Grade 12th Biology Handout

UNIT-5

BEHAVIOUR (bhr)

= what is bhr? can be defined in a no of ways depending on:
- ✓ perspective or view point.
- ✓ social context.
- ✓ speaks bad or good bhr.

* Also bhr can be defined as:
- ✓ the observable response a person makes to any situation
- ✓ a manner of acting or conducting your self.
- ✓ the way a person behaves towards other people.
- ✓ the action or acts of a person or animals in response to external or internal stimuli
- ✓ The responses or acts or movts made by an organism's in any situations.

⇒ Bhr is also a coordinated response to change the internal and external conditions w/c is a product of the sensory - neutral and hormonal factors.

examples:
- ✓ communication
- ✓ mating
- ✓ feeding
- ✓ courtship
- ✓ nest building.

* Ethology: is a branch of biology that deals about the animals bhr.

* Ethologist: A person who study about animals behaviour (bhr).

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* stimuli : any env'tal change that cause an organisms to be react.

* Response : the rxns toward or away to the stimuli

* Response has two types.

ⓐ positive response ⓑ Negative response

ⓐ positive response : the rxn toward to stimuli

ⓑ Negative response : the rxn away to stimuli

⇒ stimuli → receptor → coordinator / CNS [brain, spinal cord] → effector / gland, muscles / → Responses.

* NB : * Receptor : is a group of cells that receives a stimuli and process it.

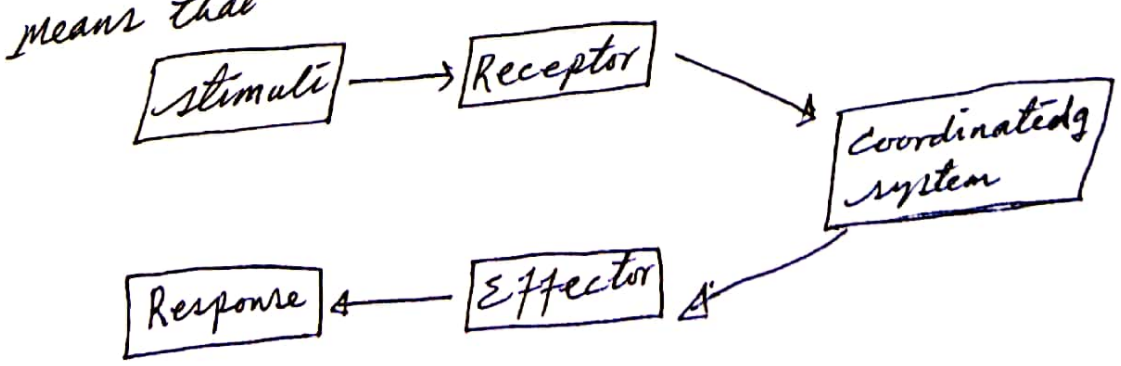
ex. taste bud, pain ---

* Effector : is any part of organisms to produce the response or rxns

ex. muscle and glands.

* Linking system or coordinating system that is influenced by the receptors and can influence the effector

means that



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Response in plants

- 3 major types of plant responses.
  - (a) photoperiodism
  - (b) Tropisms
  - (c) Nastic movts

(a) **photoperiodism**: dev'tal response of plants to photoperiod.
- day-length
- short-day plant
- long-day plant
- day-neutral plant

(b) **Tropisms**: growth responses towards or away from a stimulus.
- it mainly affects the growing parts of the plant.

* Tropisms has positive and negetive tropisms.
  - **positive tropism**: a growth response towards stimuli
  - **Negetive tropism**: a growth response away from stimuli

***NB**: plant growth is controlled by hormones (auxins).

* Also tropisms has the ff types:
- Geotropism - growth response to gravity
- Hydrotropism - " " " water
- chemotropism " " " chemicals.
- Thigmotropism " " " touch
- Aerotropisms " " " gases.

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c. Nastic movts

- is the non-directional response in plant.
  - turgor pressure
  - rapid response/movts

Example: carnivorous plant → Venus fly trap.

Response in simple Animals.

- Simple animals response by the 2 methods
  - Taxis and kinesis

*Taxis: is the movt of small animals towards (+ve taxis) or away from (-ve taxis) a stimuli.

examples: Euglena swimming towards light to photosynthesis (+ve photo taxis).

*Kinesis: is a change in rate of movts due to change in stimulus intensity.
It does not involve change in direction.
example: heart.

Types of behr

(a) Innate behr
(b) Learned/Acquired behr.

(a) Innate behr: is potentially represent at birth or hatching

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1. Circadian Rhythm - daily cycle.

Example - sleeping, mitosis/meiosis, photosynthesis, hormonal productive, closing and opening of stomata.

2. Lunar Rhythm - monthly cycle

Example - menstration cycle.

3. Circannual Rhythm - yearly cycle

Example - migration
- ✓ hibernation
- ✓ coat growth
- ✓ camouflage colouring

⇨ In mammals biological clocks is controlled by hypothalamus — sleeping, stress, osmoregulation, reproduction

2. Learned behr.

- ✓ is behr acquired through experience/trial and error or by insight
- ✓ There are dft kinds of learned behr
  - ✓ habituation
  - ✓ sensitization
  - ✓ insight learning
  - ✓ associative learning
  - ✓ classical conditioning
  - ✓ latent learning.

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Types of innate behr.

1. Reflex action
2. Orientation behr
3. Instinctive behr.

1. **Reflex action**: in born, genetically pre-programmed, automatic or immidiate involentary response.
- Reflex action in controlled by spinal cord.

example: knee jerk, sneezing, coughing, vomiting, ankle jerk, hand withdrawal from hot, sharp object, blinking of the eyes --- etc.

2. **Orientation behr**: in the movts of simple animals away from unfavourable conditions
- in the movts towards and remaining in favourable ones. example: kinesis, taxis.

3. **Instinctive behr**:- is the most complex innate behr and does not requires learning.
- involves a fixed action pattern /FAP/ for each key-stimuli.

example: Nest building, imprinting, web weaving

- Imprinting behr that occurs during a sensitive / critical / period for young animals.

Biological Clocks

- are internal regulatory mechanisms that control dit cyclical responses.
- Organisms show genetically programmed yearly, monthly, daily and other cyclical changes.

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* Habituation: is a form of learning in w/c animals learns to ignore a stimulus upon repeated exposure to it.
- depends on the duration of training
i.e - short period time
- long " "
- sensory habituation occurs when sensory system stop sending impulses to the brain.

* sensitization: is an increases in response to a harmless stimulus when it occurs after a harmfull stimulus.
* Example: person becoming more sensitive to snake right during his/her adult hood.
* sensitization has two types in higher animals.
* periferal sensitization - results from changes in the PNS.
* centeral " - results " " " the CNS

* Associative learning
* contains classical conditioning: Example:
- training guider dogs for the blind
- training horses
- training dolphins and killers whales
- training zoo animals.

* classical conditioning
- US (unconditioned stimulus).
- UR (unconditioned response).
- CS (conditioned stimulus).

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- use the pheromones by some female insects to attract - males from a distance.

* Types of pheromones

1. Alarm pheromones
   - that are secreted by animals when attacked and produced the response of fight and flight.

2. Release pheromones
   - highly voltage and can attract a mate for a distance. for a distance of two or more miles.

3. Territory pheromones.
   - that are used to mark the boundaries of the - territory by the owner. Ex. dog urine

4. sex pheromones
   - that signals the availability of female for matting.

* Territorial behr

⇒ Territory - an area that an animals defends against intruders of the same species.

* Territorial animals usually defend areas that contain one or more of:
   - a nest
   - a den or mating site
   - sufficient food for themselves and their young.

Ex. Ethiopian wolf / canis semiensis /.
- they maintain a group territory by mating urine/ wlc contain territory pheromones)

* Defending a territory

- some animals defend their territory by - fighting with those who try to invade it.

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⇒ Conspecific fighting: conflict w/c take place in the same species.

⇒ Ritual fighting: bhr in w/c the act of fighting are displayed without any physical contact.

Social bhr.

* sociality is interaction bln two or more individuals of species.
  - it modifies the individuals bhr.

example: fish, birds, humans, mammals.

⇒ Benefits of social bhr.

- Reduce intra-specific aggression as hierarchies are formed leading to stable groups.
- ✓ Improves effectiveness of reproduction through courtship bhr.
- ✓ Improves efficiency of foraging
- ✓ Gives protection against attack.
- ✓ Increases the chance of surviving extreme conditions.
  ex. some birds
- Increases survival chance during migration flight.

social bhr in Honey bees.

- Honey bees and bumble bees show eusociality (true social bhr)
  * Eusociality has 3 main features
    ⓐ cooperation in caring for offspring
    ⓑ presence of several generations in a colony.
      - this ensures that sustainability and parent assistance
    ⓒ division of labour.
      - Not all members of social groups is reproductive
      Very active

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Examples - In honey bees

* Queen - Reproductively active female.
* drone - Reproductively active male.
- Represents the 1st and 2nd castes

NB - castes - in a group within social structure.

* workers - non-reproductively active female

⇒ Queens use the pheromones called royal jelly and maintain or sustain social structures.

✓ the source of nectar is communicated b/n worker bees by a "wag dance".

End of unit five (5).
Pls read it and biology text as well as biology references.

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