# Animal Science

## Contents:



## Behaviour:

**Define Ethology:**

- Study of animal behaviour
- Involves observations of animals actions and reactions to different stimuli

**Describe importance of animal behaviour to a variety of situations:**

- Humans need to understand
    - Early humans- ambush prey, protection from dangerous animals
    - Civilisation→ domestication- behaviour played role in choice of species to domesticate
- Early ethology- Pavlov: turned light on or rang bell before feeding dogs, found dogs salivated to cue
- Recent research
    - Aspects of animal welfare encourage research
    - Attitudes influenced by religion, political and personal philosophies- e.g. pigeons in cities vs. Hindu temples
- Observations can lead to deductions about internal state of animal or its welfare, e.g. reproductive status, health, age
- Production animals
    - Work with natural instincts, rather than fighting against them

    - Need to modify responses to their instincts, rather than trying to modify their responses
    - Animal handling becomes easier and production is increased
- Companion animals- predator vs. prey behaviour
- Wildlife- conservation, biodiversity, comparisons of domestic animal behaviour provides us with insights into behaviour of wild animals

**Describe methods of animal communication:**

- Behaviour based on animal's perception of its environment
- Sensory system collects info (stimuli) from enviro and send sit via PNS to CNS (brain) for processing, animal then chooses whether to act on it
- Stimulus → animal → response

*Sensory system:*

- Use to communicate, e.g. stomping, vocalisation- alert other to danger; pheromones- signalling mating readiness
- Components
    - Chemical receptors in nose and tongue
    - Mechanoreceptors in skin
    - Ears, eyes, others (lateral line)

**Compare innate and learned behaviour:**

- Innate- instinctive
- Learned- change in behaviour (adaptation), as result of experience
    - Favoured in unpredictable environments
    - Passing on of traditions, e.g. JAP macaques in hot springs, elephants locating fruiting trees
    - Requires memory
    - Skill learning- e.g. determination of bite efficiency required to kill prey animal
    - Habituation- repeated or continuous presentation of an irrelevant stimulus to animal results in decline in probability of occurrence of subjects initially elicited responses, e.g scarecrow
    - Discrimination (perceptual learning)- able to discriminate between 2 objects, e.g. rat pushing circle rather than triangle to obtain food
    - Conditioning (associative learning)- most common animal behaviour studied, whereby animal forms association with a previously neutral stimulus and a previously significant stimulus, e.g. ringing bell or turning on light and feeding dog

**Describe importance of animal behaviour for production purposes:**

- Major drives- hunger, aggression, escape, reproduction
- Minor drives- play, sleep, exploratory/curiosity, migratory (some species)
- Domestication has led to reduction in drives in domestic animals
    - Food readily available, shelter from extremes of temp is provided, protection from predators has been provided

- Exploration/fear behaviour
    - Both aroused by novelty or unfamiliarity
    - Both dependent on developmental stage of sensory system, e.g. exploratory behaviour- young may use touch or localisation to locate mother
- Fear behaviour, e.g. flight zones
    - Most domestic species have excellent peripheral vision, predators have bifocal
    - Vision affects how an animal will react to movement within flight zone
    - Flight zones differ between species for different reasons, e.g. prey animal that has never seen humans before, mother with calf
    - Knowledge of diff flight zones (movement) improves livestock management, husbandry and yarding, e.g. use them to move around paddock
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**Describe the importance of social structures in animal behaviour:**

- Most production animal display social order/structure, e.g. flock, herd
- Some genetically predisposed to certain levels of hierarchy- avoids confrontation, e.g. dogs and wolves (matriarch)
- Type of structure dependent on
    - Size restrictions, e.g. size of territory that can be successfully defended, food resources available compared to those required
    - Sex, e.g. lion prides usually have one male, some animals solitary
    - Habitat and climate restrictions
- Diff types of behaviour directly related to social structures
    - Dominance behaviour- usually observed among males, may be resource based, e.g. bulls, stallions
    - Aggressive behaviour- antagonistic or hostile, e.g. defending young/territory, predator/prey interactions, trained guard dogs (learned behaviour)
- Importance of social structure- safety in numbers (e.g. antelope), livestock transport (transport herd animals in small groups), intensive agricultural systems, zoo exhibits (how many, composition), breeding programs

**Discuss examples of different types of animal behaviour:**

- Sexual/reproductive behaviour
    - Behaviour changes in young animals during puberty
    - Courtship behaviour
        - Males energy not wasted on unreceptive females
        - Oestrus females unlikely to be missed by males
        - Strengthens monogamous bond in some species, e.g. albatross , JAP cranes dance, male birds may present food or nest material to females
        - Mating behaviour
    - Understanding important in farm and zoo breeding programs (esp. artificially)
        - Identification of females receptiveness
        - Importance of male libido for semen collection
- Self-maintenance behaviour
    - Cleaning, keeping in good condition

    - E.g. preening, dustbathing, rubbing against object, comfort seeking- wallowing, moisture and shade seeking behaviour in pigs
- Stereotypical behaviour
    - Indicator of frustration or anxiety, e.g. pacing in zoo animals
    - Intensity (frequency, duration) proportional to severity of anxiety or stress
- Sleep behaviour
    - Little known in animals
    - Driven by- circadian rhythms (controls sleep/wake cycles), ecological requirements, e.g. nocturnal species, predator avoidance
    - Important in intensive systems and zoos
- Ingestive behaviour
    - Search for, locating and digesting food
    - Dependent on diet and digestive system, e.g. grazer vs. browser, ruminant vs. non-ruminant
- Parental behaviour
    - Not all species
    - Male may exhibits exclusive parental behaviour, e.g. emus, seahorses
    - In most species, young are cared for exclusively by mother→ maternal behaviour
- Maternal behaviour
    - Importance- successful rearing of offspring, successful gene transfer, optimise production animal system ( reduce incidence of mortality, abandonment, hand feeding)
    - Uses large amounts of time, effort and resources in most animals
    - Largely related to hormonal levels of oestrogen, progesterone, prolactin and oxytocin
        - Hormones influence odour preferences
        - Often 1$^{st}$ time mothers are less maternal and have reduced hormone levels
    - May include intolerance to other animals/humans (protective)

**Sheep:**

*Maternal and neonatal behaviour:*

- Bonds occur within 5hrs- requires smell, sound and suckling
- Young swapping (mismothering) can occur when ewes give birth at similar times
- Movement stimulates maternal behaviour and mother cleans young, may eat placenta
- Young must suckle quickly to form maternal bond and obtain immunity (colostrum)
- Failure to gain maternal bond may lead to perinatal mortality with most deaths (80-90%) occurring in 1$^{st}$ week of life- hypothermia, mismothering, infectious disease, starvation, predation

*Domestication:*

- Produce wool and meat
- Behaviour
    - Low/reduced aggression to humans due to reduced anti-predator behaviour

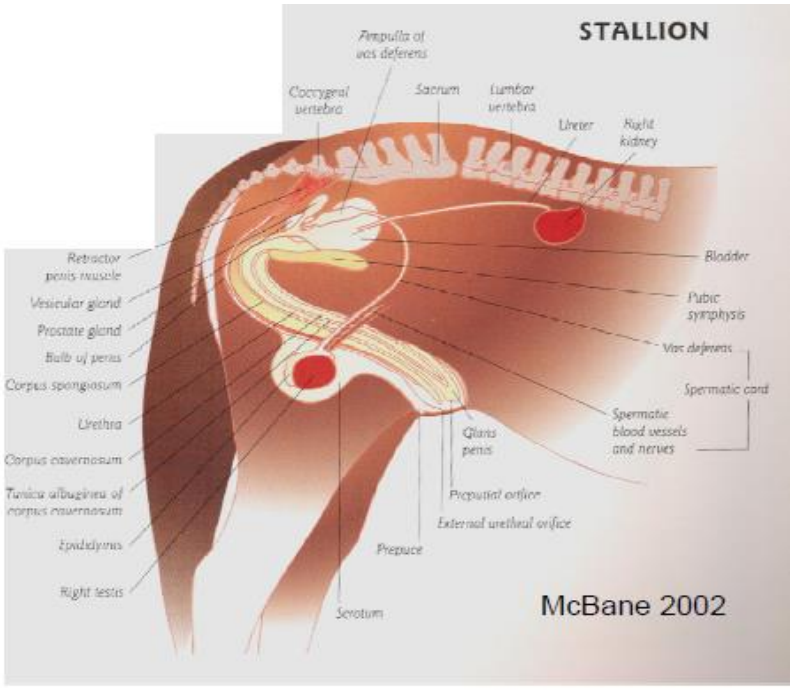
- Flocking and maternal behaviour
- Effective reproduction in captivity and no need to select their mate
- General adaptability- transport, no specific diet, varying climates

# Reproductive Systems:

**Describe function of the reproductive system:**

- Produce young
- Pass on genes
- Male- development, production, storage and deposition of spermatozoa into the female tract and addition of fluid to enhance survival in female tract
- Female- site of fertilisation and development of young (mammals, some reptiles and fish) or egg production (birds, reptiles, fish)

**Name the structures of the male reproductive tract and their function:**




*Scrotum:* houses testes

- Outside body- cattle
- Inside body- elephants
- Descend into pouch, not true scrotum (in/out)- rabbits
- Position largely temp dependent (cremaster muscle)

*Testes:* produces sperm via meiosis

*Epididymis:* stores mature sperm

- Carried to epididymis by efferent ducts
- Undergo final maturation here
- Some species have ampulla- enlarged vas deferens