Penang Sangam High School
P.O. Box 44, Rakiraki
Year 12 Agriculture Lesson Notes Week 20

Strand	**AS 12.4 Livestock Production**
Sub-Strand	**AS 12.4.2: Cattle**
Content Learning Outcome	**The student will explore, discuss, practice and evaluate livestock concepts and relate them to practices in Fiji.**

Lesson 3: Replacement Breeders

Lesson Outcome: At the end of this lesson, the student will discuss the criteria used for the selection of replacement stock

Breeders are the animals raised on livestock farms to produce young.

The farmer will have animals of different ages on the farm and will replace breeders which are:

- ✓ bulls related by blood to the heifers
- ✓ uncontrollable/ aggressive
- ✓ under preforming
- ✓ wrong breed
- ✓ old
- ✓ injured
- ✓ infertile
- ✓ diseased

When choosing calves for breeding stock, dam and sire must also be examined and their records cited.

The parents [sire and dam] of replacement calves should:

- ✓ share same gender-specific physical characteristics
- ✓ calve unassisted
- ✓ perform well in a production strategy similar to your own (i.e. grass-based pasture rotation)
- ✓ have a history of producing calves that perform well in similar production conditions to your own

All replacement animals should have:

- ✓ functioning body parts - e.g. eyes, ears, legs, tail, mouth
- ✓ big gut for foraging capacity
- ✓ big mouth for maximum grazing intake per mouthful
- ✓ big nostrils and wide muzzle for easy breathing
- ✓ proportioned, balanced build
- ✓ calm temperament - not wild-eyed, skittish, or flighty
- ✓ shiny hair which indicates healthy secretion of oils that help resist parasites and good health
- ✓ be inquisitive
- ✓ be disease and injury free

Cows and Heifers appearance:

- wide, calf-bearing hips
- well-formed udder and teats for good milk production
- feminine appearance as this shows the production of oestrogen

Bull and bull calf appearance:

- wide, strong shoulders, heavy, short neck, coarse head, and muscular rump
- be slightly front-heavy (within reason) for battle with other bulls
- masculine appearance
- scrotum that is well-formed, equally-sized and balanced
- no enlarged teats - enlarged teats on a bull are a sign of a hormone imbalance
- good, obvious muscle definition
- coarser, curlier, darker hair around the head, neck and lower part of his body

*Heifer - a young cow before she has had her first calf

*Cow - the mature female of cattle

*Calve - give birth to a calf

Lesson 4: Production of Calves
Lesson Outcome: At the end of this lesson, the student will discuss the production of calves on cattle farms.

The calves produced on cattle farms ensure that there is milk and stock to either grow out or sell. The average reproduction cycle of a cow is:

Age of sexual maturity	Age of 1st breeding	Length of oestrus cycle	Length of oestrus [standing heat]	Ovulation occurs	Gestation
9 months	18 months	21 days	12 to 18 hours	12 to 18 hours after end of standing heat	283 days

***Once heat is detected in female breeder, she is taken for mating.

Calving - act of giving birth to a calf
Dystocia - delayed or difficult parturition

Systems of Mating

Pasture mating	Hand mating	Pen mating	Artificial insemination
Bulls run with cows and heifers	Bulls kept in special enclosures away from cows and heifers. A female on heat is introduced to bull's enclosure.	Bulls are kept separately. Bulls are introduced to females which are on heat.	Teaser bulls used to identify females on heat. Females are inseminated.
Heifers mate when not fully developed	Heifers mate when fully developed	Heifers mate when fully developed	Heifers mate when fully developed
No control over sires of calves	Matching of breeding pairs possible	Matching of breeding pairs possible	Matching of breeding pairs possible
Bulls waste time establishing right to mate Many females may be mated but some unsuccessfully	Female breeders on heat are introduced to the bull's enclosure one at a time. Limited number of females may be mated in one day.	Bulls introduced to batches of females on heat overnight then separated in the morning.	Female breeders on heat identified and inseminated with semen from reliable source
Mating ratio: 1 male to 10 females	Mating ratio: 1 male to 100 or more females	Mating ratio: 1 male to 20 females	Mating ratio: 1 male to thousands of females
Some female breeders not mated if heat is	All female breeders mated if heat detected. Higher successful mating	Some females not mated if heat is synchronized. Successful mating ratio	All female breeders are mated if heat detected.

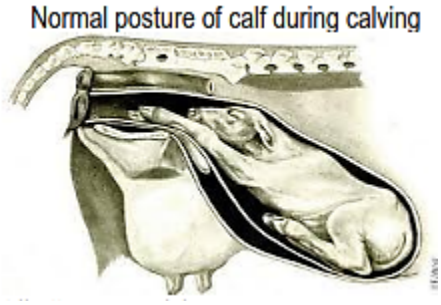
synchronized. Successful mating ratio lower.	ratio.	may be lower.	Higher successful mating ratio
Calving all year round	Calving can be predicted or synchronized	Calving can be predicted or synchronized.	Planned calving possible
Difficult to take care of young stock of different ages	Management of dams and young easier	Management of dams and young easier	Management of dams and young easier

Parturition: Calving is divided into three stages:

1. **Stage 1: Dilation of the cervix**
-often takes 2 to 6 hours but may take longer
-cervix softens and pelvic ligaments relax in preparation for delivery of calf.
-teats will distend and fill with colostrum
-mucous discharge from the vulva
-animal may isolate itself, paw the ground and have poor appetite

2. **Stage 2: Delivery**
-calf passes out the birth canal taking less than 2 hours to 4 hours
-calf should present right side up, front feet first, with legs extended and head lying between knees and pasterns in a "diving" position
-when cervix is fully dilated, calf's front hooves start moving through which stimulates release of a hormone, Oxytocin, by brain that further stimulates contraction of the uterus
-a cycle of dilation and contraction develops that helps calf on its way out, while cow contributes by bearing down with her strong abdominal muscles

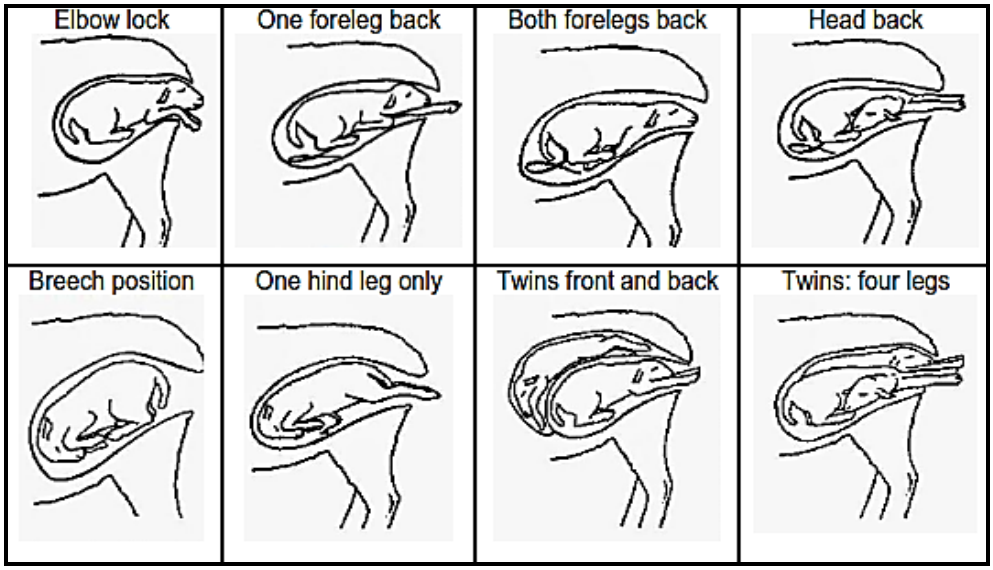
2018 – Explain the role of oxytocin in the calving process of cattle.



2019 – Discuss how parturition occurs in cattle. (3 marks)

3. **Stage 3: Expulsion of placenta**
-the placenta, which is often referred to as the afterbirth, is expelled from the uterus up to 6 hours after the last calf is delivered. Dystocia may occur where a vet is needed to assist the calf.

The diagrams below illustrate causes of calf dystocia.



-If dam is distracted or weak, clean mucous away from nose, mouth, and throat of the first issue.
-Weigh the calf, tag one ear, and dip the navel cord in 7-percent iodine solution to prevent joint ill.
-Ensure each issue receives its mother's first milk (colostrum) within one to four hours of parturition and that the issue is suckling well within 24 hours.

Lesson 5: Feeding Calves

Lesson Outcome: At the end of this lesson, the student will discuss the feeding of calves.

Calves born on livestock farms can be used for:
1. Replacement - farmers may keep calves for breeders. These calves are allowed to suckle from the dam or from the foster cow so as to develop strong immune systems and bones and to learn to respond to humans.
2. Meat - calves are often slaughtered for veal and sausage meat.
3. Sale - many farms sell their excess calves.

Calves reared on the farm are provided with the following:

1. Milk - calves are born with a limited defense mechanism against disease so are allowed to suckle from dam until they are at least 3 days old, to obtain colostrum. They are also fed cow's milk or milk substitutes [skim or powdered full cream milk] until they are ready for weaning.
In cases where the cow is to be milked, the calf is weaned from the dam onto milk replacer at 3 days of age.

2018 – State one advantage of allowing a calf to suckle milk from its dam for the first three days of its life.

2. Creep Feed - calves begin nibbling at solid feeds after birth as creep feed encourages the development of the digestive system

- ✓ fresh grass and grain are made available to 1 to 2 week old calves to develop the rumen
- ✓ prepared feeds in crumble form are also provided for calves to supplement their nutrition
- ✓ creep feed should be kept fresh and clean

2017 – MC No. 19

3. Water –calves must be provided access to clean, fresh water which does not dampen the whole living area.

Lesson 6: Improvements
Lesson Outcome: At the end of this lesson, the student will discuss methods used by cattle farmers to assist with the management of their herds.

The following husbandry techniques are used by farmers to improve the production of cattle herds.

1. **Identification** - farmers brand calves so that they can identify the cattle which belong to their farms. These brands are:
- ✓ registered so that they are legal
- ✓ unique to each farm
- ✓ applied to calves

There are two major methods of branding;
i) **Hot branding** - a branding iron is heated by fire or electricity to a light ash color [not red] and pressed to the skin of the animal. A permanent scar will result.
ii) **Freeze branding -** a branding iron is cooled to between minus 160 to minus 250 degrees using liquid Nitrogen or dry ice and alcohol. The branding iron, which is made of copper, is then pressed against the skin of a calf where it burns the hair follicles. The hair either regrows white or does not regrow, leaving a bold spot, both in the shape of the brand.

2. **Disbudding and dehorning**
-some people prefer to leave the animal in its natural state while others have found that leaving the horns on an animal can cause certain problems.

2019 – Describe one method which cattle farmers use to prevent calves from growing horns.

3. **Castration** - the process by which the testes, epidermis and a portion of each spermatic cord are removed from a male animal.

4. **Hoof trimming** - the nails on the hooves of cattle keep growing. In nature, the nails would get worn and trimmed naturally by the rocks the animals would be walking and climbing on or scratching.

5. **Weaning** - calves are taken away from the dam so that they can no longer suckle. This allows the cow to re-join the milking herd.
Calves of dairy cows are weaned off their dams and fed with milk replacer at 3 weeks age.
Calves of beef cattle are usually allowed to run with dam and weaned naturally or at 8 months age.

6. **Weighing** - weight gain indicates that an animal is growing. If young animals do not increase in weight then the farmer knows that there is a problem, usually related to management.
Farmers weigh the calves at regular intervals. The weights are recorded and growth rates can be calculated.

2019 – Explain one reason why a cattle farmer would cull a healthy young bull from the herd.

Sling and spring scale - calf is placed in sling and hung from the scale	**Cattle scales** - calf stands on platform which has a scale attached	**Calf scale** - calf tape is tightly wrapped around coronary band of either front hoof and birth

		weight is read off the tape in kg. 

2017 – Describe how a farmer would use a calf-scale to determine the weight of the calf.

Lesson 1: **Diseases of Cattle**
Lesson Outcome: At the end of this lesson, the student will discuss diseases of livestock.

Septicemia - invasion of the bloodstream by microorganisms (bacteria, viruses, or fungi) from infection that is accompanied by acute systemic illness - [**blood poisoning]**

Emaciation - the state of being abnormally thin or weak

Anorexia - a lack or loss of appetite for food

Intradermal - within or between the layers of the skin

Urogenital - of or relating to the urinary and genital organs and their functions

Bloat - an over distention of the rumen/reticulum with the gases of fermentation

2017 – Symptoms of bloat?

Swelling (darker area)

Rumenotomy - surgical opening of the rumen through the left upper flank for the purpose of examining the reticulum, rumen or esophageal groove or for emptying the rumen

Being a mammal, cattle share many of the same diseases as sheep, goats and pigs.

Diseases of Calves
Calves suffer from diseases if exposed to predisposing factors which include
(i) presence of infectious agents in dam or surroundings
(ii) habitat is cold, wet, drafty, dirty and overcrowded
(iii) calves have not developed immunity due to lack of colostrum

Calf diseases can be prevented and controlled if the predisposing factors are addressed.

Healthy calf	**Diseased calf**
	

Lesson 1: Moving Cattle
Lesson Outcome: At the end of this lesson, the student will discuss the catching and moving of cattle.

Handling - how agricultural animals are touched, moved and interacted with during husbandry procedures

Droving - a flock or herd being driven on foot from one place to another

Transport - when agricultural animals are moved by vehicle or vessel from one place to another

Transportation can be one of the most stressful situations an animal experiences and can cause a number of physiological and behavioral changes including fighting, stamping and running away.

2017 – Describe one way in which cattle that are stressed during transportation to the abattoir may act.

Effects of transport and movement include:
- ✓ stress - uncooperative animals
- ✓ bruising - meat is unsuitable for use
- ✓ trampling - animals go down due to slippery floors, overcrowding or stress
- ✓ suffocation - when smaller animals are transported with larger animals
- ✓ heart failure - occurs if animals are too hot and stressed
- ✓ sun burn - when animals are transported in the heat of the day over long distances
- ✓ bloat - restraining ruminants or tying their feet without turning them
- ✓ predation - unguarded animals moving on the hoof may be attacked
- ✓ dehydration - long distance travel without proper watering will suffer weight loss and may die
- ✓ exhaustion - may occur for many reasons including heavily pregnant animals or weaklings
- ✓ injuries - broken legs, horns
- ✓ fighting - when animals are stressed and overcrowded

Droving cattle	
- move animals at their walking pace - keep animals in groups with which they are comfortable e.g. same size, sex and horns; with a dominant animal leading	

- herd cattle into yards following barriers like fence lines, roads, river banks etc.	
Loading cattle - load different groups in separate compartments: place heavier cattle towards front of trailer; keep bulls and animals from different farms separated. This keeps animals from trying to establish a new social order on the trailer -walk cattle along a chute and up a ramp of less than 25˚ elevation.	

Transporting cattle - use vehicle which has a non-slip floor, is well ventilated and can keep groups of livestock separated from each other - ensure a safe ride - travel when it is cool and traffic is lighter on roads - travel for less than 4 hours or provide a stop where animals can be watered and fed	
Unloading cattle - transport should be backed up into a field or holding pen which has water and feed available - attach the chute then turn the engine off and open the doors - animals are then gently encouraged to disembark