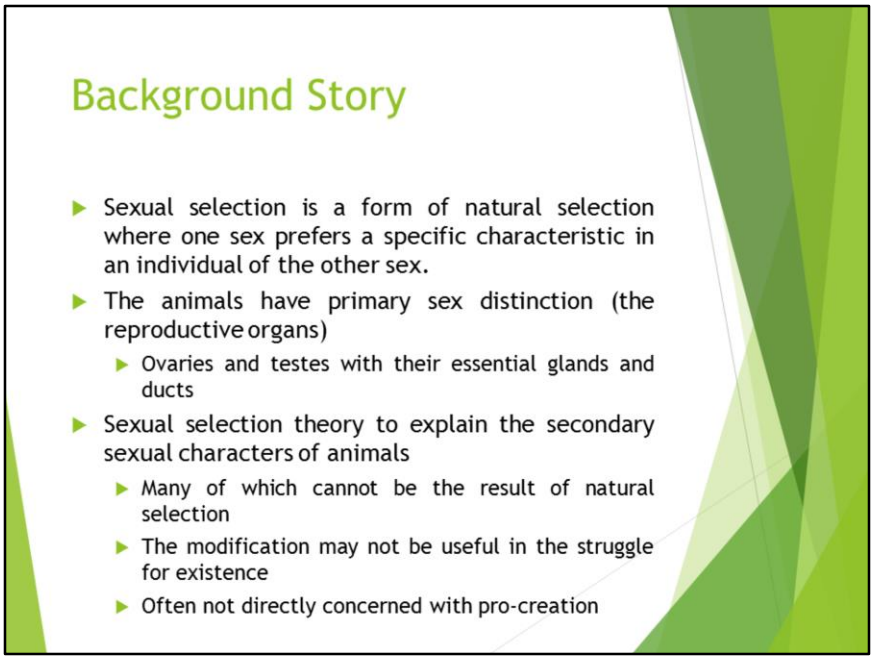

Sexual Selection
Lecture 9- Darwinism
Dr. Istiak Mahfuz

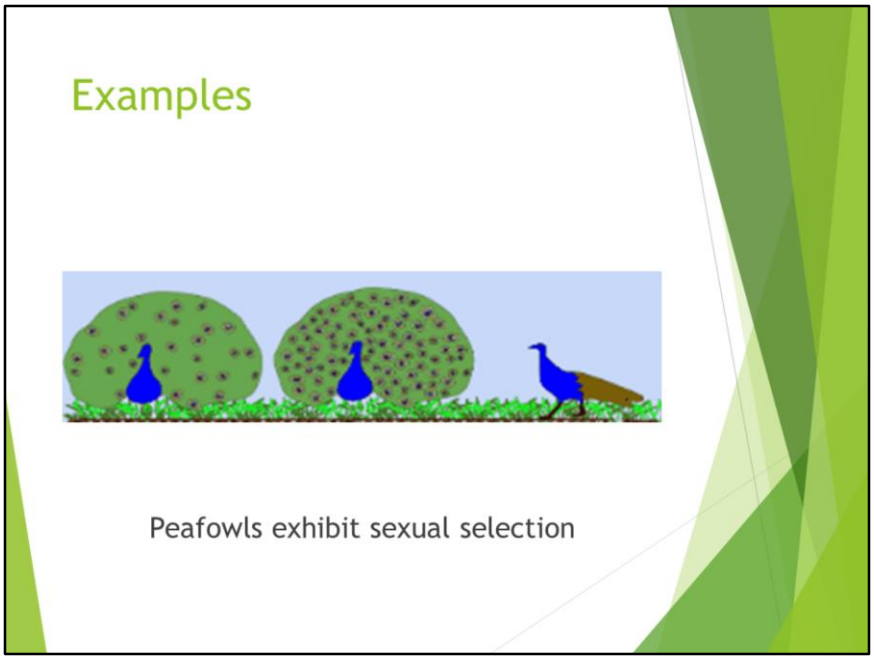


Sexual selection is another Darwinian factor, whereby he sought to account for the secondary sexual characters of animals, many of which cannot be the result of natural selection, for the modification may not be useful in the struggle for existence.

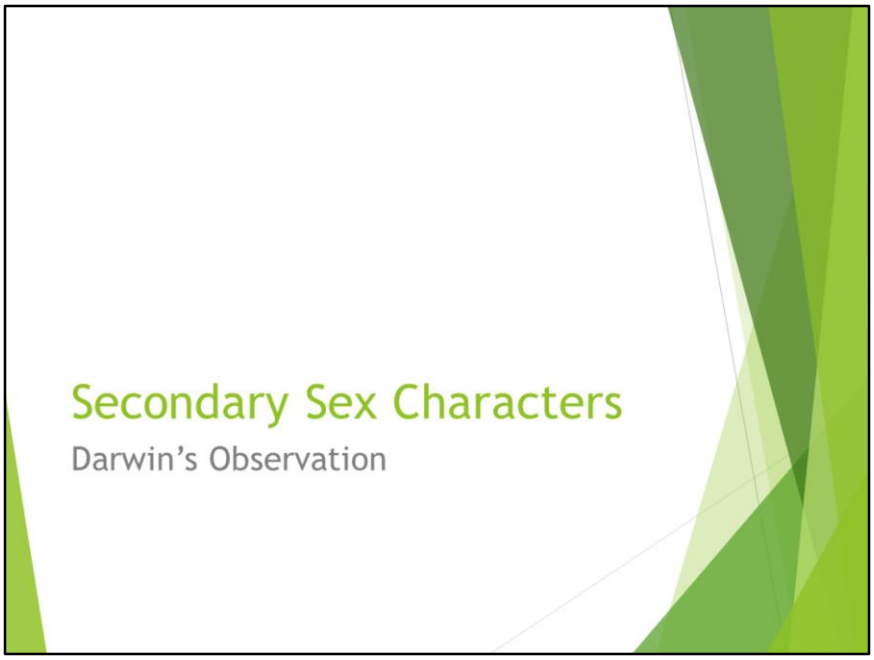
The animals have primary sex distinction which include the reproductive organs, ovaries and testes with their essential glands and ducts and the secondary sex characters which are often not directly concerned with pro-creation but may be of considerable importance to the organism. They often enable up to distinguish the sexes.

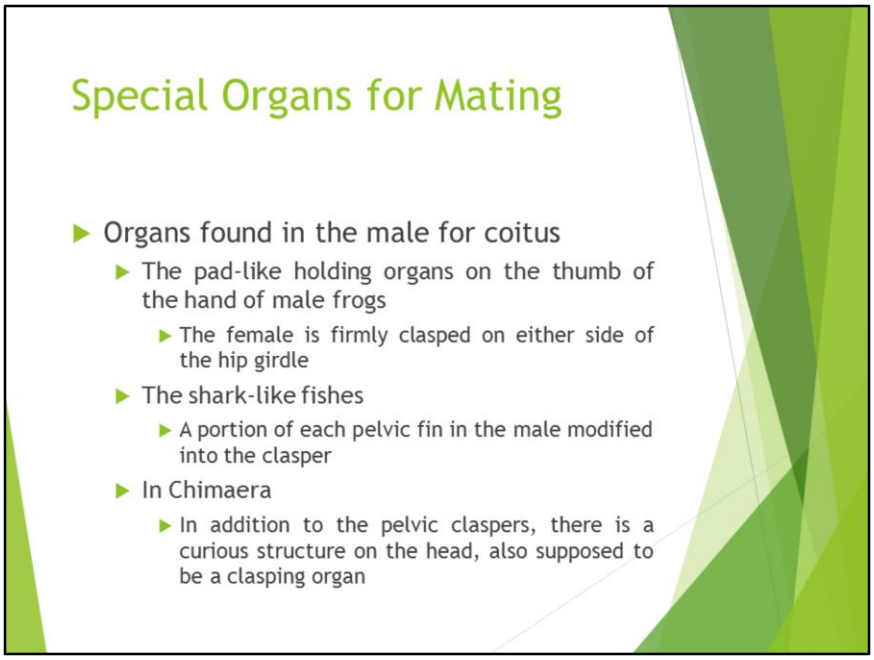
Examples

Sexual selection creates colourful differences between sexes in Goldie's bird-of-paradise. Male above; female below. Painting by John Gerrard Keulemans (d.1912)



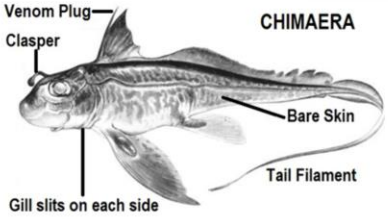
Peafowls exhibit sexual selection in that peahens look for peacocks who have more “eyes” on their tail feathers. If a peacock has fewer “eyes”, then the peahen will continue to look for a better, more suitable mate. This will eventually cause the peacocks with fewer eyes to die out and the peacocks with more “eyes” to continue to grow in proportion to the population size.


Secondary Sex Characters
Darwin's Observation

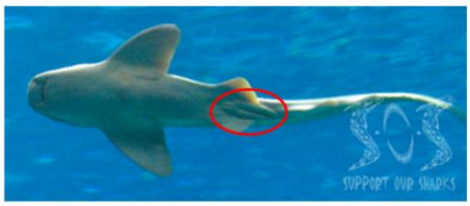


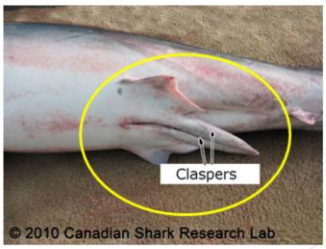
These include organs found in the male for coition. These include organs like the pad-like holding organs on the thumb of the hand of male frogs by which the female is firmly clasped on either side of the hip girdle. The shark-like fishes have a portion of each pelvic fin in the male modified into the clasper. In Chimaera, in additian to the pelvic claspers, there is a curious structure on the head, also supposed to be a clasping organ. The cephalopods show a seasonal alternation of one of the arms in male, known as hectocotylisation, and this arm is used in mating.

Special Organs for Mating



Special Organs for Mating

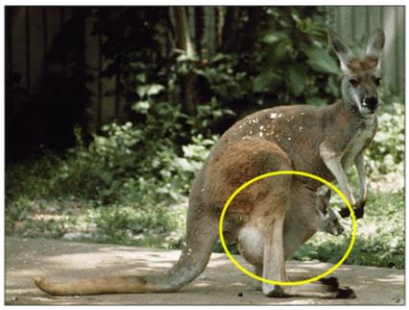




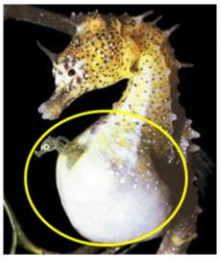
Brooding Organs

- Secondary sex characters are found especially in the female but sometimes in the male
  - The pouch of the female marsupial mammal
  - Male sea horse in which the ventral fins have been modified into a brood pouch
  - *Pipa americana* (Toad)
    - The skin of the back of the female forms growth for the reception of the egg, where the young undergo the metamorphosis

Brooding Organs



Brooding Organs



Special Sense and Sound-producing Organs

- Sense organs
  - Male giant silk-worm moths
    - Feathery antennae enormously developed and are the seat of a remarkable sense
    - Used by the male in searching out the female for the purpose of mating
- Sound-producing organs
  - The crickets- sound producing organs are the modifications of the forewings
  - The grasshoppers rub the hind legs across the edge of the wing
  - The cicadas have a remarkable pair of kettle drums at the base of the abdomen.

Special Sense Organ

Sound Producing Organs

Sound Producing Organs

Special Locomotors Organs

- Among insects, male are active in locomotion than female
- In the gypsy moth
  - The female-although possessing wings, has lost the power of flight
- The canker-worm moths
  - The female's wings have utterly disappeared.

Gypsy Moth

Female

Male

Canker Worm Moth

Female

Male

Organ of Special Use

Used as weapons/defense

- Among mammals
  - The antlers of the male deer
  - The tusks of the boar
  - Tusk like teeth in male musk deer
- Among insects
  - The huge mandibles of the stag-beetles
  - The spines on the head and thorax of the rhinoceros-beetles
- Among bees and wasps
  - The sting is confined to the females or to the workers.

Organ of Special Use

Male Deer

Musk Deer

Organ of Special Use

Stag Beetle

Rhinoceros Beetle

Special Characters for Exciting or Attracting the Opposite Sex

- Organs which appeal to the senses of sight, hearing and smelling
  - Cries and antics
  - Color and plumage
  - Special odor
  - May be either seasonal or persistent
  - Confined almost entirely to the male
- Examples
  - Gorgeous tail of the peacock, the pompous dignity of his carriage and its voice
  - The strutting of the common turkey and the drumming of the ruffed grouse
  - The beard of man and the mane of the lion

Exciting or Attracting the Opposite Sex

Exciting or Attracting the Opposite Sex

Exciting or Attracting the Opposite Sex

Exciting or Attracting the Opposite Sex

Darwin's Thoughts about Theory of Sexual Selection

- Most of these characters may be regarded as the result of natural selection
  - In general one can assume that they are useful in the struggle for existence.
- The characters meant for excitation/attraction, on the other hand make their owner more conspicuous and expose them to dangers
  - Such development is opposed to the principle of natural selection
  - It is a handicap situation and not an aid in the struggle for existence.

Theory of Sexual Selection

- Many secondary sexual characters are not useful in the struggle for life.
- The males seek the females for pairing. Males are more abundant than the females.
- In many cases, there is a struggle among the males for possession of the females.
- The females choose those males with brilliant colours, conspicuous ornaments or other attractive characters.
- Many males sing or dance to draw the attention of the females.
- The secondary sexual characters usually vary.

Criticism of Sexual Selection Theory

- The theory can apply only where the males are more numerous
  - If rejected by the first female—each male, however, undesirable would sooner or later find his mate
  - Thus unornamented males would have as many progeny as the ornamented.
- Among the higher vertebrates, where a great number of ornamented males occur, the proportion of the sexes is about equal.
- In most species the mating female is observed to be wholly passive, not capable of selecting the male.

Criticism of Sexual Selection Theory

- Ornamental colours are characteristic of the males of species in which there is no pairing as among those which pair.
- A high degree of aesthetic sense on the part of the females would be necessary for choice
  - Such sense cannot be imagined in invertebrates in which ornamentation occurs.
- There is then very little evidence which proves this theory of sexual selection.


THANK YOU