

Plant Families

* **Legumionasae** – clover, gorze, pulses, vetch, lupins, lentils
 - 5 petals

Importance: Nitrogen fixers

Nitrogen fixation – the conversion of atmospheric nitrogen into soil nitrogen

How? Roots contain swellings → nodules → contain bacteria (rhizobium) → fix N₂

- Symbiotic relationship:
 - Rhizobium feed off protein in plants
 - Plants need N₂ to grow

Why important? N₂

- Essential element for protein
- Essential element for chlorophyll
- Essential element for DNA
- Essential element for RNA
- Essential element for ATP

<u>Red Clover</u>	vs.	<u>White Clover</u>
	Different Colours	
Bigger stem		Smaller stem
Doesn't creep		Creeps
Bigger leaves		-
More aggressive		-
More erect		-
-		Better N ₂ fixer
-		More widely used

* **Cruciferae (Brassica)** – All cabbages, kale, broccoli, cauliflower, brussel sprouts, turnip, cress, mustard, beet root, oil seed rape

- Arranged in fours:
- 4 sepals
 - 4 stamens
 - 4 petals

- Broad leaves → prone to pests

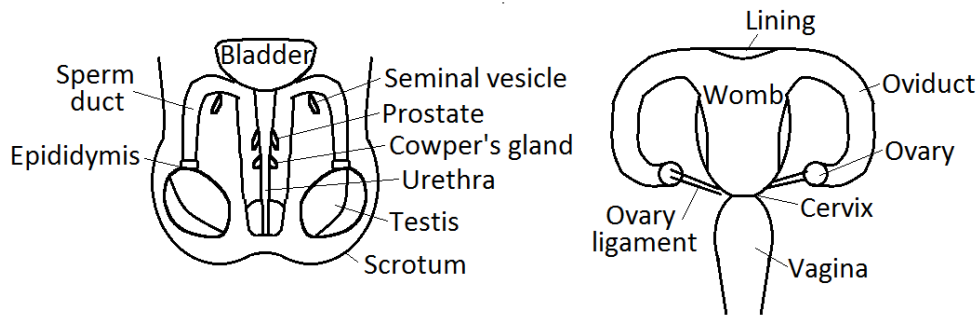
* **Rosaceae** – Rose, wild rose, apple, strawberry, briars, hawthorn, blackthorn

- Five petals, five sepals
- Numerous stamen and carpels

- **Importance?**

- In habitats, ag, dispersal, germination, conservation

Reproductive system



Testes – produce sperm

Penis – sperm in vagina

Epididymis – sperm matures here

Scrotum – holds testes out of body

Cowper's gland } produce
Prostate } seminal fluid

Seminal vesicles – stores seminal fluid

Ovaries – produce eggs

Fallopian tubes – fertilisation occurs here

Uterus (womb) – holds foetus

Birth canal (vagina) – insemination here

Follicle stimulating hormone (FSH) – causes egg/sperm production

Luteinising hormone – stimulates for hormones

Ovulation – Release of egg from ovary

Fertilisation – Egg + sperm → zygote

Implantation – Embryo attaches to lining of the womb

Placenta – Links mother's bloodstream to foetus

Gestation (pregnancy)

Cows – 9 ½ months

Ewe – 4 months, 4 weeks, 4 days

Sow – 3 months, 3 weeks, 3 days

Amniotic fluid – surrounds and protects foetus in womb

Oestrus cycle (release of egg)

Cow – every 21 days

Ewe – every 16 days during autumn and winter

Sow – every 21 days

Release lasts for:

Cows – 18 hours

Ewe – 24-36 hours

Sow – 2-3 days

How to prevent mortality of calf/mother during pregnancy

- Increased feeding 2 months before
- Good choice of bull
- Good condition
- Inspect regularly

Lactation (let down process)

- Teat milked → stimulus
- Message sent to brain
- Brain release oxytocin (from pituitary gland)
- This causes muscles of **alveoli** and ducts to contract → milking now possible
- Prolactin released for milk production (lasts 3-7 minutes)

Note:

- Cow must be relaxed (high adrenaline → low oxytocin)
- More milked → more produced
- Milked every 12 hours

Calculated lactation yield

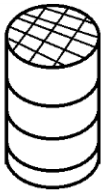
Daily yield at peak (at day 40) x 200

Milk tests

- 1) **Total bacteria count** – milk sample inoculated on agar plate and incubated for 3 days
 - Colonies counted (with electric counter)
- 2) **Somatic cell count:** (somatic: all cells exc. reproductive)
WBCs counted → if too many → indicates mastitis
- 3) **Temperature:** Bulk tank at 4°C
→ inhibits microbial growth
- 4) **Delve (antibiotics)** – milk must be discarded for 92 hours after antibiotics given
- 5) **Freeze-point depression** – indicates if water was added
- 6) **Colostrum (Biestings) test**
- 7) **Sediment test** (should have cover on bulk tank)

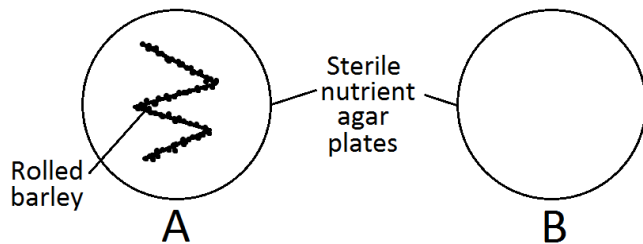
Expt to show diff size particles in a soil sample

- M:**
1. Use a soil sieve set, in order of holes size
 2. Place relatively dry soil sample on top sieve
 3. Shake well in circular fashion
 4. Remove each sieve and observe particle sizes
- R:** Only tiny clay particles through finest sieve



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Expt to show the presence of microorganisms in an animal food stuff (rolled barley)



- M:**
1. Use **pestle** and mortar to crush some rolled barley to very fine particles
 2. Open lid A minimally and with a sterile loop inoculate with tiny particles in a W shape
 3. Leave B unopened
 4. Seal both with tape and incubate upside down in an oven at 25-37°C for 48 hours
 5. Remove and replace with new lid and observe
- R:**
- A - slimy, curd-like colonies (bacteria)
 - hairy, powdery colonies (fungi)
- B - none
- C:** Both bacteria and fungi found in rolled barley

Expt to determine the percentage germination in a seed sample

- M:**
1. Prepare a seed tray by lining it with moist cotton wool
 2. Place 100 seeds into the cotton and press down gently
 3. Place in a warm temperature with good supply oxygen
 4. Leave for a few days and observe daily
- R:** # of seeds germinated → % germination

PARASITIC DISEASES

Redwater fever

- Babesia (Protista)
- Spread by tick
- Red urine
- Death if not treated
- Remove long grass

Lice

- Fail to thrive cause irritation
- Heavy → anaemia
- Insecticide

Stomach / Intestinal worms

- Nematodes
- No thrive and diarrhoea
- Leader-follower
- Nematicide

Lungworms (house, husk)

- Nematodes
- Husky cough, no thrive
- Develops to hoose pneumonia
- Nematicide

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Maggots

- Bluebottles and greenbottles lay eggs in fleece
- Hatch and feed on flesh
- Prevent by dipping

Sheep scab

- Notifiable
- Mange mite piercing skin
- Wool falls off
- Dipped

Liver fluke

- Injest encysted cercarium
Lives in bile duct of sheep/cattle
No thrive, no appetite

Clover – grows best: 6.5-6.8

Redundant and dies off if heavily sprayed w N_2 fertiliser

<u>WHITE</u>	<u>RED</u>
Flower colour	Flower colour
Short	Taller
Creeping habit	Erect habit
No hairs	Hairs
Small leaves	Large leaves
Better quality	-
Persistent	Not as persistent

N_2 fixers

- Lightning 5-10%
- Free-living ones
- Artificial fertiliser

