

PRACTICAL MANUAL

ON

LIVESTOCK PRODUCTION MANAGEMENT
AND LABOTATORY

Glossary of Livestock Terms:

Artificial insemination (A.I.) : The technique of artificially introducing the semen of the male into the reproductive tract of the female.

Avian : a generic description of birds in general.

Beef: Meat from Cattle

Bovine : a generic name for cattle.

Brand : a marking placed on the hide of an animal by applying extreme heat, cold, paint or caustic materials.

Broken-mouth : a mouth having teeth missing. Usually applied to sheep or goats and occurs with old age.

Buck: an intact mature, male goat.

Buckling: an intact, immature male goat.

Bull: an intact male bovine.

Cattle: animals of the family Bovidae, genus Bos.

Cock: mature male chicken.

Cow: a mature, female bovine having had at least one calf. (a cow between her first and second calves is often known as a 'first-calf heifer'.)

Debeak : to cut off a portion of the upper and lower beaks of poultry to prevent cannibalism.

Disbud : to remove or prevent growth of the horn buds in young livestock.

Disinfectant : a substance used to kill harmful organisms on non-living surfaces.

Dock : to remove all or part of the tail.

Drench : to give liquid medicines orally to animals.

Elastrator : an instrument used to place strong rubber bands over the scrotum of tail for castration or docking, respectively.

Full-mouth : a sheep or bovine that has all its permanent incisor teeth intact and fully developed.

Hay : dried grass or legumes stored for winter fodder.

Hen : a mature avian female.

Live weight : the weight of an animal before it is slaughtered.

Needle teeth : small, sharp teeth, that piglets have at birth – also called 'wolf teeth'.

Restrain : to stop the movements of an animal so it can be examined or treated.

Rotational grazing : the regular, cyclic use of pastures to promote grass growth and combat parasite infestation.

Ruminant : a member of the class of animals having a four chambered stomach (cattle, sheep, goats, deer, etc.).

General Introduction of the Institute Livestock Section

The Livestock section of the Kapasa Makasa University consists of following sub-units:

Beef Cattle Unit: The unit maintains a small herd of Boran beef cattle reared under semi-intensive production system. The main infrastructure currently available includes, the night kraal, holding and crushpen and a number of paddocks fenced with game fence wire. Animals are fed natural fodder from the fenced rangeland, preserved dry fodder, and concentrate. There is very little in terms of fodder production for dry season where legumes are grown for feeding the animals. Currently use of bulls is the common breeding methods, utilizing the summer breeding season or natural. Energy and protein feed concentrates are obtained from the processing facility within the institution. In addition the institute has feed processing equipment for mixing and production of diets.

Sheep and Goat Unit: The unit maintains reasonably small flock Fat tailed sheep and Goat crosses. The animals are housed in slated modern house during night and during hot weather. The housing unit is enclosed in a paddock. The animals are allowed grazing for about eight hours daily on natural pasture along with in-house concentrate feeding. Preserved fodder, perennial legumes and fodder tree leaves such as moringa will be supplied during the dry season when grazing becomes difficult. Flock mating is practiced where male animals are allowed to run with the breeding female herd.

Poultry Unit: The unit consists of broiler production housing, and the village chicken production section currently under construction. There are two broiler production units. The centre intends to expand the poultry section by introduction of improved breeds of village chickens like Bushveldt, black Astrollops to be maintained as breeders flock. The broiler chickens are kept on deep litter system.

The village will be kept under semi-intensive system. In addition Layers will be introduced under cage system.

Activity Unit 1

Familiarization with external body parts of various livestock species

Objectives: To acquaint students with various external body parts of different domesticated animals.

Materials required:

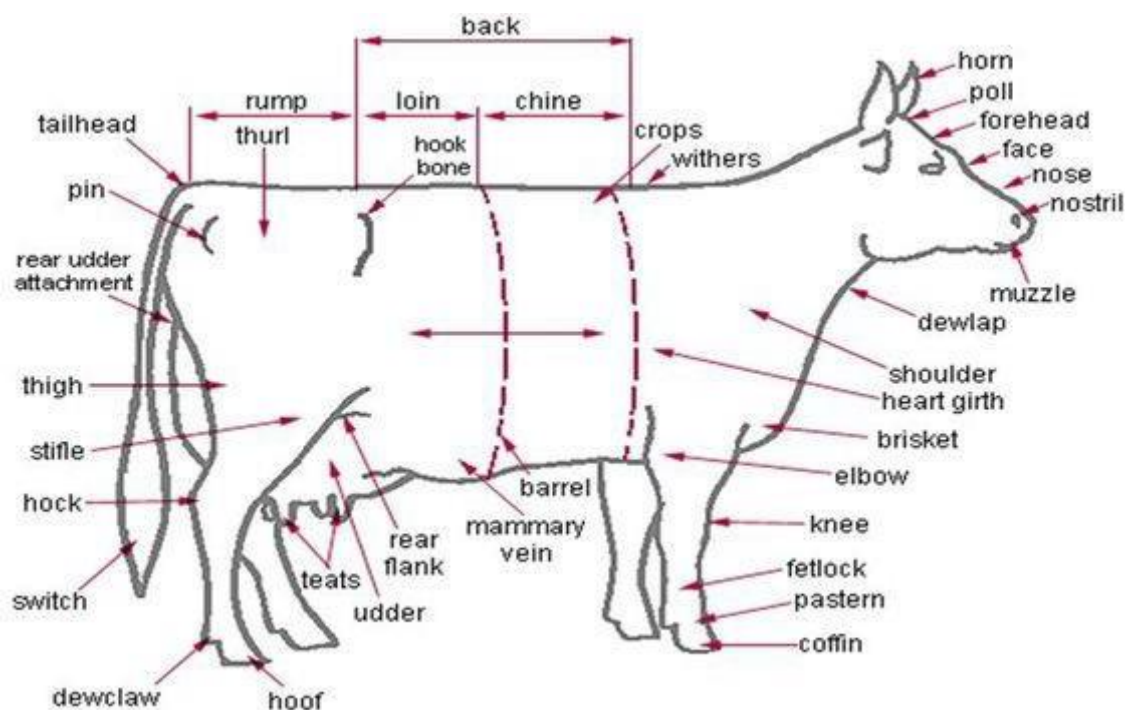
- Sketch of an animal with labeled body parts
- A mature animal as per species

Procedure:

- Study of labeled body parts on the sketch.
- Observe the location of the different parts on the body of animal as explained by instructor
- Practice locating and naming the parts correctly with the help of labeled diagram.

Identify the differences in the external parts in different animals.

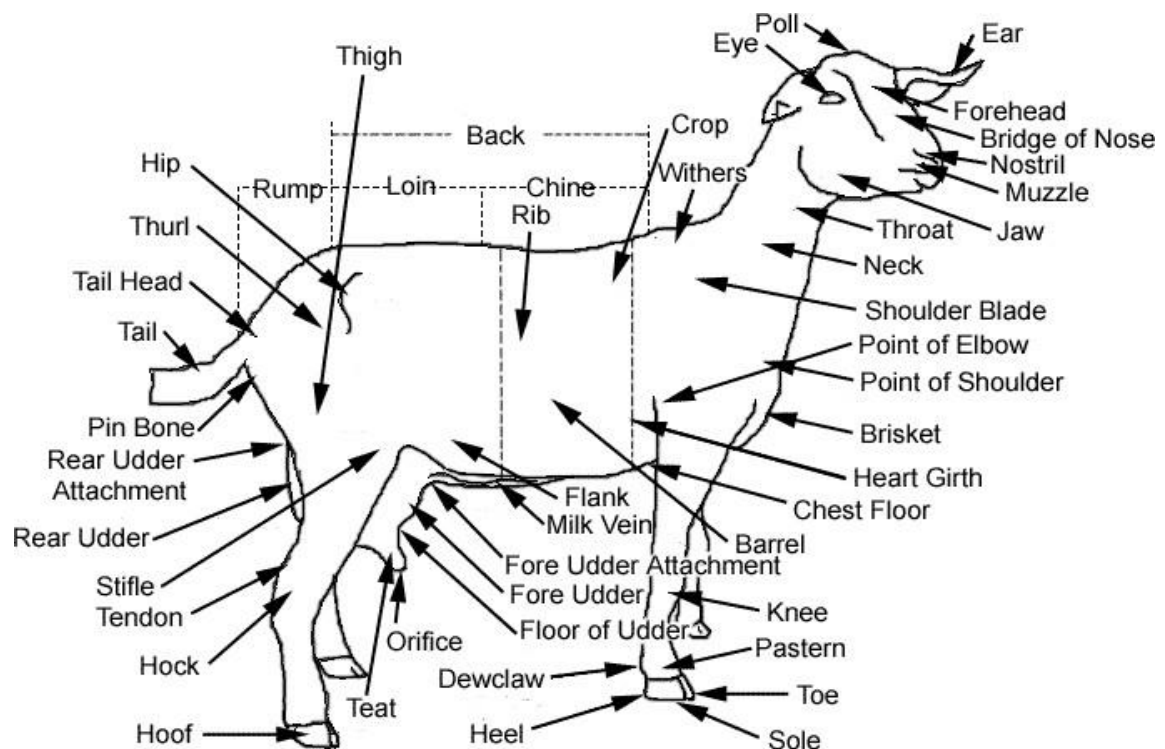
1. Parts of Cattle & Buffalo



- Head:** Poll, horns, temporal fossa, fore head, ear (base, tip, body & edge), eyes (eye ball; upper, lower & third eye lid; eye lashes), face, bridge of nose, cheeks, nostrils, muzzle, lips (upper, lower), chin, dental pad, teeth, gum, inter-dental space, tongue, mouth, angle of mouth, angle of lower jaw, throat and jowl.

- II. **Neck:** Base, apex and hollow of neck; crest; jugular groove; jugular vein; wind pipe; food pipe and dewlap (not in buffalo).
- III. **Fore Limb:** Shoulder, shoulder joint, point of shoulder, arm, elbow joint, point of elbow, fore arm, axilla, knee joint, fore cannon, back tendons, fetlock joint, dew claws, pastern, pastern joint, coronet, hoof, claws, horny wall, sole, bulb of heel, hollow of heel and inter-digital space.
- IV. **Hind Limb:** Hind quarter, thurl (hip joint), thigh, buttocks, pin bone, hook bone, stifle joint, hock joint, point of hock, hamstring, hind cannon, (back tendons, fetlock joint, dew claws, pastern, pastern joint, coronet, hoof, sole, bulb of heel, hollow of heel and inter-digital space).
- V. **Trunk (Body):** Hump (not in buffalo), withers, chine, loin, back, rump, point of rump, dock, tail, switch of tail, keel bone, brisket, chest, girth, abdomen, flank, barrel, anus, flap of flank, navel flap, udder (fore & rear; left & right), teats, milk vein, milk mirror/escutcheon, vulva, clitoris, sheath, scrotal sac, testes and penis.

Parts of Sheep and Goat



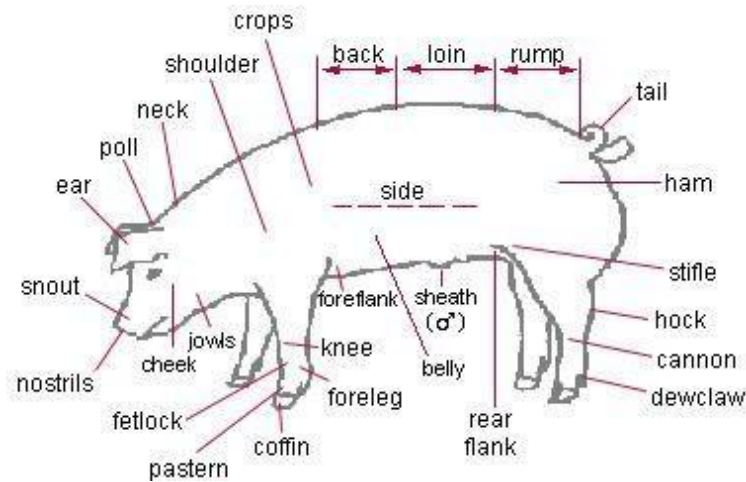
NB: Various external body parts of cattle are similar to sheep and goat as well, with following exceptions.

Points not present - Dewlap, hump, switch of tail, escutcheon, navel flap.

Points peculiar to sheep - Lacrimal pouch, tassels (throat folds), inguinal pouch, inter digital pouch, gigot (thigh)

Points peculiar to goat - Beard, mane, tassels (throat folds), crest (scrag), bag (udder), shank (hind cannon).

3. Points of Pig



1. **Snout:** Upper mandible is slightly protruding outwards with coverage of upper lip. This part is normally used by animal for digging the soil with the help of canines.
 2. **Neck:** Neck is stout or not distinct
 3. **Backon:** A side of a pig's body.
 4. **Ham:** It is the portion of thigh of swine.
 5. **Hoof:** It has two digits along with two rudimentary digits called dewclaws.
- (Rest body parts are similar to horse)

4. Parts of hen

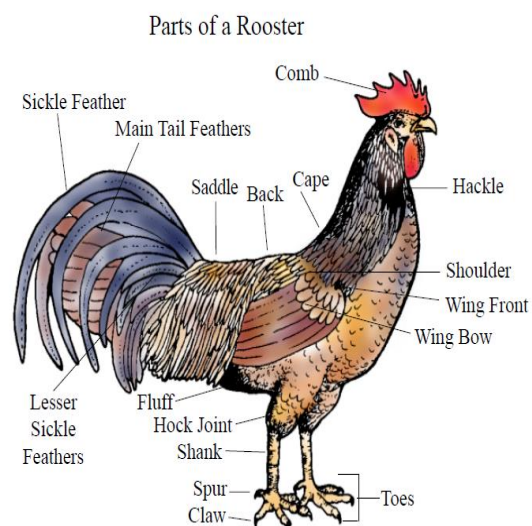
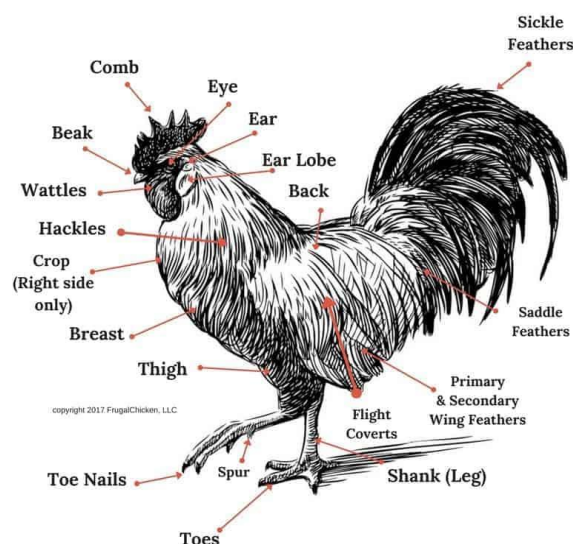


Figure 1. External parts of a Rooster. Source: University of Illinois. Used with permission.

Beak: To survive, chickens must have their beak. It is a unique arrangement of the hard, fibrous protein keratin. A chicken's beak has various functions, including eating, grooming, and defense. Chickens scratch at the ground with their beaks in search of food. They also use them to pick up small items like seeds, insects, and other tiny targets.

It's interesting to note that a chicken's beak grows during its life. It can grow extremely long if it isn't cut or naturally worn down. Health issues may result from this. Therefore, trimming hens' beaks is crucial to avoid any problems.

Comb: The chicken's comb, a bow on its head, has numerous crucial purposes. It is made out of a web of blood vessels. These veins regulate the chicken's body temperature. They accomplish this by altering the blood flow to the comb. The comb communicates during courting and mating as a vividly colored sign of the chicken's well-being.

Wattles: The bumps that protrude from a chicken's chin are wattles. They are made up of a network of blood vessels as well. Used for controlling body temperature. Throughout courting and mating, they also convey vigor and health. Wattles can be utilized to differentiate between males and females since they are more noticeable in males. Wattles can be tiny, rounded, long, and pendulous, among other forms and sizes. Like the comb, a chicken's breed and genetic makeup affect its sort of wattle.

Eyes: An eyelid, known as the nictitating membrane, covers the chicken's eyes, which are located on either side of its head. Every eye has a visual field of around 300 degrees. They can see their surroundings almost entirely because of this.

Ears: Chickens have extremely keen hearing. They are capable of hearing a variety of noises. They have a unique auditory system, although their hearing is less widely recognized than their vision. On either side of its head, the chicken has two tiny tufts of feathers that protect the ears. Hens can distinguish between noises other birds make and those of their species.

Nostrils: Chickens have nostrils protected by tiny, hard scales on their beaks. Since chickens lack a distinct channel for breathing and eating as people do, they must breathe through these nostrils. Their air sacs' walls are very thin, which facilitates more effective gas exchange. In addition, hens have a keen sense of smell, which they use to find food.

Earlobes: The chicken's tiny earlobes are on either side of the head, just below the eyes. The genetic makeup of earlobe colour differs greatly amongst chicken breeds. Chickens can move their earlobes, improving their ability to hear noises from various angles.

Feathers: They serve as insulation, aid in controlling the chicken's body temperature, and are crucial to its ability to fly. Chickens have two kinds of feathers: contour feathers, which give the bird its form. Additionally, they have down feathers, which act as insulation.

Wings: The wings of a chicken are designed for flight. Large, strong-flying muscles that link to the chicken's breastbone enable the bird to produce lift. The wings are also employed for balance and communication in addition to flying.

Legs: The legs of a chicken have a complex of over 50 different muscles and tendons working together to create movement and stability. These muscles are quite powerful. They may support the full weight of the bird.

Feet: The four toes on the chicken's feet each feature a pointed claw for digging and scratching. The chicken's toes are connected by a web of skin, which helps it stay balanced and hold objects. A

chicken's feet include scales that help it retain a grip on slick surfaces and shield it from harm and abrasion.

Toes and Claws: A chicken has razor-sharp claws. They can cut through both bone and tissue with ease. They become a powerful weapon against predators as a result. The ability to move and grasp makes a chicken's toes and claws so potent. Chickens have powerful grips that allow them to hold onto perches and other items. They can hang on a perch upside down without losing their balance. Chickens use their toes and claws in concert to scrape the ground or dig for food. They produce a robust digging movement. This movement effortlessly overcomes the soil and other obstacles.

Activity Unit 2

Familiarization with different body systems: skeletal, digestive, respiratory, circulatory and reproductive of farm animals

Objectives:

- (1) To know the different parts of farm animal body systems in detail.
- (2) To study the location, functional morphology of various parts of these systems.

Materials required:

1. Sketch of an animal with labeled internal body parts/systems
2. A mature animal as per species that should be slaughtered eg goat, chicken
3. Specimens from slaughter slabs or abattoirs

Procedure:

1. Study of labeled internal body parts on the sketch.
2. Observe the location of the different parts for various body systems of animal as explained by instructor
3. Practice locating and naming the internal parts correctly with the help of labeled diagram.
4. Identify the differences in the parts for various systems in farm animals.

Digestive system:

The general structure of the digestive system of farm animals is a hollow tube running from mouth to anus or cloaca. Starting from mouth these organs are: Oesophagus, Crop, Proventriculus, Gizzard, Small intestine, (Duodenum, Jejunum, Ileum), accessory gland (salivary glands, Pancreas, Liver), Large intestine (Caeca) and Cloaca for poultry and for large animals organs are: pharynx, oesophagus, stomach, Small intestine, (Duodenum, Jejunum, Ileum), (salivary glands, Pancreas, Liver), Large intestine and Anus. Ingested feed, feed present in the digestive tract, is external to the body

The function of the digestive system; breakdown of feed to its component parts (degradation) is termed digestion, movement of the digested materials into the body is termed absorption and excretion of wastes referred to as fecal.

Poultry:

(a) Mouth: In chicken teeth and lips is absent and instead you have a beak consist a pair of horny mandible on each side, which is the main organ of prehension. Tongue of chicken is shaped like a barbed head of an arrow with the point directed forward. Tongue helps in positioning the food and moving the food towards throat for swallowing. The salivary glands which lie in the buccal cavity, secrete saliva that lubricants food and as a buffer.

(b) Oesophagus: it is characterized by its ability to dilate and the property helps in propelling food from mouth to stomach.

(c) Crop: It acts as storage organ of food before passing it to the stomach as required.

(d) Proventriculus: It is a relatively small glandular stomach richly supplied with digestive juices from glands and lymphoid tissue. The gastric glands secrete hydrochloric acid and enzyme pepsin, which helps in protein digestion.

(e) Gizzard: The gizzard is oval, reddish in colour and located just after the proventriculus. Gizzard is also called as muscular stomach because it is supplied with two pairs of longitudinal muscles with the help of these muscles grinding of the food takes place to reduce particle size so as to enhance digestion.

(f) Small intestine: Small intestine forms the digestive tracts from duodenum to caeca and it is

structurally adapted for absorption of nutrients. The intestinal lumen is lined with villi which appear as small finger like projections. The portions of the small intestines are; duodenum, jejunum and ileum arranged in this order towards the large intestines.

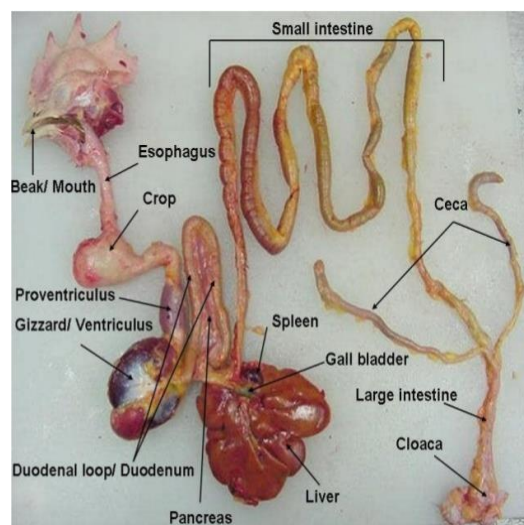
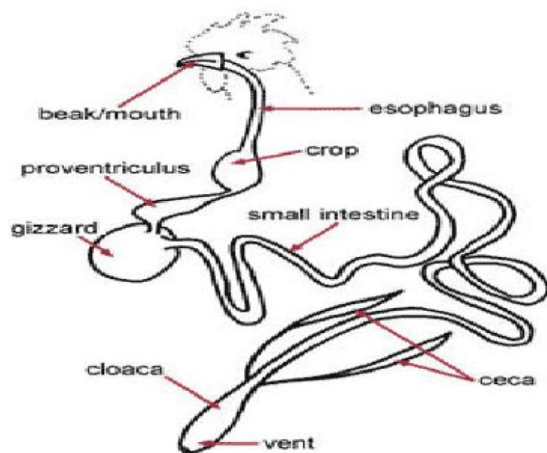
(g) Duodenum, Jejunum and Ileum: Immediately after the gizzard the intestine is folded in a loop like structure called as duodenum. The sides of the duodenum are parallel which enclose the pancreas. Duodenum helps in pancreatic and gastric digestion. Immediately after duodenum Jejunum starts which usually up to the meckel's diverticulum, just after that ileum starts and end at the ileo-cecal junction. Maximum absorption of nutrients takes place in the Jejunum portion

(h) Pancreas: Pancreas is located in the fold of duodenum and secretes a fluid called as pancreatic juice that contains proteolytic, amylolytic and lypolytic enzymes, which hydrolyze proteases, peptones, starch and fat.

(i) Liver: It is the largest gland in the body that produces bile. Its two ducts terminate into the duodenum as passage for the bile. The one dark green colour duct from right lobe of the liver is enlarged to form 'gall bladder' in which bile is temporarily stored.

(j) Large intestine: In relation to the small intestines, the large intestine is short. It starts from ileo-caecal junction consisting of short caeca, leading to the cloaca. It serves as a storage organ for faecal material and little fiber digestion takes places in caeca by the action of microorganisms. Absorption of water takes place in caeca as well as synthesis of vitamin B complex and vitamin K occurs in caeca.

(k) Vent/Cloaca: Cloaca is a common chamber for openings of digestive system, urinary system and reproductive system. The end products of digestive and urinary system are mixed and excreted through vent.



Monogastric and ruminant Digestive system

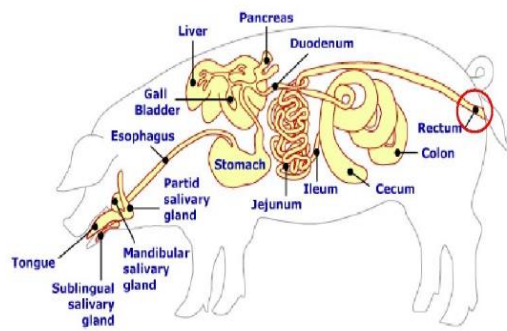
Classified based on type of stomach:

Simple Stomach: Man, Pig

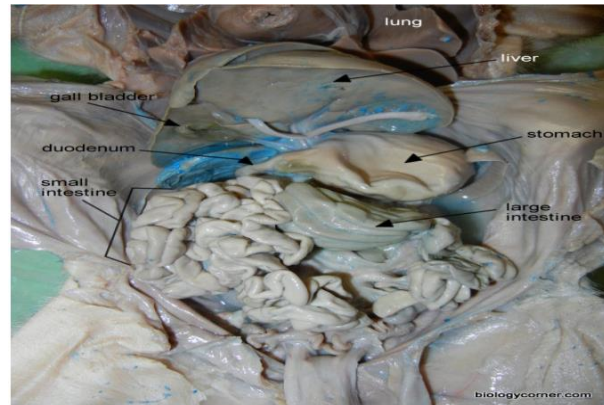
Simple Stomach with enlarged ceacum: Horses, Rabbits, Guinea Pigs

Complex Stomach: Cattle, Sheep, Goats

(A). Simple Stomach



Digestive System National Junior Swine Association Skillathon ...



Fetal Pig Digestive System (labeled) | biologycorner | Flickr

Mouth: The mouth gather and chew crush feed using tongue and teeth, preparing food for swallowing. The saliva secreted from the salivary glands moistens feed to aid in swallowing. Saliva juices contain enzymes that begin the carbohydrate breakdown with salivary amylase.

Pharynx: This is the funnel shaped muscle between mouth and esophagus as part of digestive and respiratory tracts. It channels food into the esophagus, preventing food material from entering the lungs. In ruminants the it also involved in rumination and eructation

Oesophagus: it is a muscular tube connecting to stomach separated from stomach by the oesophageal sphincter

Stomach: located between esophagus and small intestine. Perform similar functions as for poultry.

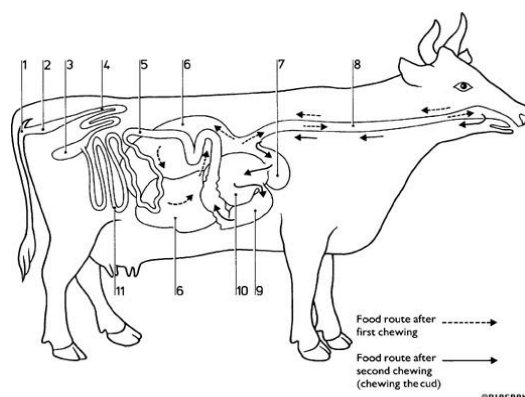
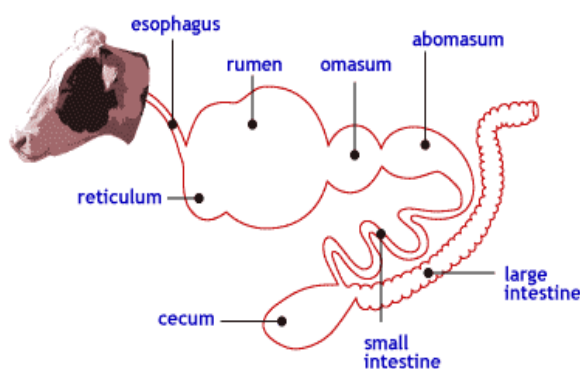
The simple stomach is basically divided into three regions; cardiac, fundus and pylorus

Small Intestine: Functions of the small intestine are digestion of proteins, carbohydrates, and fats; absorption of the end products of digestion

Large Intestine; it has three sections which are cecum, colon and rectum. It performs bacterial activity, water absorption and waste storage

Ruminant Digestive Systems:

Ruminants will “chew their cud” (regurgitate) their food material and then grind it with their molars at a time when the animal is resting. This is done until the food particles are small enough to pass through the reticulum into the rumen. The ruminant animal has a complex stomach comprising rumen, reticulum, omasum and abomasum.



1. Anus 2. Rectum 3. Caecum 4. Colon 5. Duodenum 6. Rumen 7. Reticulum 8. Oesophagus 9. Abomasum 10. Omasum 11. Small Intestine

Rumen:



The rumen is a large fermentation Vat for roughages and concentrate. Microbial Anaerobic fermentation to break down cellulose that creates lots of gases (methane and carbon dioxide) and VFA's (acetate, propionate, butyrate) released by bacteria passed to bloodstream through papillae

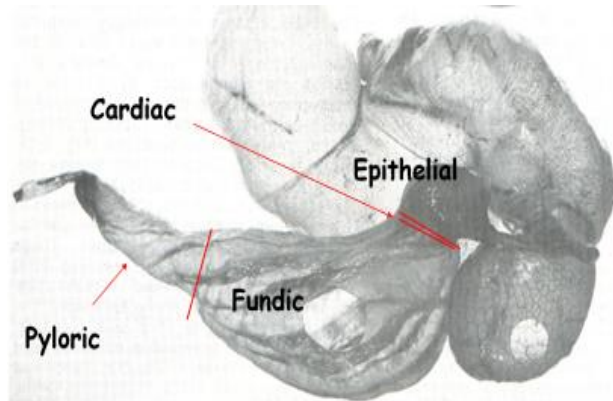
Reticulum: (Hardware Stomach or Tripe)- it is the smallest compartment (5%) as a small sac -part of rumen body. It captures dense, heavy feed for later rumination and collection of objects that shouldn't be in the digestive system such as nails, screws, baling wire. Sometimes magnets are placed into many dairy animals' reticulum for that purpose.



Omasum also referred to as "manyplies" or "book": it is the third compartment (7-8%) full of folded tissue. It "Grinds" the feed material and prepares the food material for chemical breakdown reducing the particle size and the absorption of water dries out ingesta. It also absorbs volatile fatty acids

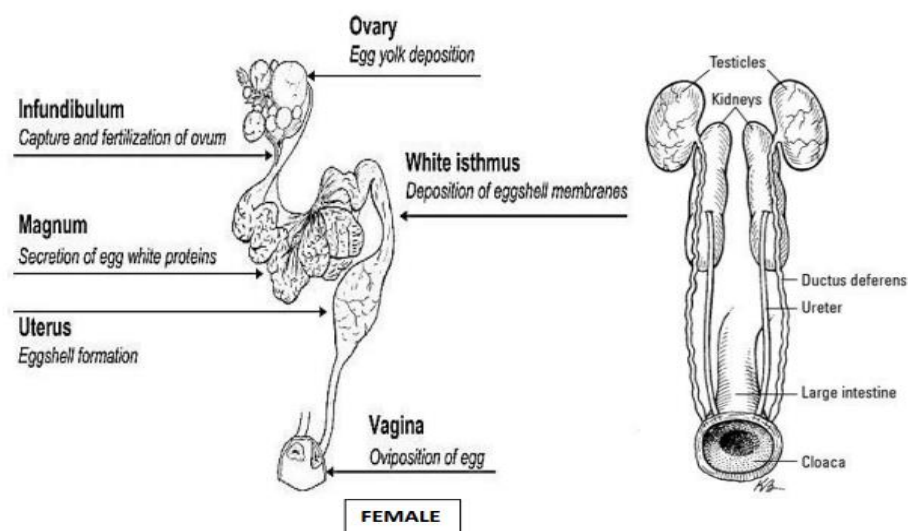


Abomasum: Referred to as a true stomach. The abomasum is tubular in design final compartment-(7-8%) of the complex stomach very similar to the stomach of non- ruminants. This is where the majority of chemical breakdown of food material occurs. It secretes HCl and enzymes for chemical digestion. Absorption of some nutrients and minerals takes in the true stomach. The HCl reduces the pH to 2.5 which kills the rumen bacteria. The ingesta eventually pass to small intestine.



Male and female reproductive system:

Poultry:



Female chicken/hen Reproductive System:

The reproductive system of the female chicken consists of **one ovary** and **one oviduct**. At the time of hatching, the female cluck **has two ovaries** and **two oviducts**.

The **right ovary** and the **right oviduct** degenerate later on, and **only the left ovary** and the **left oviduct** develop and function in the adult female. The ovary can be seen as a cluster of **grey yolks of varying sizes** situated at the anterior end of the left kidney. The yolk of the egg is formed in **ovary** whereas the **albumin** and the **egg shell** are formed in the **oviduct**. The ovary also secretes sex hormones.

The oviduct is in the form of a long glandular tube extending from the ovary to the cloaca. It has five membranes and the shell.

The vagina opens into the cloaca. Except the yolk, all other parts of the egg, viz. albumen, shell and shell membranes are formed in the oviduct. Its walls have glands, which secrete the material for the formation of the egg.

No.	Part of the oviduct	Functions	Duration of developing egg stays	Length (cm)
1	Infundibulum	Picking and engulfing the yolk	15 minutes	9
2	Magnum	Secretion of thin and thick albumen	3 hours	33
3	Isthmus	Formation of shell membranes	1 hours & 15 minutes	10
4	Uterus	Formation of shell	18 to 21 hours (average 20 hours)	10
5	Vagina	Oviposition	2 to 5 minutes	6
TOTAL			24 Hours : 35 minutes	68

Male chicken/cock Reproductive System:

The male reproductive system of birds is extremely simple, consisting of **two testes**, each having an **epididymis and vas deferens** that lead to the **copulatory organ**. The male bird is unique among domestic animals in that the testes are located along the backbone within the abdominal cavity and in front of the top lobe of the kidneys. During non-breeding season the testes are difficult to locate due to their small size, but during breeding season they may grow as much as several hundred times their non-breeding size. The testes also secrete the male sex hormones.

Normally, semen **is stored in the vas deferens** where it is diluted with lymph fluid; both are ejaculated as a mixture during copulation.

The penis of the male chicken is quite small, lymph enters the penis to form a mild erection, but it does not penetrate the cloaca. Rather during mating, the cloaca of the female opens to expose the end of the oviduct where semen is deposited.

Male reproductive system for a bull and buck/ram

The organs and glands of the male reproductive tract manufacture the male gamete (spermatozoa) and deliver it to the female reproductive tract. These structures include the epididymis and ductus deferens, accessory sex glands (ampullary glands, vesicular glands, prostate, and bulbourethral glands), the urethra, the penis. The reproductive tract of a bull has the following parts:

The testicles, including;

- Seminiferous Tubules made of Leydig Cells and Sertoli Cells.

The secondary sex organs, including;

- The epididymis
- Vas deferens
- Seminal Vesicle
- Prostate Gland
- Cowper's Gland
- Urethra and Penis

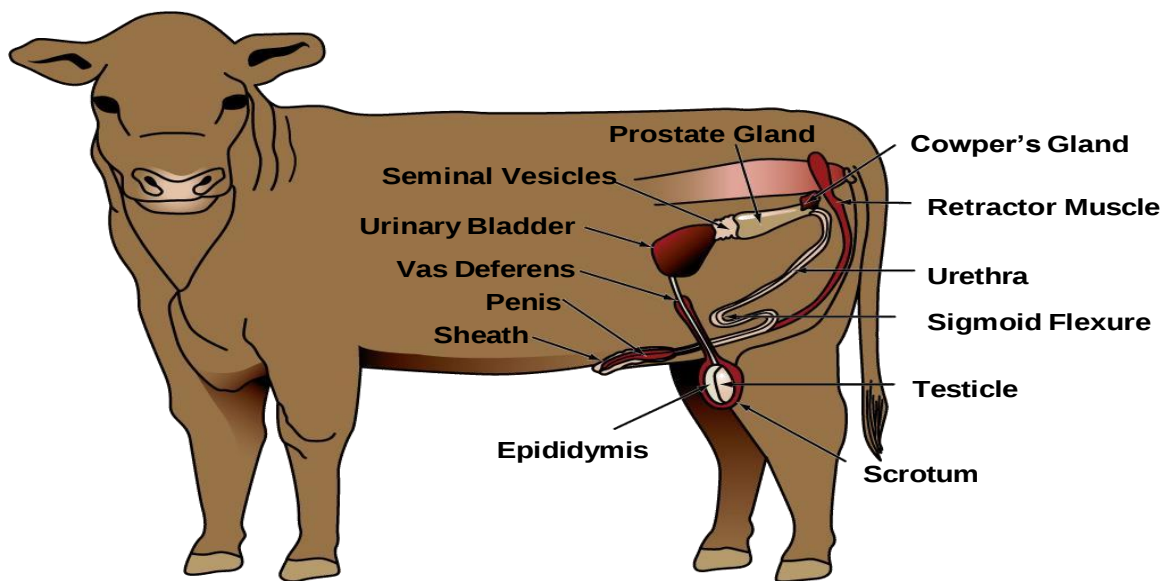
The Testes: The testicles have two functions:

- Production of the spermatozoa that will become the sperm cells
- Production of testosterone, the 'male' hormone

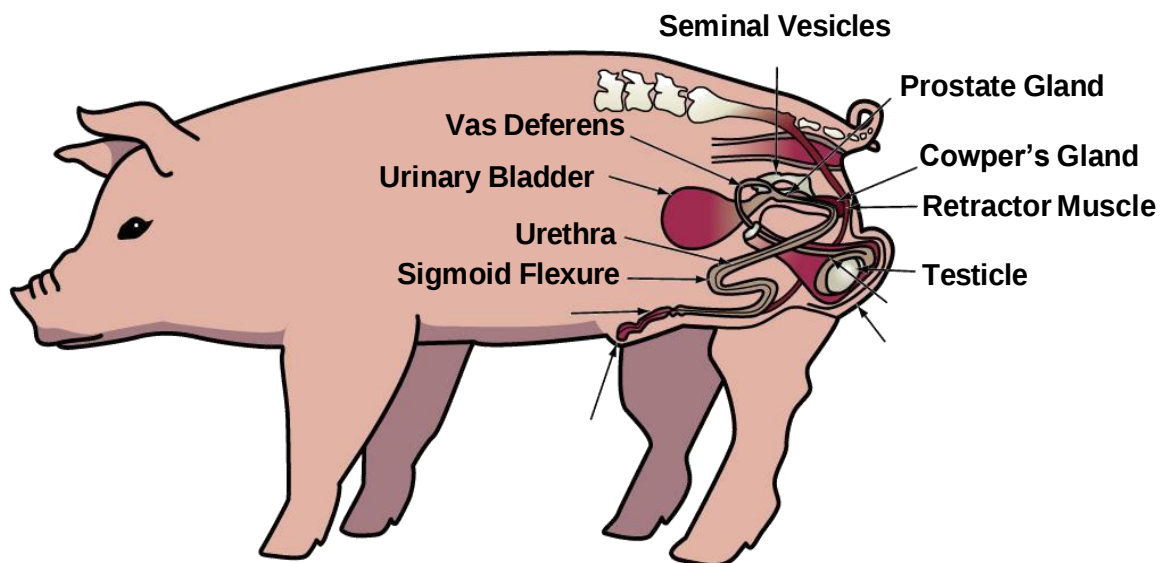
The testicle is the entire organ, consisting of the testis, the scrotum, and beginning of the epididymis. **The epididymis** is composed of the long, convoluted epididymal duct that connects the efferent ductules of the testis with the ductus deferens. The epididymis houses the spermatozoa as they mature before they are expelled by ejaculation. The epididymis is arbitrarily divided into a head, a body lying on the long axis of the testis, and a tail that is attached by ligaments directly to the testis and to the adjacent vaginal tunic.

Vas Deferens: From the epididymis, spermatozoa enter the vas deferens which carries the spermatozoa into the body cavity towards the urethra. It is surrounded by muscles that contract during ejaculation.

Ampullae of Henle: The vas deferens enlarges inside the pelvis to form the ampullae. This is where spermatozoa are stored and mixed with a nutritive substance.

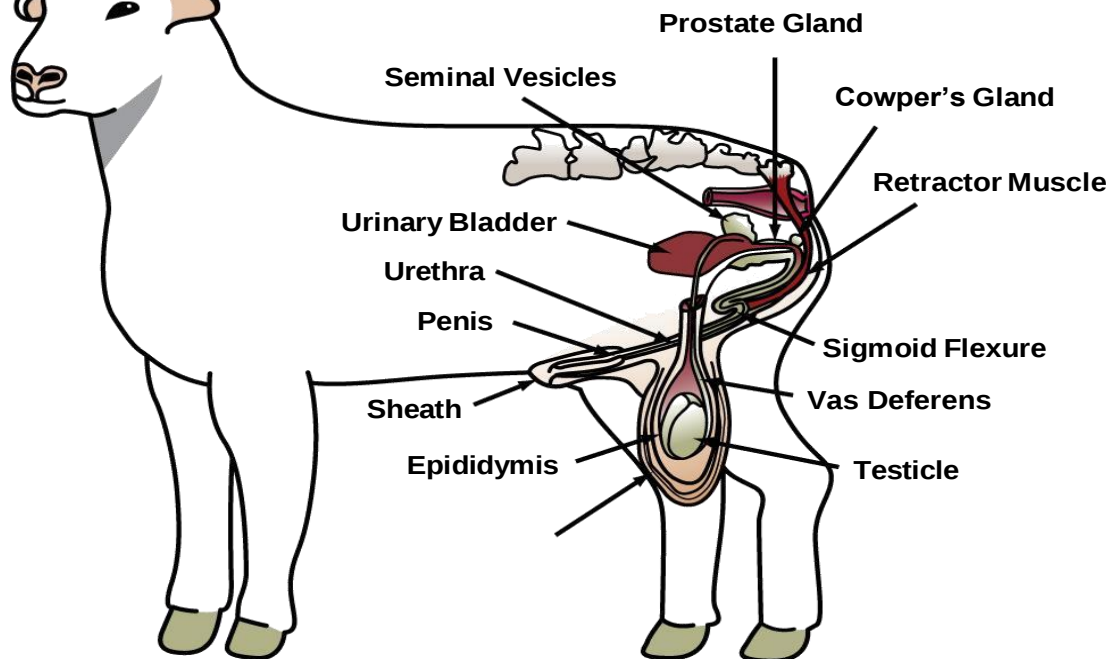


The reproductive system of a bull



The reproductive system of the boar pig

Reproductive System of the Ram



Accessory Glands: There are three accessory glands:

Seminal Vesicles: it feels like a bag of grapes (palpation) and it secrete a fluid high in sugars (fructose) to nourish the spermatozoa. This fluid also dilutes sperm at ejaculation and serves to activate motility. The fluid is rich in proteins, fructose and enzymes. Secretes prostaglandins, causing uterine contractions

Prostate glands: The prostate produces an alkaline secretion that gives semen its characteristic odor. Creates a basic pH of 7.5-8 to protects sperm

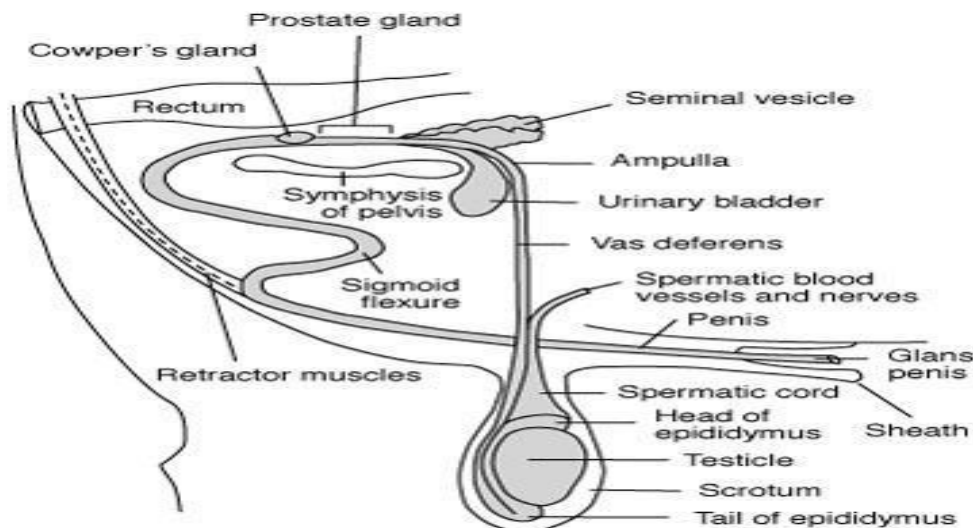
Cowper's gland: The bulbourethral (formerly Cowper's) glands are paired glands on either side of the pelvic urethra just cranial to the ischial arch but caudal to the other accessory glands. Its secretions cleanse male and female reproductive tracts prior to passage of spermatozoa (King Sperm's archers)

Urethra: The urethra extends to the tip of the penis (phallus), where it exits the body. It is surrounded by smooth muscle crucial for ejaculation. During copulation, sperm is moved into the urethra. This is a common pathway for both urine and semen.

Penis is composed of sponge-like blood tissue. Under sexual stimulation, this tissue fills with blood, enlarging it and enabling it to be inserted into a female's vagina.

The Retractor: Muscle: pulls penis back into the body

Sheath/Prepuce: This is the external skin which protects the penis.



Female reproductive system

The female reproductive organs consist of the ovary, uterus, cervix, vagina and vulva. Female reproductive tracts of various farm animals are similar to the cow, but differ primarily in the shape of the uterus and cervix.

Vulva: The external opening of the vagina is called the vulva.

The vagina serves as a receptacle for the male's penis.

In the cow, the semen is deposited in the vagina near the cervix during natural mating with the bull.

When artificial insemination is used, an insemination instrument is threaded through the vagina and cervix and semen is deposited at the uterine side of the cervix.

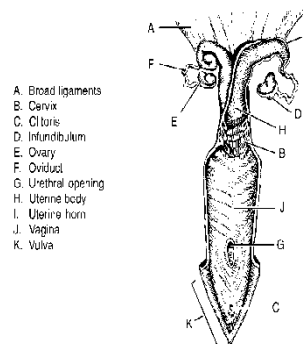
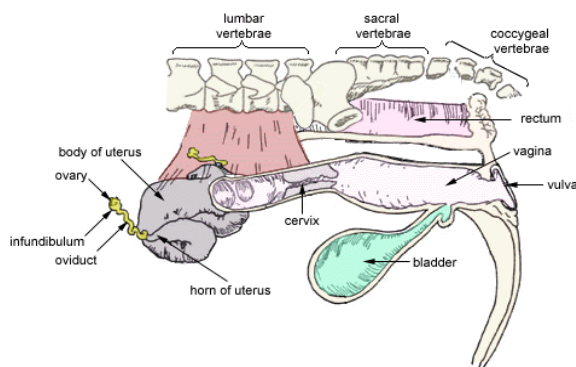
Cervix: connects uterus and vagina and serve as barrier during pregnancy. The cervix has annular rings and has thick walls that allow a passage of sperm at mating and expulsion of the fetus at parturition. During pregnancy, the cervix is filled with a thick mucus secretion known as the cervical plug, which protects the uterus from infections entering from the vagina.

The ovary is responsible for two basic functions:

- Production of the gamete -ovum.
- Production of two primary reproductive hormones, estrogen and progesterone.

The oviduct begins as a funnel-shaped tube that engulfs the ovary. When ovulation occurs, the ovum is picked up by the infundibulum and channeled into the oviduct (also known as the Fallopian tube), where fertilization takes place if sperm are present. Oviducts-

Functions of the oviduct are: site of fertilization, transport embryos to uterus, transport of spermatozoa and ovum.



Uterus: The uterus is the site of embryonic development during gestation. The fertilized embryo

moves from the oviduct into the uterine horn, where foetal development begins and continues to term until it reaches the uterus for implantation. There are different types of uterus and for the cow it is bipartite, with relatively long uterine horns and well developed.

Unit 3

Identification of Common Tools in Animal Farm

	<u>Image</u>	<u>Name & Use of items</u>
1		
		CASTING ROPE For restraining animals
2		
		BULL NOSE PUNCH For making perforation at nasal septum
3		
		BULL NOSE RING For controlling animals
4		
		BULL NOSE RING For controlling animals
5		

		BULL RING WITH HOLDER For controlling animals
6		PROBANG / STOMACH TUBE For collection of rumen liquor, drenching of liquid medicine & feed
7		METAL EAR TAG For identification of animals by ear tagging
8		TAG APPLICATOR For identification of animals by ear tagging
9		

		METAL EAR TAG WITH TAG APPLICATOR For identification of animals by ear tagging
10		PLASTIC EAR TAG WITH TAG APPLICATOR For identification of animals by ear tagging

11		
		TATTOOING MACHINE WITH DIGIT BOX For identification of animals by tattooing
12		
		TATTOOING DIGIT For identification of animals by tattooing
13		
		TATTOOING INK For identification of animals by tattooing
14		
		COLD BRANDING ROD (ALPHABETICAL & NUMERICAL) For identification of animals by cold branding

15		
		HOT BRANDING ROD (ALPHABETICAL & NUMERICAL) For identification of animals by hot branding
16		
		EAR NOTCHER For identification of animals by ear notching
17		
		BONE CUTTER For cutting bone during bird PM
18		
		SHEARING SCISSOR For shearing wool

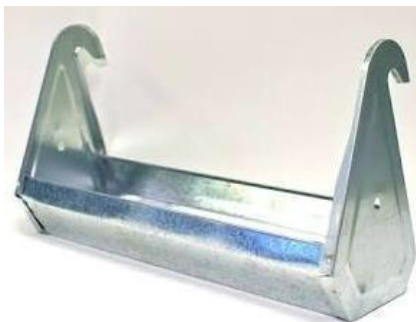
19		
		SHEARING SCISSOR For cutting hair & wool
20		
		HAIR CLIPPER For cutting hair
21		
		DANDY BRUSH For grooming of animals
22		
		BURDIZZO CASTRATOR (SMALL) For bloodless castration of small animals

23		
		BURDIZZO CASTRATOR (LARGE) For bloodless castration of large animals
24		
		MEASURING TAPE For body measurement of animals
25		
		PAN SPRING BALANCE For weighing of feed
26		
		PLATFORM BALANCE (SMALL) For weighing of small animals

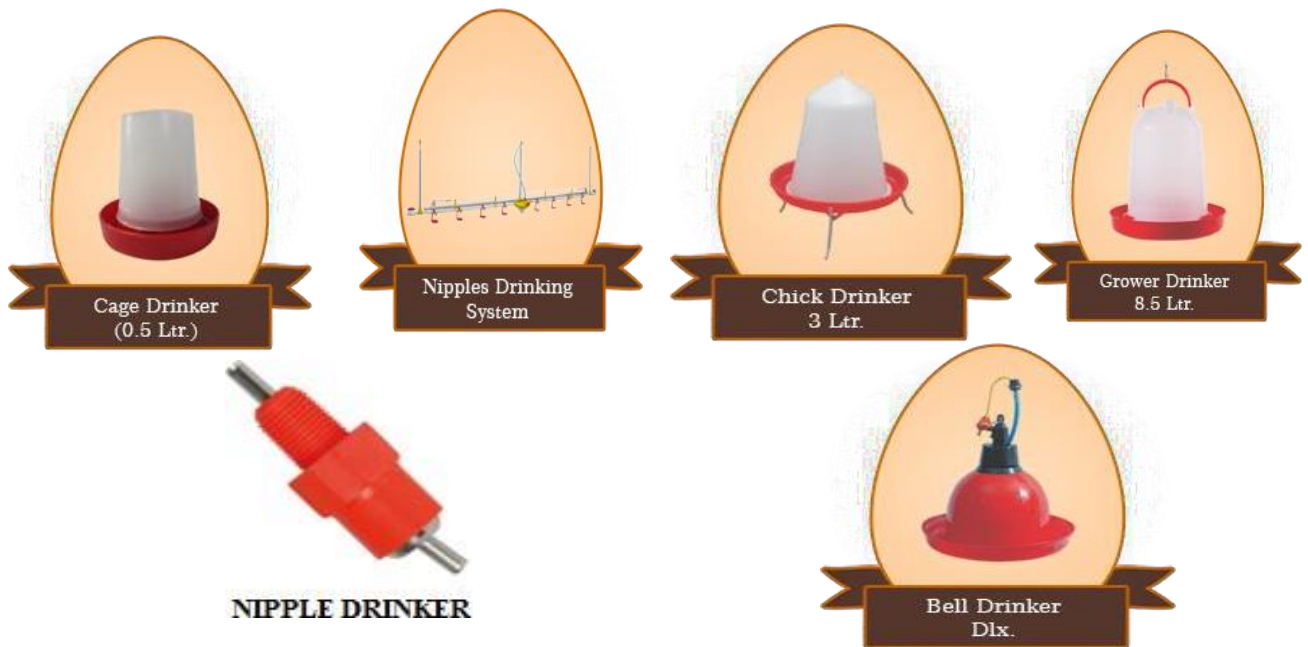
27		
		HOOF TRIMMER For hoof trimming
28		
		WIRE SAW Used for dehorning animals
29		
		ELECTRIC DEHORNER Used for dehorning animals
30		

			DELIVERY HOOK (SMALL) Used for easy parturition
31			
			DELIVERY HOOK WITH HANDLE Used for easy parturition
32			
			SNARE / CATCHER Used for catching animals mainly pig and also used for easy delivery process

EQUIPMENTS USED IN POULTRY FARM

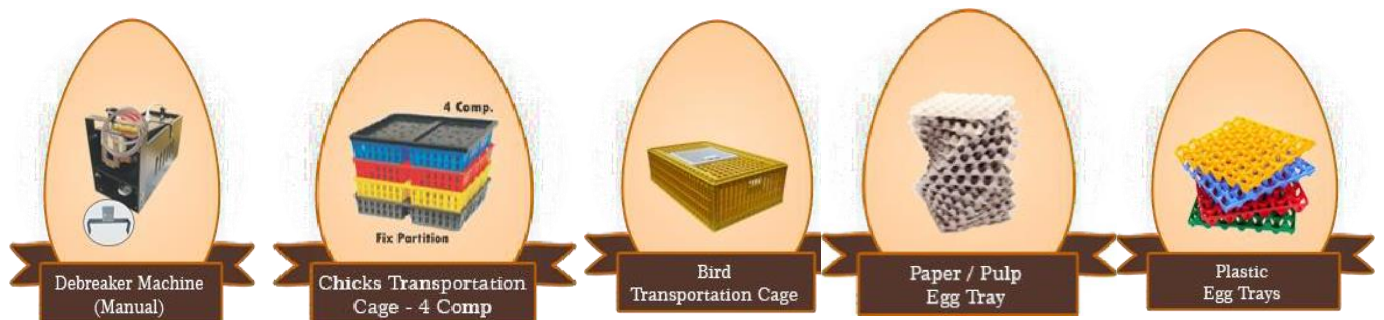


FEEDING EQUIPMENTS



DRINKING EQUIPMENTS

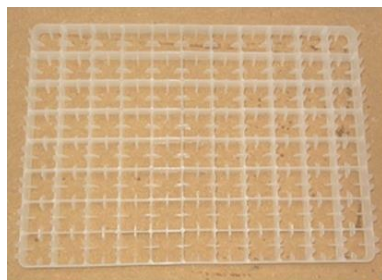
MISCELLANEOUS EQUIPMENTS USED IN POULTRY FARM



PARTS OF AN EGG INCUBATOR



EGG TROLLEY



EGG TRAY



HATCHING TRAY

Activity Unit 4

Identification of Livestock & Poultry

Objectives:

1. To know the different ways of marking for easy identification
2. To be able to understand the different marking equipment and the procedures involved.

The aim of animal identification is: Prevention of theft, Animal performance recording, Breeding, Genetic improvement, Management, Livestock statistics, Proof of ownership, Insurance, Traceability, disease control and food safety.

Procedure and materials:

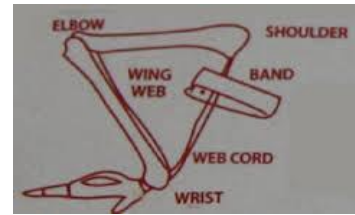
1. Drawings and pictures of various equipments
2. Various equipment as required and animals for practicals

Basic requirements for an identification system include:

- clear readability of the identification device
- central control over the production, allocation and distribution of identification devices
- devices must be difficult to counterfeit and be non-transferable (tamper-resistant)
- devices must be durable, cost-effective and easy to apply
- devices should not cause pain or discomfort to the animal

Some of the preferred methods of identification in different species

ANIMAL SPECIES	TYPE OF IDENTIFIER	WHERE IDENTIFIER IS APPLIED
Pig	Tattoo	Inner or outer surface of the ear
	Ear tags	Close to head in ears
	Notches	Ears
Sheep & goat	Tattoo	Inner surface of the ear, tail, inside rear flank
	Ear tags	Close to head in ears
	Neck chain	Around neck
	Paint branding(Stenciling)	Colour paint on the back
Poultry	Leg band	Closely around leg
	Leg ring	Closely around leg
	Wing badge	Front edge of wing
Cattle	Tattoo	Inner surface of the ear
	Natural colour & Marking	Charts & records
	Branding	Rump & shoulder
	Ear tag	Ear
	Nose print	Record

Methods:**-For poultry identification:****WING BAND****PLIERS****LEG BAND****For cattle:**

Branding: It is one of the permanent method

Types of branding include:

Hot Iron branding;

A good hot iron branding should be visible and recognizable since it destroys hair follicles located under several layers of the skin and leaves a permanent bald scar on the skin of the animal.

Requirement;

Branding irons/Electric branders made up of iron or steel, squeeze chute/Travis (for restraining).

Procedure

Assemble and keep the equipment ready Heat the branding iron

Before branding, restrain the animal

Check the temperature of branding iron. It should be red hot.

Then press the iron and shake the handle against the skin for fixing the iron properly. Time of application is usually 3-5 sec.

The brand marks should be big enough to read identify at a distance and each letter separated 2.5cm to prevent sloughing of the skin. Apply an antiseptic for healing of wound.

Freeze branding

Application of cold iron to the skin of the animal causes destruction of melanocytes and white hairs grow on the branded area.

Equipment Required: Iron/copper branders, Liquid nitrogen / dry ice and alcohol. Assemble the necessary cold branders / iron.

Procedure:

Cool the branding irons in the liquid nitrogen or dry ice. Before application, restrain the animal

Clip the area of the branding site, clean and apply alcohol to the clipped area

Apply the cold branders to the clipped area and apply equal pressure by pressing iron properly and evenly on the skin.

Time of application is 30 sec to 1min.

Ear tagging: Most popular method of identification system.

Equipments required: Tagging forceps/applicator and & tags

Procedure

Select the tag type (Single piece / Double piece).

Use the contrasting ink and style based on the skin colour of the animal.

Invert the ear tag into the appropriate applicator.

Locate the area in the ear for tagging) (half the way between base and tip of the ear). Puncture the ear with applicator if the tags are non-piercing type.

Apply the ear tag by puncturing the ear with the applicator.

Ear tattooing

It is one of the permanent methods of identification system.

Instruments Required

Tattooing forceps, tattoo digits /letters,

Tattooing ink/paste

Procedure

The required dies (Numbers and letters) assembled in the tattooing forceps.

Locate the area in the ear to be tattooed. (above the cartilage equidistance between tip and cartilage of the ear).

Clean the area with alcohol.

Position the equipment. Check the Number / letter in a piece of paper before applying in the ear.

Then squeeze the forceps for puncturing properly. Rub the tattoo ink / paste on the punctured area.

Ear notching

This method is commonly used in pigs and in beef cattle.

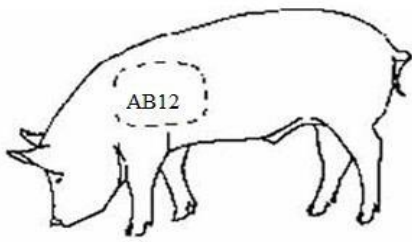
Notching means making a 'V' shaped notches at specific areas of the ear with the help of a sharp scissors or pincers/ notcher.

This method is fit for large farms.

Though this is a permanent method, notching is painful to animals

Age of animal and method of identification

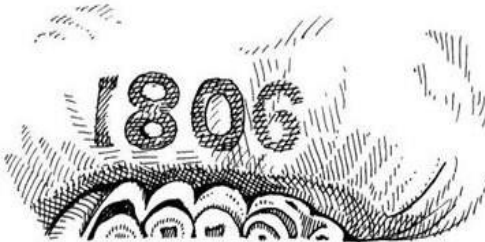
Cattle	Tattooing by the age of one month Branding at the age of six months
Pig	Ear tattooing at the age of one month Notching at 1-3 days of age Shoulder tattooing above 25 kg body weight
Sheep & goat	Tattooing at the age of one month Ear tagging by the age of one month



SHOULDER TATTOO FOR MARKET PIG



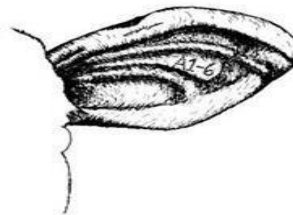
TATTOOING FORCEP & DIGIT



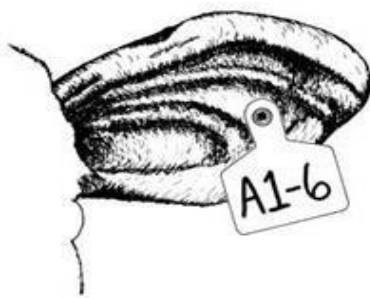
TATTOOING IN UPPER INNER LIP IN HORSE



TATTOOING IN LEG OF OSTRICH



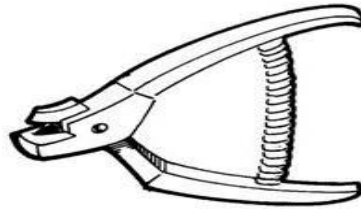
TATTOOING IN EAR



EARTAG

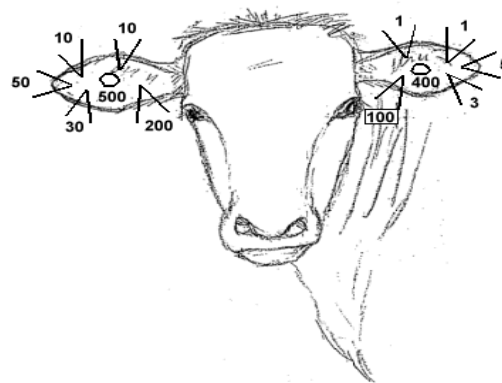
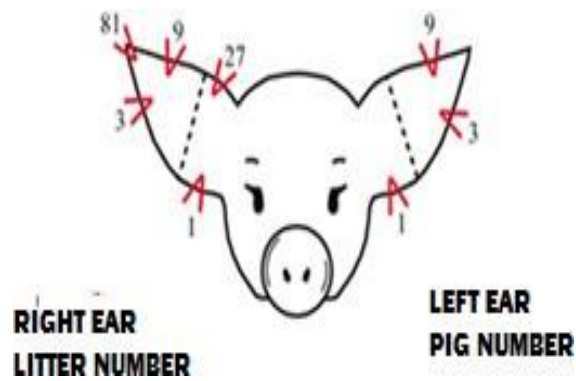


TAGGING FORCEPS



EAR NOTCHER

Standard ear notching identification system that can be used to pigs and cattle.



EAR NOTCHING IN PIG & CATTLE

Activity Unit 4

Routine management activities Livestock

Objectives:

1) To know the different management practices that should be carried out for efficient management of farm animals

2) To be able to understand the procedure, timing and reasons for carrying out routine practices

The aim of carrying out routine management practices is to enhance livestock production and productivity through controlled breeding, avoiding injuries and reduce water and feed trough space.

Routine livestock activities that can be carried out depend on the animal species, production system and resource availability. These activities among others include: tail docking, iron injection, disbudding, castration and dentition

Dehorning: Removal of horn either partially or completely. Dehorning is done in adult animals because of the following reasons:

- 1) Horns serve no purpose in the case of dairy animals.
- 2) During fighting does not cause major injury.
- 3) Less space for housing is sufficient.
- 4) Provides uniformity among the animals.
- 5) Dehorned animals are handled easily and are not dangerous to operators.
- 6) Avoid horn Cancer.
- 7) Management reasons

Materials:

- Dehorning hot iron
- Saw
- Anaesthesia
- Elastrator and rubber ring
- caustic soda

Methods: Before dehorning is carried out the animal need to be restrained. Common block anaesthesia eg lignocaine is administered to the animal in order to control and to avoid pain. Using the ordinary saw the damaged portion is cut just above the fracture area. There could be profuse bleeding because of severing of major blood vessels. After surgery apply some antibiotic powder in the area.

Elastrator Method: When there is no urgency for the operation this technique is being adopted. The horny portion of the horn is chiseled to a width of 1-2 cms. In the chiseled area a rubber band with high tensile strength is applied with the help of an elastrator. After the application, the rubber band will try to contract and it will slowly start cutting the soft core of the horn. This method is safer than the saw method because the blood loss is minimum or negligible.

Disbudding: In this method the growth of horn is arrested at an early age of the animal. It is preferably done within 4 to 10 days after birth.

Methods of Disbudding:

1. Chemical Method.
2. Hot Iron
3. Electrical dehorner.

Chemical method Caustic Potash/ Sodium or Potassium hydroxide Pellets or Sticks are used.

First you need to clip the hair around the horn bud then apply Vaseline or Petroleum Jelly around the

horn bud to avoid damage to the adjacent soft tissue. Then using the forceps hold the pellet and start rubbing against the horn bud in a circular fashion. The process is continued till blood starts oozing out of the central bud and bleeding has to be stopped before applying tincture iodine over the area and bandage.

Hot iron Method: In this method the end of the dehorner or hot iron is made red hot and applied over the horn bud in order to destroy the tissue. The sharp end of the rod is made to penetrate the outer circumference of the horn bud and lifted. Since the rod is red hot the bleeding gets automatically arrested.

Electrical Dehorner: The principle is the same as that of the hot iron dehorner, but the difference is that the temperature at the end of rod is maintained at 1000° C. The tip of the rod made of Copper is circular and just by pressing the rod against the horn bud for 10 seconds and by gentle lifting, the horn bud is removed. The rod is heated by electricity.

Castration: It is the removal of testicles. The purpose of castration is to get rid of surplus bulls which are unfit /not required for breeding purpose are castrated, to enhance docility of the animal fit for work purpose, castration improves the neck conformation for ease fitting of the yoke, in some cases for example in male pigs, goat and sheep it is done to improve weight gain and improve quality of meat and prevention of indiscriminate breeding.

Age for castration. Cattle: 1 year. Kid and lamb -4-6 months. Piglets-1-2 weeks.

Materials required depend on the method applied and may include: sharp knife, rubber ring and elastrator, burddizzo pincer.

Methods of castration:

The open cut method: it is practiced in horses, pigs and dogs. The area on the scrotum is first sterilized and local anaesthetic is given. With a sharp knife a slit is made on the skin and the spermatic cord is identified. Then two crushing one below the other are made at distance of 2 cms and in between, the cord is ligated and the portion towards testes is removed by severing at the second crush point. Antibiotic powder is dusted and the skin is sutured. Tincture iodine is applied to prevent infection.

Closed Method: Burdizzo Castrator is the instrument used for the castration.

- i. It is bloodless operation
- ii. Destroys the spermatic cord by crushing.
- iii. The nourishment to the testicles is discontinued and atrophy of the testicles takes place.

Procedure: The animal is casted first, then the testicles are dragged against the scrotal wall. The jaws of the castrator are introduced through the lateral border of the scrotum. Then the handle is pressed; the instrument is so fabricated that by pressing the handle maximum pressure is applied at the jaw end. The crushing is done 3-5 cm above the dorsal end of the scrotum. Two crushings are made at intervals of 2.5 cms. The second crushing is made just below first crushing to avoid pain. Apply tincture iodine to the crushed area.

Advantages: the operation is bloodless and the amount of pain is minimum compared with open cut method.

Activity Unit 6

Assessment of Age

Ageing of Animals

Objectives: To learn estimation of age in animals using different tools.

Estimation of age is an important factor in selection and purchase of animal. Further, it is important for –

1. For selection and purchase of animals.
2. For fixing the price of animal.
3. For determining the dose of medicines according to age of animals.
4. For estimation of age in the absence of records.
5. For judging the performance and returns from animal.

Methods: Age can be estimated by

- General appearance of the body.
- Counting horn (Cornual rings) and hoof rings.
- Dentition
- Records

Materials: Live animals or specimen

Dentition: It is the study of configuration and conformation of teeth with special reference to their period of eruption through gums. The estimates of age made through dentition are quite reliable as each pair of teeth arises approximately at a particular age of the animal. Variation in eruption of teeth may be due to individuality, breed, species and management conditions. Teeth erupt in two stages in mammals and accordingly classified as Temporary and Permanent. The temporary ones are also referred to as milk teeth. They are smaller, narrow in size and white in nature. The permanent teeth are usually broader and yellow tinged.

Further, they are classified based their position and function teeth as: Incisors, Canine, Check teeth (Pre molars and Molars). For the purpose of estimating the age, preference is given to incisor teeth

Differences between Temporary and Permanent Teeth

Temporary Teeth	Permanent Teeth
White or milky in colour.	Brownish or yellowish in colour.
Smaller in size.	Larger in size.
Have a distinct neck	No distinct neck.
Triangular in shape, and so a small triangle of gum is seen between the teeth.	Rectangular in shape, and so little or no gum is seen between them.
Have a short fang (root)	Long stout fang.
In horse, several ridges on the surface are seen which later become smooth.	Often 2 grooves on upper incisors and 1 groove on lower incisors.

Incisors are meant for mainly defense while the premolars and molars are for the mastication of food. Incisors are named after its position: Central / Medial; 1st Lateral; 2nd Lateral and Corner. Generally teeth fall into two broad categories which are: temporary and permanent.

Dental formula: It is a conventional way of giving a number for each type of teeth that are present on one side of the mouth. The numerators of the fractions represent the number of particular type of teeth in upper half of one side the jaw; whereas the denominator represents the same in lower half. These are then multiplied by 2 to get total teeth in the buccal cavity It is represented as

1 : Incisors 2. : Canine 3. Premolars. 4. Molars.

The number in the numerator denotes the number of teeth in the upper jaw and the number in the denominator denotes the number of teeth in the lower jaw.

Dental Formulae:

Species	Temporary	Permanent
Horse	$2 (3/3, 0/0, 3/3, 0/0) = 24$	$2 (3/3, 1/1, 3-4/3-4, 3/3) = 40 / 44$ (Male) $2 (3/3, 0/0, 3/3, 3/3) = 36$ (Female)
Cattle, Buff., Sheep & Goat	$2 (0/4, 0/0, 3/3, 0/0) = 20$	$2 (0/4, 0/0, 3/3, 3/3) = 32$
Pig	$2 (3/3, 1/1, 3/3, 0/0) = 28$	$2 (3/3, 1/1, 4/4, 3/3) = 44$

Cattle, Sheep and Goat:

Temporary. I : O/ 4; C : O/O : PM : 3 /3: M 0/0; $10 \times 2 = 20$ no.

Permanent. I :O/ 4; C : O/O : PM : 3 /3: M 3/3; $16 \times 2 = 32$ no.

Since the incisors are easily examined the attention is commonly paid to the stage of development of incisors

Type of teeth	Cattle		sheep	Goat	Pig
	Indigenous	Exotic			
Central incisors	2.5 years	2	1.5	1.25	1
1 st lateral	3.5 years	3	2	3	Canine-9 months
2 nd lateral	4.5	4	2.5	4	Lateral 1.5 years
Corner	5.5	5	3	5	6 months

Pigs:

Temporary. I :3/ 3 C : 1/1 : PM : 3 /3: M 0/0; $14 \times 2 = 28$ no.

Permanent. I :3/ 3; C : 1/1 : PM : 4/4: M 3/3; $22 \times 2 = 44$ no.

A tooth has Crown, Root (fang) and Neck as its parts. The crown has four surfaces: **Lingual;**
Labial

(in incisors)/ Buccal (in cheek teeth); **Contact** and **Wearing**/ Grinding/ Masticatory surface.

Classification of teeth

Type of teeth		Horse	Cattle, Buff., Sheep & Goat
INCISORS (Monocuspid)	Location	Anterior part of both jaws	Anterior part of lower jaw.
	Kind	Temporary & Permanent	Temporary. & Permanent
	No.	6 Upper (Central, lateral, corner) 6 Lower (Central, lateral, corner)	Dental pad – Upper jaw 8 Lower (Central, medial, lateral, corner)
	Use	Biting and Cutting	Biting and Cutting
CANINES (Monocuspid)	Presence	Only in male horse (Tush in equine, Tusk in pigs) Nearer to incisors in lower jaw than upper jaw.	Absent
	No.	2 in upper jaw 2 in lower jaw	-
	Kind	Always permanent	-
	Use	Tearing	-
CHEEK TEETH (Bicuspid)	Kind	Temp. & Permanent	Temp. & Permanent
	1 st , 2 nd , 3 rd (Premolar)	6 in upper jaw 6 in lower jaw	6 in upper jaw 6 in lower jaw
	4 th , 5 th , 6 th (Molars)	6 in upper jaw 6 in lower jaw	6 in upper jaw 6 in lower jaw
	Use	Grinding the food	Grinding the food
WOLF TEETH	Rudimentary	Anterior to premolars. Occasionally found.	-

ERUPTION TABLE FOR CATTLE

Time of eruption	Incisors	Cheek teeth	
Up to 1 mn	All Temp.		1 st , 2 nd , 3 rd Temp.
6 mn	-		4 th Perm.
1.5 yrs	-		5 th Perm.
2.0 yrs	Central Pair Perm.		1 st , 2 nd , 6 th Perm.
2.5 yrs	-		3 rd Perm.
3.0 yrs	Medial Pair Perm.		-
4.0 yrs	Lateral Pair Perm.		-
5.0 yrs	Corner pair Perm.		-

ERUPTION TABLE FOR BUFFALO

Time of eruption	Incisors	Cheek teeth	
Up to 1 mn	Central and medial Temp.		-
1.5 mn	Lateral Temp.		1 st , 2 nd , 3 rd Temp.
4.0 mn	Corner Temp.		
6.0 mn	-		4 th Perm.
1.5 yrs	-		5 th Perm.
2.0 yrs	-		1 st , 2 nd , 6 th Perm.
3.0 yrs	Central Perm.		3 rd Perm.
3.5 yrs	Medial Perm.		-
4.5 yrs	Lateral Perm.		-
5.5 yrs	Corner Perm.		-

ERUPTION TABLE FOR SHEEP & GOAT

Approx. age	Sheep	Goat
First year	One pair of central permanent incisors	Front teeth are small and sharp.
Second year	Two pairs (central, medial) permanent incisors.	Central pair of incisors are replaced by permanent teeth.
Third year	Three pairs (central, medial, lateral) permanent incisors.	One tooth on either side of the central ones are replaced by permanent teeth.
Fourth year	Four pairs (central, medial, lateral, corner) permanent incisors.	Six permanent incisors appear.
Fifth year	-do-	All permanent incisors appear.
Six year onwards	Broken mouth condition may occur, that may later lead to Gummer condition.	

ERUPTION FOR PIG

At 5 months there is a full mouth of temporary teeth.

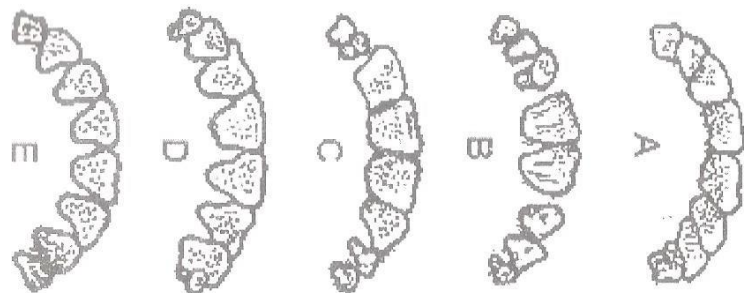
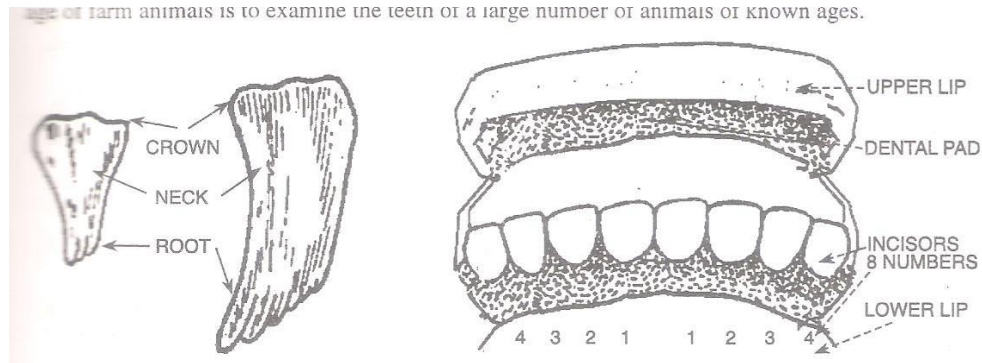
1. The eruption of teeth in pigs is peculiar; corner incisors erupt first, then central ones and lastly the intermediary ones.
2. At the age of 6 months the corner temporary in incisors are replaced by permanent teeth.
3. The permanent central incisors and permanent intermediate ones will replace temporary teeth by one and half years respectively.
4. By one and half year all permanent teeth will be erupted.

Estimation of age after complete eruption

A. Cattle : Incisor Teeth

When incisive border gets flattened		When roots are exposed		
	6 Years	CENTRAL	11 Years	

7 Years	MEDIAL	12 Years
8 Years	LATERAL	13 Years
9 Years	CORNER	14 Years



Based on horn rings:

The age of animals is found out by counting the number of rings in the horn called corneal rings. Number of rings plus one will give the age of the animal.

Horns: Age in cattle may be estimated using horn rings. Horns remain smooth up to about 3 years of age. This time they develop first ring, followed by one ring every year of advancing age.

Hooves: Hooves are small, smooth and close to each other in young animals. These get enlarged, roughened and much separated from each other on advancement of age. Hooves are difficult guide in estimating correct age as hoof rings get worn out in working animals.

General appearance of the body

Indicators – Eyes, teat, skin, hoof, horns, body size and disposition.

- Eyes are bright in early age and get sunken as age advances.
- Young animals have back straight, teats erect, skin smooth and tight and coat soft.
- Young animal is small sized, has thin legs, tight belly and active disposition.
- Young have small horns, smooth and black horns and hooves.

Using this information, animals may be categorized as young, adult and old.

Activity Unit 8

Date:

Familiarization with Fodder Crops, Seeds and Collection

Objective

1. To get familiarize with various fodder crop.
2. To utilize this knowledge in selecting the fodder for developing a balanced and economic ration.

Procedures

1. Place different seeds and fodders in different containers.
2. Study the characteristics of different seed and fodders.
3. Students will collect and prepare herbarium.

Sl. No.	English Name	Common local Name	Scientific Name
Annual Fodder crops (Non-leguminous)			
1.	Maize		<i>Zea mays</i>
2.	Sorghum		<i>Sorghum bicolor</i>
3.	Pearl Millet		<i>Pennisetum typhoideus</i>
4			
5			
Leguminous			
1.	Cowpea		<i>Vigna unguiculata</i>
2.	Clusterbean		<i>Cymposis tetragenobola</i>
3			
Perennial Fodder Crop (Leguminous)			
1.	Lucerne, Alfa alfa		<i>Medicago sativa</i>
2			
3			
4			
Perennial Pasture Grasses			
1.	Napier grasses	Elephant grass	<i>Pennisetum purpureum</i>
2	Guinea grass	Elephant grass	<i>Panicum maximum</i>
3.	Buffalo grass		<i>Cenchrus ciliaris</i>
4	Rhodes grass		<i>Chloris gayana</i>
5	Star grass		<i>Cynodon dactylon</i>

Preservation of Fodder – I: Hay Making**Objectives**

1. To familiarize the students with different methods of fodder preservation.
2. To make availability of fodder during scarcity period.
3. To avoid wastage of excess fodder produced during peak reason.

Note: The primarily object of hay making is to reduce the water content of the green heritage so that same can be kept well without spoilage like fomentation, developing mould etc. Hay is dry fodder, green in color. For safe storage moisture content should be below 18 percent.

Types of Hay – Legume hay, non-legume hay and mixed hay.

Hay	Maximum permissible moisture content
Loose hay	25-28 percent
Baled hay	22-25 percent
Chopped hay	19-22 percent

In order to judge whether hay is properly cured, two thumb rules methods are available.

- (a) Scrape method: With the nail by to scrap the epidemic can be peeled from the stem then it is not sufficiently cured.
- (b) Twist method: A small amount of the hay is twisted in the hand. If the stem breaks a little and no “plant juice” comes out from the twisted stem the hay can be assumed to have been cured well.

Common crops for hay making

(a) Grass from natural grassland, e.g.	
1. Kolukattai, Anjan	<i>Cenchrus ciliaris</i>
2. Moshi	<i>Iseilema spp.</i>
3. Phul	<i>Themeda spp.</i>
4. Ber, Bher	<i>Ischaemum spp.</i>
5. Dood, Hariyali	<i>Cynodon dactylon</i>
6. Dichanthium sp.	<i>Sehima nervosum. Heteropogon contortus.</i>
(b) Perennials such as:	
1. Leceme	<i>Medicago sativa</i>
2. Rhodes grass	<i>Chloris gayana</i>
3. Para grass	<i>Brachiaria mutica</i>
4. Guinea grass	<i>Panicum maximum</i>

5. Kikuyu grass	<i>Pennisetum clandestinum</i>
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(c) Annuals such as:	
1. Oats	<i>Avena sativa</i>
2. Sudan grass	<i>Sorghum sudanense</i>
3. Teosinte	<i>Elicillaena maxicana</i>
4. Soyabean	<i>Glycine max</i>
5. Cowpea	<i>Vigna sinensis</i>
6. Groundnut	<i>Arachis hypogaea</i>
7. Berseem	<i>Trifolium alexandritum</i>
8. Dina grass (Deenanath grass)	<i>Penisetum pedicellatum</i>

Materials required: hay bale specimen, fodder, sickle, hay box, ropes, slashes, machete and shovel

Procedures: the process involves the following;

1. Cutting the forage
2. Conditioning
3. Making windrows
4. Baling
5. Transportation
6. Storage

CUTTING

Cut at the time just before flowering

After flowering nutritive value is low

If cut when still very young the yield will be very low

So there should be a compromise between yield and nutritive value

The cut grass is called swathe

CONDITIONING

Leave the plant out in the field for a whole day or more so that moisture evaporates

Leave until grass has dried to precision i.e below 20%

The best way to dry the pasture fast is to use a mower conditioner

Swathe is made to pass through the rotors

Rotors will crush the outside of the stems of the grass

This facilitates loss of water from the stem

DETERMINING THE 20% MOISTURE CONTENT

Pick up some stems and twist them if nothing happens it is too wet

If some break off – it is about 35 % moisture

If most of them break off – it is about 25% moist

If all break off you have waited too long

WINDROWS

After cutting, grass should be made into windrows

This to facilitate easy bailing of the grass

A side rake can be used for making windrows

BAILING

Bailing can be done immediately after making windrows

Bails can be in different shapes

Ensure the grass is well secured to facilitate easy handling

SMALL SCALE HAY MAKING

Using a hay baling box or small pit:

1. Cutting the grass with a sickle, machete
2. Drying the Grass
3. Making a hole for making hay bales
4. Putting Strings in the Pit for Tying the Hay

5. Filling the Hay in the Hole
6. Compressing the Hay
7. Tying the Hay
8. Removing the Hay from the Hole
9. Storing the Hay

Preservation of Fodder – II: Silage Making**Objectives**

1. To familiarize the students with different methods of fodder preservation.
2. To make availability of fodder during scarcity period.
3. To avoid wastage of excess fodder produced during peak reason.

Common crops for silage making are Maize, Jowar, Bajra, Napier, Oats etc.

Silage is a fermented green forage product prepared under an anaerobic condition. Good silage is yellow-brown in colour with a characteristic acid with fruity smell and just exude moisture when squeezed. It is highly palatable and slightly laxative.

The crop should have 25-35 percent dry matter for better silage preparation.

Good silage should have following qualities:

pH	= 4.0 to 4.5
Lactic acid	= > 2.5 percent
Acetic acid	= 0.5 to 0.8 percent
Butyric acid	= < 0.1 percent
Dry matter loss	= < 10 percent
Effluent loss	= almost nil
Ammonial cel Nitrogen	= < 10 percent

Materials required: Fresh fodder, polythene plastic, silage bag, sickle, forage chopping equipment, rope.

Procedures:**Commercial silage production:**

Using a pit:

- a) Cut the plant material
- b) Chop into small pieces using either a manual or motorized chopper
- c) Put a polythene plastic in the silo/pit
- d) Place the chopped material in a silo/pit in layers
- e) Compact the material after each layer using a tractor or drums
- f) Cover with plastic to seal off (air tight)
- g) Cover with a layer of soil
- h) After 3-4 weeks the silage is ready

For small scale silage production:**Using: silage bag:**

Chopping:

- Chopping forage on logs using a machete
- Chopping fodder with guillotine and an ordinary knife

- Feeding a hand driven chopper
- Diesel driven forage chopper

Fill up the bag with fodder in layers,

Squeezing and sealing

Forage compaction in a mold

Removing the mold

Transport for storage:

Activity Unit 16

Date:

Humane Handling and Restraining of Cattle, Buffalo, sheep and Goat

Objectives:

1. To familiarize the students with different methods of animal handling.
2. To familiarize the students with different infrastructure and equipment used for restraining animals
3. To impart knowledge on animal behavior

It is generally necessary to apprehend and handle animals individually or in group temporarily for day to day management purposes. Such animals have to be approached, handled, controlled and even restrained in such a manner that no harm comes to the either the animals(s) being handled or to the handler.

Regardless of the types of animals being handled, complacency and the feeling of being safe in their presence may leave you off guard. Injuries usually occur when the victim does not expect it and all animals should be considered unpredictable. A lack of knowledge of animal behavior could put a handler into dangerous situations.

Facilities and Equipment:

In order to, not only prevent animal injuries but also carry out some routine animal operations, proper equipment and handling facilities must be available. Larger animals, in particular need equipment that is able to restrain them for general maintenance or health care such as crate or trevis or crush or stock.

Approaching animals:

The proper approach to a large animal is critical to working with them safely. Most large animals can see at wide angles around them, but there is a blind spot directly behind their hindquarters beyond which they cannot see.

- Any movement in this "blind spot" will make the animal uneasy and nervous.
- The safest approach is to "announce" your approach through a touch to their front or side. (See figure 1)
- Most large animals will kick in an arch beginning toward the front and moving toward the back. Avoid this kicking region when approaching the animal (See figure 2)
- A frightened cow will plow right over you. It is safer to use proper handling facilities made specifically for separating large animals. Most animals will be more cooperative in moving through a chute that has minimal distractions.
- When inside a handling facility or milking lane, always leave a way to get out if it becomes necessary. Try to avoid entering a small area enclosed with large animals unless it is equipped with a man gate that you can get to easily. Never prod animals if they have no place to go.

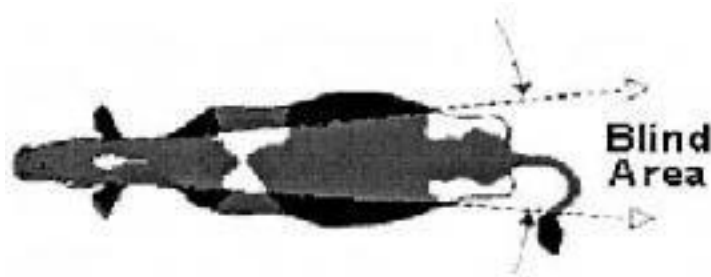


Figure 1



Figure 2

Controlling of Animals:

The process of regulating the movement of animals to certain extent for a brief period for the purposes like, drenching, giving injection, wound dressing, insemination, studying dentition, examining body parts etc.

Controlling by hand: grasping horn and /or external ear and seizing nostrils by first and second finger and thumb.

Controlling by rope: applying neck rope, muzzle and halter, lasso around the animal, lifting fore leg, milk-mans rope, under-kinch, nose rope etc

Use of equipment: like Bull leader, Bull holder, Drinkwater's gag, nose ring etc.

Restraining of Animals:

When animals' movement need to be regulated for longer duration for performing operations, shoeing, dehorning, branding etc., is done by throwing the animals on the ground. The process is called casting and is done either by Reuff's method or by Burley's method.

Controlling and restraining of small ruminant:

The animals do not require elaborate procedures for the purpose. They may be controlled by holding in between legs of the operator at the chest region. Use of mouth gag and turning are also conveniently used. Sheep stocks are suitable for larger size animals.

Recording Body Measurement

Objective: To learn recording of various body measurements.

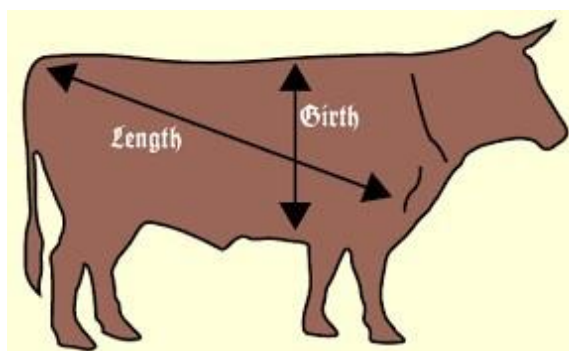
Materials required: Measuring tape 3 m., measuring stick, weigh bridge/bands.

Measurements: Generally applied for body height, length, girths (chest and paunch) and cannon bone circumference.

Animals should be measured from the near side, thus make the animal stand squarely on hard level ground, bearing equal weight on each limb with head up. Avoid using undue force while taking measurements.

- A. Body Height:** It is the vertical distance from ground to the highest point of withers.
- B. Body Length:** It is the oblique distance from point of shoulder to point of buttocks/ pin bone. Ordinary measuring tape is used for this purpose. Wall graphs are also helpful in recording such measurements.
- C. Chest Girth (Heart girth):** It is measured just behind the point of the elbow and round the chest using measuring tape. It is generally recorded in the morning, when the animal is off feed and water for a minimum of 12 hours.

The paunch girth (abdominal girth) is measured from rump and round the flank. For both the measurements, tape is held with just sufficient pressure.



Observation chart for body measurements (cm)

Species	Name/ No. of animal	Sex	Body measurements					
			HAW	BL	CG	PG	CBG	..
Cattle								
Sheep								

Goat								

Estimation of Body Weight of Animals

Object: To learn weighing/ estimation of body weight of animals.

Articles required: Measuring tape 3 m., weigh bridge/band. Weighing or Estimation of body weight is useful to –

- Determine approximate weight of the dressed meat.
- Estimate quantity of feed/ fodder requirement of the animal.
- Calculate the dose of the medicine.
- Correlate body weight with advancing age for various reasons – breeding, etc.

If weigh-bridge is available, walk the animal over it and record the weight indicated on the dial. Necessary precautions should be taken not to get the animal frightened while passing him over it.

Method:

Estimation of body weight

When suitable weigh-bridge (scales) is not available, a simple but reasonably accurate method of estimation of body weight becomes very useful. Various workers have developed formulae for estimating body weight based on body measurements.

Formulae developed by various workers

Sl	Name of the formula	For	Measureme nt units	Formula	Estimated Weight unit
1.	Shaeffer's Formula	C,H , S,G	inches inches	$(BL \times CG^2) / 300$ or $(BL \times CG^2) / 660$	lb kg
2.	Aggarwal's formula	C&H	cm	$(BL \times CG) / A$ A= 64.5, if CG <165 A= 61.0, if CG 165-200 A= 57.5, if CG > 200	kg
3.	Mullick formula	Buff.	inch	$(25.2 \times CG) - 960.232$	lb
4.	Sreedharan's	Buff.	cm	$0.00027454 (CG)^{2.7}$	kg
5.	Singh's, D.V.	Buff.	cm	$- 758.45 + (1.02 BL) + (5.8 CG)$	kg

Note:

- Cattle generally requires dry matter 2.0% – 2.5%, fodder 10 % of their body weight.
- The weight of dressed carcass, blood, hide and fat is $1/5^{\text{th}}$, $1/3^{\text{th}}$, $1/8^{\text{th}}$ and $1/12^{\text{th}}$ of the body weight, respectively.
- Estimates of live weight of animals are seldom variable by more than 5%.

Methods of Milking

Milking is the process of harvesting milk from udder. It is an art and should be conducted gently, quietly, quickly, cleanly and completely. Hand milking and machine milking are the two methods of milking.

Hand Milking

Cows are milked from left side. after let down of milk, the milker starts milking teats either cross wise or fore quarters together and then hind quarters together or teats appearing most distended milked first few streams of fore milk from each teat be let on to a strip cup. This removes any dirt from the teat canal and gives the operator a chance to detect mastitis.

Milking is done either by stripping or by full hand method. Stripping is done by firmly holding the teat between the thumb and fore finger and drawing it down the length of the teat and at the same time pressing it to cause the milk to flow down in a stream. Grasping the teat with all the five fingers and pressing it against the palm does fisting or full hand milking. The teat is compressed and relaxed alternatively in quick succession, thus the method removes milk much quicker than stripping as there is no loss of time in changing the position of the hand. Further full hand method is superior to stripping as it stimulates the natural suckling process by calf and moreover the method exerts an equal pressure on the large teats of cows and buffaloes.

Many milkers during milking tend to bend their thumb against the teat. The method is known as knuckling which should always be avoided to prevent injuries of the teat tissues. Thus milking should always be done with full hand unless the teats are too small or towards the completion of milking. The first few strips of milk from each quarter should not be mixed with the rest of the milk as the former contains highest number of bacteria.

Machine milking

Modern milking machines are capable of milking cows quickly and efficiently, without injuring the udder, if they are properly installed, maintained in excellent operating conditions, and used properly. The milking machine performs two basic functions.

- It opens the streak canal through the use of a partial vacuum, allowing the milk to flow out of the teat cistern through a line to a receiving container.
- It massages the teat, which prevents congestion of blood and lymph in the teat.

Advantage

The advantages of this milking machine are:. It is easy to operate, costs low, saves time as it milks 1.5 litre to 2 litres per minute. It is also very hygienic and energy-conserving as electricity is not required. All the milk from the udder can be removed. The machine is also easily adaptable and gives a suckling feeling to the cow and avoids pain in the udder as well as leakage of milk.

Clean milk production

Milk containing dirt, dust, foreign materials high bacterial count and with off, flavour is called a contaminated milk. Milk is contaminated by various sources like Udder, Exterior of cows body, milking barn, flies, milker, utensils etc. On consumption of contaminated milk, one may get a number of health problems. The sources for contamination are discussed below with their relative importance.

Udder

Unsanitary conditions of milking barns and bedding of the animal causes bacterial growth. Such bacteria may enter in to the udder through teat canal, which causes infection the udder like mastitis resulting contamination of milk. The fore milk may be discarded as it contains high bacterial count. Complete milking should be done. Incomplete milking may lead to infection of the udder.

Exterior of cow's body

Bacteria present on the animal body may enter in to the milk at the time of milking. Maintenance of, clean skin, washing flank and *udder with clean damp cloth before milk reduces the contamination from this source.

Milking barns

Milking barns with good ventilation and neat flooring avoids contamination from this sources, Dry feeds or forage should be fed after milking.

Flies and other vermin

External parasites like flies, lice; mosquitoes etc may have their entry in to milk. So care should be taken to avoid these parasites from the barn by spraying fly spoors or by fly traps. Breeding places for these parasites like stagnant water, moist atmosphere etc may be avoided.

Milker

Milker is directly responsible in producing good quality milk. Dirty hands and clothing of the milker may be the source of contamination. Several bacterial diseases may transmit from the milker, or handler to the consumer through milk. Persons suffering from diseases like T.B, Typhoid fever, diphtheria may not be employed for milking. Dirty habits like smoking, drinking should be avoided.

Utensils

Utensils are the containers or equipments in which the milk is handled, processed, stored or transported. Clean sanitized, smooth copper free and dry utensils may be used for handling milk.

Milking method

Wet hand milking and fisting causes contamination of milk. Milkers in rural moisten their

fingers with milk, water or even saliva, while milking. This should be avoided. Wet hand milking should be avoided. Wet hand milking makes the teats look harsh and dry chokes, cracks and sores appear which causes contamination. Twisting causes damages to the teat tissue which leads to udder infection. So dry hand milking may be practiced to avoid contamination of milk. Major contamination of milk is caused by bacterial entry. So steps to be taken to, monitor such bacterial entry like avoiding unsanitary conditions of the barn. Milker, Utensils and avoiding unfair milking practices.

Steps in Clean Milk Production

- The animal should be washed before milking.
- Washing of cows is best practice to minimize the bacterial entry.
- If calf is allowed for sucking, udder may be moist, cleaned with weak disinfectant solution later with fresh, clean water and wiped dry with a smooth and clean cloth.
- Hands of the milker should be clean and dry. Wet hand milking may result in high bacterial count in the milk.
- Nails of hands of the milker should be well trimmed.
- Milker should be free from all diseases.
- Dusty feed like Rice polish should not be fed to the animal at the time of milking.
- Milking barns should be well ventilated free from flies.
- Utensils used for milking should be clean, sanitized, smooth and copper free.
- Flavour producing feeds should be fed only after milking So that flavours will not appear in milk.
- The hind legs and the switch of the animal be tightened with the help of a milk man's rope at the time of milking.
- Milk is kept in cool place to maintain the flavour and keeping quality.
- Milk should be covered with lids to avoid dust, dirt, entry hot, or cold, day light or strong artificial light, all at which tend to decrease milk quality.
- Raw milk with not exceeding 2,00,000 specific count in one ml of milk can be graded as very good raw milk

Milk Hygiene

Milk is sterile when secreted into an uninfected udder. Contamination occurs during and after milking. Exclude milk from clinical mastitis cases to avoid high bacterial counts. Use mastitis control routines at each milking to reduce the proportion of infected cows and clinical mastitis cases. Avoid contamination from dirty udders and teats by good cow housing and grazing management. Wash off visible dirt from udders and teats prior to applying the teat-cups. If udder washing is necessary, then drying afterwards is essential. Individual paper towels for both washing and drying are preferable to udder cloths. Clean and disinfect milking and ancillary equipment after use, paying particular attention to milk contact surfaces which are a main source of contamination.

The milk secreted into an uninfected cow's udder is sterile. Invariably it becomes contaminated during milking, cooling and storage, and milk is an excellent medium for bacteria, yeasts and moulds that are the common contaminants. Their rapid growth, particularly at high ambient temperatures can cause marked deterioration, spoiling the milk for liquid consumption or manufacture into dairy products. This can be avoided by adopting the simple, basic rules of clean milk production.

Milking premises

The milking premises should have a dairy or suitable place equipped with a piped hot and cold water supply, a wash trough, brushes, a work surface, storage racks and cupboards and, if necessary, a vacuum pipeline connection. In addition, it is advisable to have a dairy thermometer (0°C - 100°C), rubber gloves and goggles for use when handling chemicals.

Initial cleaning

Cleaning your hands and the cow's udder helps reduce the chance she'll end up with mastitis, or an infection in the udder. Wash your hands with soap and water, then use the proper technique to clean the udder. Wipe the bottom and sides of the udder with a clean, damp towel, then dry it completely with another towel. Any dampness left on the udder can lead to the skin cracking or flaking as you milk her. After you're finished milking, dip each teat in a small cup of iodine or teat dip to cleanse it and remove any bacteria that might invade the udder.

Stripping Technique

When you're ready to start milking the cow, grab a teat in each hand, holding it between your thumb and forefinger. Start at the top of the teat, then slide your thumb and forefinger down the length of the teat, compressing it as you slide. Squirt a few streams out of each teat in this manner into separate cups, then check the milk for signs of mastitis, such as flakes or clumps in the milk. Never drink milk from an infected teat. After squirting out enough milk to inspect, stop the stripping technique. The friction from sliding your fingers down the teat can irritate the cow's skin. At the end of your milking session, use the stripping technique for a few squirts; the last dribbles of milk often are richer than the rest.

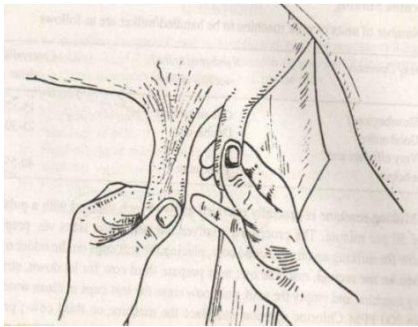
Full-Hand Technique

The proper technique for the majority of your milking time is using your full hand. Grasp the top of the teat by wrapping your thumb and forefinger around it, then compress the teat and wrap your other fingers around it as you squeeze. This forces milk already in the teat out in a stream without sliding your hand up and down the teat. Release the compression without fully letting go of the teat. This allows more milk to drop from the udder into the teat so you can compress your fingers from top to bottom and squeeze out the milk. Because your hand isn't sliding on the teat, it reduces the chance of irritation to the cow.

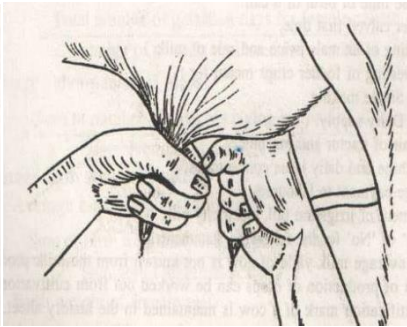
Which Side of the Cow

A cow who is not used to being milked won't care which side you work from; there's no set rule you must use to choose a side. However, it's important to always work from the side the cow is comfortable with. When you choose a side, or if someone has milked the cow previously, use the same side every time you milk. This helps the cow relax. In the United States, most people approach the cow from the right side to milk, although people in other countries, such as India, often milk from the left.

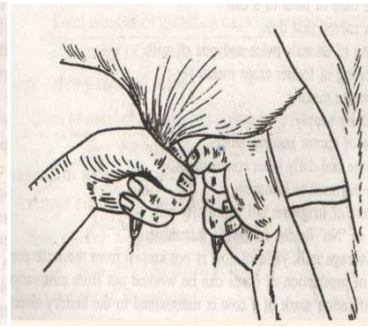
METHODS OF HAND MILKING



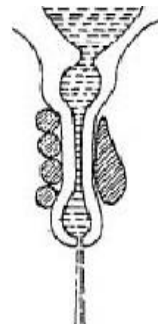
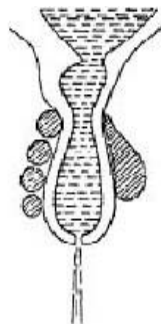
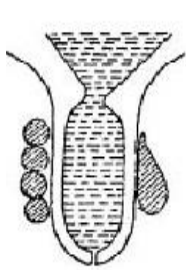
Stripping method of hand milking



Full hand or fisting method of milking



Knuckling method of hand milking

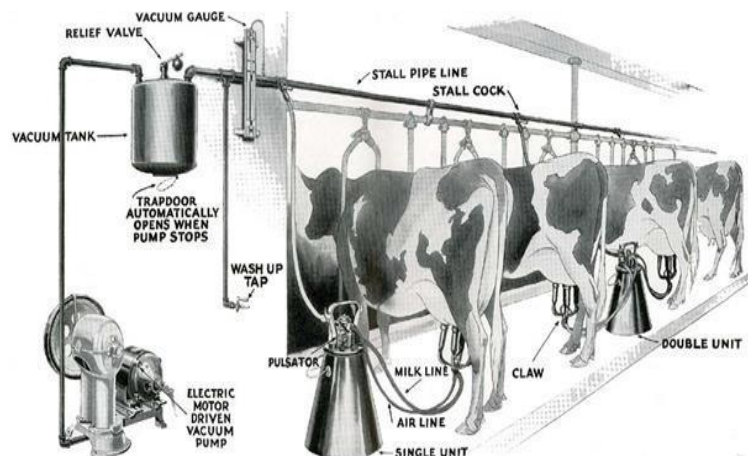


Milk Can

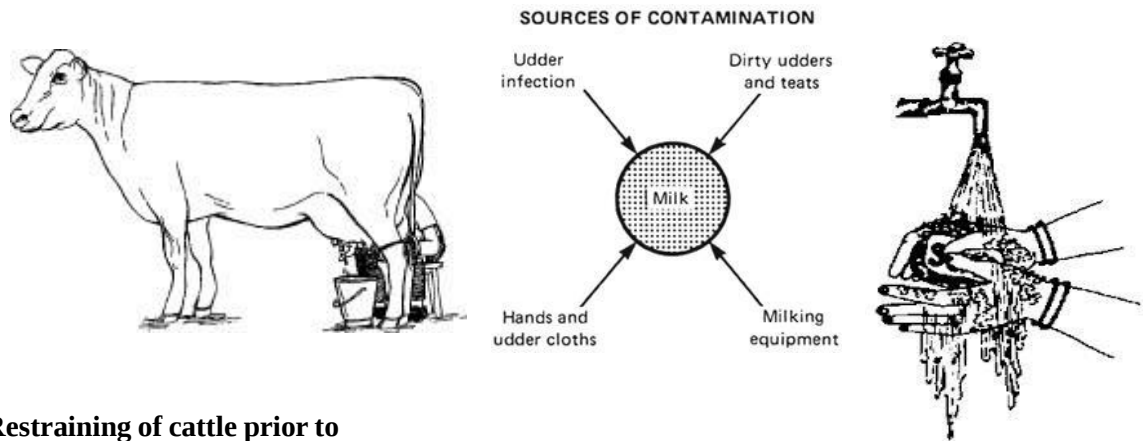
This diagram shows the action of the hand and how milk is drawn out of the teats during milking



Milk Bucket



PARTS OF MILKING MACHINE
AND MILK PARLOUR



Restraining of cattle prior to milking
Washing of hands before milking

