NATIONAL OPEN UNIVERSITY OF NIGERIA

FACULTY OF AGRICULTURAL SCIENCES

DEPARTMENT OF ANIMAL SCIENCE AND FISHERIES

FPY/SIWES PRACTICAL GUIDE MANUAL

ANP 403: ANIMAL HUSBANDRY TECHNIQUES NON-RUMINANT

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PRODUCTION OF EGGS AND BROILER CHICKENS/TABLE AND HATCHABLE EGGS

1.0 Introduction

Farmers are careful to house and feed the chickens to maximize laying and ensure the hen has a relatively long and healthy life. Egg producers also have flocks of hens at different ages, ensuring they have a steady supply of eggs ready for market to provide year-round income. The females (mature hens and younger pullets) are raised for meat and egg production and breeds have been developed to fulfill commercial needs. Fresh egg production is primary to the egg industry, however, a significant amount of egg production includes eggs purposely broken and used for powdered eggs, frozen eggs, or purchased by food producers for inclusion in food products.

The broiler growing phase is only one part of the integrated total meat production process. The objective of the broiler manager is to achieve the required flock performance in terms of bird welfare, live weight, feed conversion, uniformity, and meat yield within economic constraints. Broiler production is a sequential process, with ultimate performance being dependent on each step being completed successfully. For maximum performance to be attained each stage must be assessed critically and improvements made wherever required.

2.0 Objectives

At the end of this session, you should be able to

- identify methods of rearing chicken, acquire knowledge and skill of complete package of practice for quality production of broilers.
- explain how to produce table and hatchable eggs
- discuss the skill involved in caring and management of chicks.

3.0 Procedure

Egg production cycle: Birds usually start to lay at around five months (20-21 weeks) of age and continue to lay for 12 months (52 weeks) on average, laying fewer eggs as they near the moulting period. The typical production cycle lasts about 17 months (72 weeks) and involves three distinct phases, as follows.

i. Phase 1: Small chicks or brooders. This phase lasts from 0 to 2 months (0-8 weeks) during which time small chicks are kept in facilities (brooder houses) separate from laying birds.

ii. Phase 2: Growers. This phase lasts about 3 months, from the ninth to the twentieth week of age. Growers may be either housed separately from small chicks or continue to be reared in brooder-cum-grower houses. It is important to provide appropriate care to the growers particularly between their seventeenth and twentieth week of age as their reproductive organs develop during this period.

iii. Phase 3: Layers. Growers are transferred from the grower house to the layer house when they are 18 weeks old to prepare for the laying cycle. Birds typically lay for a twelve-month period starting when they are about 21 weeks old and lasting until they are about 72 weeks old.

Management of chicks: Before chicks arrive at home; make sure that;

i. A brooder is in place
ii. Paraffin lamps/electric bulbs/charcoal stove is available o Litter for the floor is available 1m2 will accommodate 20 chicks upto 4 weeks old.
iii. Temperature control: 350C for day-old chicks, 24-270C for 1 week. Reduce heat as they grow especially at night.

Feeding Exotic chicken

i. Broilers – 1 to 3 weeks feed with chick mash, 3 to 6 weeks feed with broiler starter, thereafter with broiler finisher.
ii. Layers – 1 to 8 weeks feed on chick mash, after 8 weeks introduce growers mash gradually, then with layers mash after drop of first egg.

Management of Layers

a) Allow for good air circulation in laying house
b) Layer needs on average 120 gm of food per day
c) Distribute food troughs and water troughs evenly (one basin/50 birds)
d) Provide grit at 20 weeks
e) Laying nests must be kept in dark places, collect eggs 3 times a day, allow a nest/5 hens
f) Provide soft clean litter
g) Store eggs with small end down
h) Clean dirty eggs with steel wool/coarse leaves (**never** wash them)
i) Add greens to the diet and whenever possible vitamins to water
j) Debeaking at onset of lay
k) Culling when egg production drops below 40% .

Before Your Chicks Arrive: Setting the Stage

i. Brooder: a safe place to keep chicks warm, watered, and fed. You can buy or build elaborate brooders, but many chick growers go with a large plastic tote or large cardboard box. Be certain to have the right size (with high walls) for the number of chicks. You can also start small and move to a larger brooder as the chicks get older. Finally, you'll want a (ventilated) lid to keep brave chicks from escaping once they get bigger.

ii. Brooder location: You want to keep the brooder in a warm, dry place; many people set it up in a garage, others do it in their house, while yet others do it in the chicken coop (if there are no adult chickens in the coop).

iii. Heat lamp: Fairly essential to keeping the chicks warm and their temperature regulated, as they can't do so initially. You can use a regular lamp and light bulb, but products made for this purpose (with a guard) are a bit safer and more consistent. Attaching heat lamp to a 2x4 across top of brooder works well as does attaching it to a floor lamp's pole.

iv. Thermometer: While not absolutely crucial, a thermometer will help you more easily monitor the temperature in the brooder. -- Bedding: Pine shavings in general are the best materials, but in the first week or so, we like newspapers with a layer of paper towels on top (because the chicks will try eating the pine shavings).

v. Waterer: Absolutely essential to have one or more waterers designed specifically for chicks; other systems will lead to sad results and death.

vi. Feeder: You don't necessarily have to get chick feeders (though it's recommended); some folks use the base of an egg carton. If you don't use a chick feeder, be more vigilant about keeping the feed clean (from poop) and dry. Some experts recommend simply placing the feed on a paper plate for the first few days.

vii. Chick starter feed: It's essential to use a feed specifically designed as starter for chicks; your main choice will be deciding between regular and medicated. Feed this feed for the first 8 weeks or so.

viii. Electrolyte powder: If your chicks are arriving by mail, purchase the electrolyte powder (think Gatorade for chicks) to supplement their water starting the third day or so and give the chicks extra strength in those key early days. (Old timers used to put sugar in the chick water.)

ix. Coop: Unless you're keeping the brooder in the coop, you don't technically need to have it ready now, but it is best -- as time will pass quickly. Every imaginable type of chicken coop exists -- and

your goal should be to find/build the one that best fits your needs/code/number of chickens.

x. Pen: The healthiest chickens are the ones who forage the yard for their food, thus you should have a plan for where you'll let your chickens roam, from one nicely fenced pen to a series of pens, to a moving pen, to your entire backyard. The pen should be fenced/enclosed to protect chickens from predators.

Day 1: Acclimating Chicks

i. Temperature: Brooder temp should be 90 degrees.
ii. Water: First thing to do when baby chicks arrive is to take one at a time and dip their beaks in the water and be certain they drink; this step is absolutely essential to survival. Refill waterer often.
iii. Feed: Once the chicks have had a drink, repeat the process with their feed.
iv. Location: Keep feed and water on outskirts of heat lamp, ideally on opposite sides (with heat lamp in the middle) to keep water from feed.
v. Sleep: Expect the chicks to sleep quite a lot during this first week.

Week 2: Baby (Chick) Steps

i. Temperature: Bring down brooder temperature 5 degrees to 85 degrees.
ii. Water: Check and refill waterer(s) at least twice a day. Clean regularly with diluted vinegar.
iii. Feed: Keep with the starter feed. Be vigilant about keeping feed free of moisture and chick poop. Using a piece of plywood or extra floor tile, raise waterer and feeder for less waste and mess.
iv. Feathers: You'll begin to see small feathers replacing the fluff on your chicks' wings and tail.
v. Bedding: Switch to pine shavings -- about 1-2 inches deep; clean brooder before doing so.
vi. Grit: Introduce a small amount of fine "chick" grit to chicks' diet -- needed to assist in digestion (which they would normally get if raised naturally outside).
vii. Perch: Consider adding a small, chick-sized perch in brooder for "roosting 101" -- made easily with three small branches in an H-shape.
viii. Socializing: If your chicks are going to be more than simply production birds, now is the time to acclimate the chicks to you.

Week 3: Keeping a Lid On

i. Temperature: Bring down brooder temperature 5 degrees to 80 degrees by raising heat lamp about 3 inches.
ii. Lid: Now's the time when you should start putting a lid on your brooder.
iii. Waterer and Feeder: Consider raising the height again, placing them on a 2x6 -- and possibly switching to adult units to make it easier on your maintenance.
iv. Brooder: If you started with a small brooder, it may be time to upgrade to a larger one to accommodate your chicks' growth.
v. Feathers: Lots more feathers are appearing and replacing the fluff

Week 4: Life Beyond the Brooder

i. Temperature: Bring down brooder temperature 5 degrees to 75 degrees by raising heat lamp another 3 inches.
ii. Field trip: Depending on the season (assuming late spring/early summer), now is the time to introduce the pen to the chicks in small doses -- say 1-3 hours daily with supervision.

Week 5: Tweens

i. Temperature: Depending on the season, the heat lamp is done, as long as the temperature does not dip below 60s at night.
ii. Feathers: The chicks should be looking less like babies and more like miniature chickens, as adult feathers grow out.
iii. Separating the sexes: It's hard to tell the genders of most breeds of chicks, but by now you should be able to by examining their feather development -- and it's a good time to separate the sexes -- the cockerels (young roosters) and the pullets (young hens) -- especially if your focus is on keeping only hens for laying. -- Pen: The chicks can take longer day trips to the pen.
iv. Feed: It's now time to start mixing in adult chicken feed as you finish up your chick starter feed.
v. Feeders and Waterers: If you have not already, time to switch to larger (adult size) feeder and waterers.

Week 6: From Brooder to Coop

i. Acclimating: Time for the chicks to flee the brooder for the coop! If they have not been raised in the coop, take time to help the chicks get used to their new digs.
ii. Feed: Provide your chicks with chicken feed, table scraps, and other tasty treats.

iii. Feeder: Consider hanging the feeder (at the proper height at top of chicks' backs) to make it easier on the chickens -- and less waste overall.
iv. Pen: Being outside (depending on the season/weather) should now be part of daily routine for the chicks, bringing them home to the coop to roost for the evening.

Week 8: Expanding the Menu

i. Treats: Chickens are omnivores, so a good mixed diet is essential. Be creative and help the chicks from being bored by hanging some of the treats (such as a head of lettuce) so the chicks can peck at them.

Week 12: Readying the Hens I

Nesting Boxes: Assuming you are raising hens for egg-laying, now is the time to install/prepare the nesting boxes. These should be raised above the ground and away from roosting area (to avoid poop contamination), ideally offering some privacy. Lots of methods for constructing the boxes, from old drawers and crates to water buckets.

Week 16: Readying the Hens II

i. Fake eggs: A great tip a veteran told us was putting a plastic egg (partially filled with sand to give it a bit of weight) in the nesting boxes to help your young hens learn.
ii. Feed (layers): Time to switch to a layer feed for your young hens.

Week 20: Laying Begins

i. Harvesting eggs: Once your hens start laying eggs (there may be a few misfires first), you'll want to check the nesting boxes for eggs twice a day (while you also refresh water/feed). Discard any broken or pooped-on eggs.
ii. Nesting Boxes: Keep clean and fresh.
iii. Extending the season: As fall arrives and daylight gets shorter, hens will slow down egg production for the winter. You can extend the season by placing a light in the coop that comes on in the late afternoon and stays on for about 5 hours -- giving the hens about 15 hours of "daylight."

4.0 Conclusion

Broiler poultry farming is a lucrative business. Basically, broilers are only for meat production. Generally highly meat productive birds or

poultry breeds are called broiler poultry. Broilers are like other common poultry birds. But this broiler is made in a scientific way for producing more meat in a short time. Following the procedure above will ensure sustainable, profitable production of broilers.

5.0 Practical Assignment

1. Do you understand the different procedure of managing day old chicks in the poultry farm? If yes, write down what you understand about them

   _____
   _____
   _____
   _____
   _____

2. How is layers managed in the farm you visited?

   _____
   _____
   _____
   _____
   _____

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PRODUCTION/MULTIPLICATION OF PIGS

1.0 Introduction

The major production systems of the swine industry are farrow-to-finish production, feeder pig production, and feeder pig finishing. Farrow-to-finish swine production is the most common type of production. It covers the entire production process, from breeding to sales of market hogs. Gilts and sows are mated to boars or artificially inseminated. Females farrow a litter of pigs. The piglets are weaned, and the sows are bred again. The baby pigs are moved into a nursery until they weigh approximately 50 pounds and then to a finishing barn where they grow until they reach 240 to 270 pounds. The pigs are then sold as market hogs to provide pork for human consumption. Farrow- to-finish production is the most intensive production system and generally has the greatest requirements as to management skills, labor, and facilities.

2.0 Objective

At the end of this unit, you should be able to:

- explain production and multiplication strategies of pigs.

3.0 Procedures

General Procedures

i. Several breeds can be used in the production of swine. Producers should select breeds that work well in their production system. When breeding animals, swine producers use purebred and hybrid genetics to produce profitable offspring. Most commercial swine producers use some form of crossbreeding program.

ii. The three production systems used in producing swine vary as to the facilities needed, costs, and returns on the pigs marketed. Swine producers require different types of facilities, depending on the production system.

iii. Pigs can contract many different diseases. Producers use a variety of methods to help reduce the spread of disease, including biosecurity measures, proper sanitation, and the purchase of disease-free breeding animals. They need to identify specific health problems and work to reduce their effects. Swine diseases can generally be prevented through the use of disease-free breeding stock, biosecurity, and vaccinations. Producers should use subcutaneous injections whenever possible.

iv. Swine producers must make sure to meet nutrient requirements for proper herd health and production. Diets vary depending on the stage of growth or production.

Multiplication/Breeding Procedures of Pigs

Breeding is a complex science that requires skill and knowledge. It also requires thorough record keeping. To achieve genetic improvement the following methods can be used:

Selection: select the best individuals in the herd for breeding, looking at their performance in various characteristics e.g. litter size, growth rate, feed conversion ratio, disease resistance etc.

Culling: remove the individuals that do not perform well.

Artificial Insemination (A.I.)

Artificial insemination is becoming popular in Pig breeding. It is not a difficult procedure provided the basic guidelines are followed it can be highly successful.

The principles of oestrus detection, timing and frequency of insemination do not differ from those employed when using natural mating. However it is important in ensuring that;

i. Suitable equipment is used
ii. Suitable insemination environment
iii. Proper insemination techniques.
iv. Well stored and viable semen.

Management of Breeding Stock

a) Boars

i. Start serving > 8 months of age.
ii. First two months of service, serve only twice per week.
iii. After can service six times per week.
iv. Should be kept in its own pen to avoid fighting.
v. When mating transfer the sow to the boar
vi. One boar can serve up to 15 sows
vii. Considerable exercise is necessary to prevent the development of leg weaknesses.
viii. The boar's feet should be trimmed regularly as deemed necessary.

ix. Boar should be washed with soap and water every 4 months and sprayed for the lice and mange.
x. The pen walls should be white washed with a wash containing a powerful disinfectant at the same time.

b) Gilts/sows

i. Provide enough exercise as some sows will tend to fatten if not exercised.
ii. A fat sow takes longer to come on heat.
iii. It is also more likely to crush her young piglets.
iv. First service for gilts should not be until the age of 7 - 8 months.
v. Sexual maturity occurs as early as 4 - 5 months.
vi. Reproductive life of a sow is 4 - 5 years.
vii. Keep about 3-4 gilts/sows per pen of 9-10 m^2
viii. Pen should be kept clean (change bending regularly).
ix. Sows/gilts pens should be next to the boars to stimulate them to come on heat.
x. But not too close so that they would not get use to him.

Flushing

i. It is important that the gilt has at least two true heat periods before mating, to gain the increase in ovulation rate.
ii. For gilts, the ovulation rate can be further increased by a high energy intake for 10–14 days prior to service.
iii. But should be reduced for the first 3 days after mating.
iv. Increased feeding levels afterward to ensure adequate energy intakes,
v. but prevent high energy intakes between days 70 and 105 of gestation.

Breeding Cycle

The normal heat period lasts for 3 - 5 days

Heat signs
1st Stage: Early Heat Signs

i. General restlessness
ii. Vulva turns red and is swollen
iii. White mucus discharge.

2nd Stage: Service Period Signs

i. Real Oestrus lasts for 40 - 60 hours
ii. Vulva becomes less red and swollen
iii. Slimy mucus discharge
iv. Tendency to mount and be mounted by others.
v. The sow or gilt will stand still when pressure is applied to her back. (Thus the right stage to send her to the boar or inseminate).

3rd Stage: *Post Oestrus*-Period Signs

i. The sow/gilt will not stand still when pressure is applied to her back.
ii. The swelling of the vulva disappears.

Recommended practices

i. Put the sow with the boar for a short period every day when the heat is expected.
ii. Always take the sow to the boar. This is less upsetting for him.
iii. Put the sow and boar together just before feeding.
iv. Allow the boar to serve twice, with an interval of about 12 hours between services. If the sow doesn't conceive, she will return on heat in about 3-week's time.
v. 10 days before service, give the sow/gilt 1 - 2 kg of feed extra per day. Continue this for one week after service.
vi. give 0.5 kg extra feed per day at last month of pregnancy, but decrease gradually one week before farrowing. Provide plenty of water to help prevent congested gut during farrowing.
vii. Each boar should be kept in its own pen to avoid fighting. For mating, the sow is taken to the boar.

Farrowing and Birth Management

Expected date of birth: On average pregnancy lasts 115 days after conception (3 months, 3 weeks and 3 days).

Farrowing Preparation measures and birth of piglets

About a week before the expected delivery date, the sow should be:

i. Washed with soap and water and then rinsed with a mild disinfectant. The pen should be disinfected before the pregnant sow is put in. Immediately after washing she should be put in a pen of her own.

ii. Dewormed and treated for lice and mange. Any good acaricide (cattle dip) can be sprayed on the sow or gilt to kill the lice and ticks.
iii. Putting in the farrowing pen a week before the birth will also help her get used to the new surroundings. This increases chance of a quiet and smooth farrowing. It makes individual feeding of the sow possible.
iv. 2 days before farrowing, the sow and the pen should be washed and disinfected again.
v. high pressure sprayer in shower area for pigs should be provided, in case of large farms

Piglet Management
Care of the Newborn Piglets

i. A few minutes after the birth the umbilical cord may be pulled gently away or cut if necessary (to about 5 cm length).
ii. After birth, the navel of each piglet should be soaked in a cup of iodine solution to prevent inflammation and tetanus.
iii. Each piglet should be rubbed carefully, dry with a cloth.
iv. Make sure the piglets are able to suck from the udder as soon as possible after birth.
v. Weak piglets may need to be assisted.
vi. The piglets can be given additional feed of goat or cow's milk, or a mashed bean porridge to which a little sugar has been added.
vii. If the milk produced by the sow is too little to meet the needs of the piglets or the sow completely neglects the piglets, they should be put on another sow or reared on cow or goat's milk.

Feeding Piglets Who's Mother Produce Less Milk

i. If the sow does not produce enough milk the piglets should be given to another sow which farrowed or gave birth up to three days before.
ii. This sow should have fewer piglets than the number of teats on her udder.
iii. Transfer extra piglets to the sow with less piglets after disguising them with a spray which has a strong smell e.g. engine oil/kerol diluted with water to last at least 1 or 2 days.
iv. All piglets should be sprayed as soon as introduction is done so that the foster mother doesn't recognize the foreigners.
v. If there is no sow to take over feeding the piglets, they will have to be given extra food by hand.
vi. Goat or cow's milk can be given to the motherless or orphaned piglets.

Teeth Trimming

i. The piglets are born with needle sharp teeth
ii. It is usually necessary to trim the piglets' teeth to prevent them biting the udder.
iii. Only the points of the teeth should be removed.
iv. If any more is removed there is a risk of damaging the mouth.
v. When trimming the teeth the tongue of the piglets should be rolled back to avoid injuring it.

Anaemia or Iron Deficiency

i. Anaemia is caused by iron deficiency.
ii. This iron is needed for the formation of haemoglobin.
iii. This is an important problem, especially for young piglets kept indoors.
iv. They receive additional 1-2 mg/day from milk while they need 7mg during the first week.
v. The piglets become very pale a few weeks after birth and their growth slows down.

Tail Cutting

i. Cut the tip of the tail within 4-7 days.
ii. This prevents tail chewing, which can lead to infections.
iii. A piece of chain can be hung down from the ceiling for the piglets to chew.

Heating for Piglets

i. In cold weather, a small area can be heated with an infrared lamp.
ii. This keeps the young pigs warm.
iii. It helps prevent pneumonia and crushing as the piglets tend to stay under the lamp when not feeding.

Creep Feeding

i. Young piglets from 7 days onwards should have high protein feed available to them.
ii. This has to be fed in a small area where the mother cannot eat the feed.
iii. The feed conversion rate of young piglets is very high and thus creep feeding is particularly economic.
iv. Creep feeding helps the piglets to get used to feeding at an early age.

Weaning Piglets

i. The piglets should already have started getting used to eating from a trough alongside their mother.
ii. They will need protein-rich feed as they will be growing fast.
iii. There should also be plenty of clean water for the piglets to drink.
iv. It is important for the piglets to learn to drink water early in preparation for weaning.

Types of Weaning

i. Weaning is usually undertaken in one of the three following categories:
ii. Conventional weaning: 3–5 weeks of age.
iii. Early weaning: 10 days of age to 3 weeks.
iv. Specialised weaning: segregated early weaning (SEW) and medicated early weaning (MEW).

Steps Taken at Weaning Sow

Determine whether the sow is to be culled or served again.

i. On the day of weaning don't feed the sow, in the days following farrowing flush the sow until serving (flush for max of 10 days)
ii. Move the sow to another pen (near a boar)
iii. Sometimes vitamin/mineral is given just after weaning

Steps Taking at Weaning Piglets

i. Give piglets identification (tagging, notching, tattooing)
ii. Weigh the piglets to judge their average weight gain and uniformity
iii. Feed piglets with care to prevent digestive problems after weaning. The type of feed should not be changed during and just after weaning
iv. Weaning (3-5 wks) do not feed more than 100-200g/piglet/day during 1st 4 days
v. Weaning (6-7 wks) start by feeding about 50% of the ration piglets receiving during the last few days of suckling, then increase gradually
vi. Check health of the piglets carefully (especially first 4-12 days after weaning)
vii. Prevent stress, pay attention to hygiene and climate of the pen.

4.0 Conclusion

One of the big advantages of farming pigs is their ability to reproduce. Sows can produce over two litters per year with in excess of 20 piglets weaned. This is a very high reproductive rate compared to cattle and sheep for example. This article covers the basic information you need to adequately manage breeding pigs.

5.0 Practical Assignment

1. What are the production and multiplication procedures of pigs in the piggery farm you visited?

   _____
   _____
   _____
   _____
   _____

2. Enumerate the recommended practices of pigs management as practiced in the farms you visited

   _____
   _____
   _____
   _____
   _____

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FATTENING OF PIGS

1.0 Introduction

Pigs are considered intelligent, normally gentle animals that appeal to many people as pets, whilst being a highly productive meat producer and one of the most popular farmed species throughout the world. The three prerequisites for successful pig ownership are: Keeping pigs well fed on a balanced diet, providing shelter from the weather and paying attention to their health and welfare.

Good nutrition is fundamental to a pig's growth rate, reproductive success, health and longevity. Pigs are opportunistic omnivores that have evolved to eat a wide range of feeds. They are classed as monogastric animals, which mean that they have one stomach compartment – this is compared to ruminant animals that have four stomach compartments. Pigs digest feed very similarly to humans, with limited ability to extract nutrients from high fibre feeds such as pasture.

2.0 Objectives

At the end of this unit, you should be able to:

- understand the nature of pigs and their nutrition

3.0 Procedure

i. The feed mixture should be high in protein. Examples of feed high in protein: Oilcake, Fish meal, Purchased concentrates (buy 18% protein formulation). Mix these protein-rich feeds with rice bran, vegetables and kitchen scraps for a rich, balanced feed.
ii. Keep the feed trough clean. Remove dirt and old feed before giving new feed.
iii. Pigs must be provided at all times with an adequate daily supply of drinking water that is palatable, not harmful to their health and at a temperature that does not inhibit drinking, about 8 to15 litres.
iv. Feed the pigs twice a day with fresh, clean feed. Make sure it is not mouldy
v. Corn is their most common food, but they could benefit from having a diet with protein from soybeans or cooked meat.
vi. They grow faster with vitamins and other supplements.

4.0 Conclusion

Pigs can be competitive for food when group housed and because concentrated feed can be eaten quickly, it is important that they are all

given equal opportunity to eat their fair share. Compound feeds should be formulated by nutritionist that understands the specific nutritional requirements of pigs to ensure a balanced diet that supports health and productivity.

5.0 Practical Assignment

1. List local ingredients available for feeding pigs in your area:
   _____
   _____
   _____
   _____
   _____

2. Formulate feeding regime for pigs grown for slaughter and market?
   _____
   _____
   _____
   _____
   _____

3. Write out the standard feed stuff formulation to make complete pig diets in the farm you visited?
   _____
   _____
   _____
   _____
   _____

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PRODUCTION OF MICRO-LIVESTOCK (RABBITS, GRASS CUTTERS AND SNAILS)

1.0 Introduction

Micro-livestock' has also been referred to as mini-livestock' 'or 'unconventional livestock'. Any species living permanently or temporarily on the ground can be considered as mini- livestock provided that has potential benefits for humans, nutritional and/or economic, well known in its area of natural dispersion and not usually obtained by controlled breeding.

2.0 Objective

At the end of this unit, you should be able to:

- discuss the basic principle or act of raising grass-cutter and snails.

3.0 Procedure

Grass-cutters

Rearing pen: The grass-cutters are kept in pens inside the rearing shed. The number of pens depends on the production objectives. It is recommended to have one breeding female per pen. The recommended surface area per adult animal in the pen is 0.2 m2. The layout of the pens depends on the type of material used in their construction. Metal pens can be moved around, whereas brick pens will be fixed.

It is not recommended to use materials such as straw, bamboo, wood or matting because they can be eaten away by the grass-cutters. The pens can be open or closed, whichever the producer prefers. There should be room to move around between the pens. Feeding and drinking troughs can be made of cement or clay, and should be heavy enough so that the grass-cutters cannot knock them over. The producer can make the troughs himself. All that is needed is to make a mould out of wood or other scrap material. Calculate one trough per three grass-cutters.

The squeeze cage is used to handle the animals more easily. The dimensions of the cage should be almost the same as the animal to be handled. The producer can make it himself, by building a rectangular cage with fine meshed screening. The producer should base the size of the cage on the average weight of the animals in his production, and will also depend on the animal stock chosen (heavy or light variety). The squeeze cage should be built in such a way that the animal cannot turn around inside the cage.

Selecting a group of animals for breeding should not be done at ran dom. The farmer can get the best animals from the nearest breeding and multiplication centre, or from another breeder. The selection should be made on the basis of weight. The females should all have around the same weight (avoid weight differences of greater than 500 g); in contrast, the male should be 0.5 to 1 kg heavier than the females. Closely related mating pairs, where the male is related to the females, are also not recommended. The females can, however, be related.

The male grass-cutter can mate with several females in a single period. The male, who can be identified by his wrinkled, brown genitals, is placed first in the pen so that he can mark his territory and thereby reduce the risk of fights. The female, identified by the closeness of the anus to the genital area, is put in the pen with the male for 24 hours. During the mating session, make sure the male is heavier than the female.

Handling grass-cutters is not easy: The technique used depends on the size of the animal. Young, light animal is lifted by the tail by holding at the base of the tail. Then grab its back with the other hand (just behind the front legs and without squeezing too hard). The animal is thereby turned on its back, while holding the tail stretched out at the same time.

A medium-sized animal can also be lifted by the tail, but it is recommended to grab it on the back with the other hand so that there is not too much weight on the tail, especially if the animal is agitated. The animal is then turned on its back in order to calm it down. A heavy animal should be handled by means of the squeeze cage.

The animals should get a balanced diet each day. A diet based solely on green forage will lead to slow growth and reduced milk production in feeding mothers, thereby increasing the risk of various infections. At the same time, insufficient forage can lead to digestive problems. It has been calculated that a complete and balanced diet will produce an average weight of 3.5 kg in males and 2.8 kg in females.

Snail

Snail meat has been consumed by humans worldwide since prehistoric times. It is high in protein (12-16%) and iron (45-50 mg/kg), low in fat, and contains almost all the amino acids needed by humans.

Snail farmers follow this sequence for maximum production, namely;

i. Select the most favourable site for the snail farm
ii. Providing good housing for the snails
iii. Providing good feed and ensuring good snail farm management.

Obviously, it is possible to farm snails in a completely controlled environment, but this would require considerable investment costs. Without artificial climate control, successful commercial snail farming is more or less restricted to areas with the following characteristics:

i. Temperature: a steady year-round temperature of 25-30 °C, and a low fluctuation between daytime and nighttime temperatures.
ii. Day-length: a fairly constant 12/12-hour photoperiod throughout the year.
iii. Air humidity: a year-round relative air humidity of 75-95%.
iv. These conditions correspond to the tropical rainforest climate zones – and they work best when there is no pronounced dry season or strong fluctuations.

4.0 Conclusion

A well-managed integrated production system comprising several diverse enterprises including small animal production adds considerable value to a farm household. Small animals add to food security, improve human health through a more varied diet, generate a steady cash flow that increases household income, have an important role in poverty alleviation, contribute to the empowerment of women and children as well as the sick and the disabled and other marginalized groups, make productive use of labour and valorise local feedstuffs and feedstuffs not normally suitable for direct consumption by people.

5.0 Practical Assignment

Enumerate the principles required for raising mini-livestock in your area?

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What are the basic equipment and conditions necessary for successful rearing of snails and grass-cutters?

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IDENTIFICATION OF BREEDS OF POULTRY, PIGS AND RABBITS

1.0 Introduction

There are several recognized breeds of poultry, pigs and rabbits in the world. Choosing the best breed can be challenging, and this practical session will make aware of the various breeds and varieties, and will provide necessary information so that poultry farmers can select the right type for given situation.

2.0 Objective

At the end of this practical session, you should be able:

- to identify different breeds of poultry, pigs and rabbits.

3.0 Procedure

1. **Poultry**: To identify different breeds of poultry, follow the following procedures and criteria. Parameters for Identification includes: Color, Comb, Feathers, Weight, Egg color, Egg Size, Disease resistance, Taste / Palatability, Adaptability, Pigs.

Breeds of Poultry

Jersey Giant 	The Jersey Giant is the largest of the American breeds, weighing 10 to 13 pounds. There are two varieties of Jersey Giants: Jersey Black Giants and Jersey White Giants. Both varieties exhibit similar characteristics of yellow skin and single comb. However, they differ in plumage color and pigmentation in the beak and shanks. Jersey Black Giants have black beaks and nearly black shanks. Jersey White Giants have yellow streaked beaks and dark willow-colored shanks.

New Hampshire 	Originally developed from the Rhode Island Red, the New Hampshire is used for both meat and egg production. With almost identical characteristics as its ancestor, the New Hampshire breed is slightly meatier, weighing 6 1⁄2 to 8 1⁄2 pounds. Also, its plumage is lighter red in color and is generally less uniform. New Hampshires have red ear lobes and a single comb.
 Plymouth Rock	Considered the oldest and most popular of the American breeds, the Plymouth Rock exhibits excellent meat properties and laying capabilities. Plymouth Rocks have long bodies of good depth; they are fairly broad-breasted. Body weight varies from $7\frac{1}{2}$ to $9\frac{1}{2}$ pounds. Several varieties of Plymouth Rocks, each distinguished by plumage color, are available. White and barred varieties are most popular; both have single combs.
Rhode Island Red 	First developed for utility purposes and later becoming a fancier's breed, the Rhode Island Red is rangier looking than the Plymouth Rock. With a wide and deep rectangular body, the breed is considered a meat-type, but it is also noted as the best egg layer of the heavier breeds. A Rhode Island Red is slightly smaller than a Plymouth Rock, weighing between 6 1⁄2 to 8 1⁄2 pounds.
Wyandotte	The Wyandotte is a general-purpose breed, well adapted for meat production and egg production. The Wyandotte's body shape and feathering give it a short-backed and low-set appearance.

	A mature bird weighs 6 1⁄2 to 8 1⁄2 pounds. Eight varieties of Wyandottes are available; each differs mainly in color. Only the White Wyandotte is raised commercially for producing broiler crosses. A Wyandotte has yellow skin and shanks, a rose comb, and red ear lobes. It lays brown-shelled eggs.
Brahma (Light Brahma variety). 	The Brahma breed originated in India and was brought to the American continent more than a century ago. Three varieties of Brahmas were developed. A mature bird weighs 9 1⁄2 to 12 lbs. The Brahma is characterized by a pea-comb. The Light Brahma variety is most popular because of its plumage color; its body is white, the hackle feathers are black with white edging, and the tail feathers are black.
Cochin 	The Cochin breed was imported into the United States about 1847. The Cochin was bred for loose feathering with little attention given to egg production. Its feathering is extremely long and abundant. A Cochin appears massive in size because of loose feathering and feathered shanks. A mature Cochin weighs 8 1⁄2 to 11 pounds. Cochins have a low-carried breast and a single comb. Four varieties within the breed are Black, Buff (pictured), Partridge, and White.

Langshan 	This single-combed breed originated in China, but was imported to the U. S. from England. The Langshan is smaller in body size than other Asiatic breeds and has longer legs with moderately feathered shanks. Body feathering is moderately tight. Tail feathers are long and are carried high. A mature Langshan bird weighs 8 to 10 pounds. The three breeds lay brown-shelled eggs.
Cornish 	Several varieties of the Cornish breed have been produced with the Dark and White varieties being most popular. Cornish crosses are quite popular for broiler production. The breed is noted for its broad, deep breast and its compact, heavily-meated body. A Cornish is heavy for its body size, weighing from 8 to 10 1⁄2 pounds. All varieties of Cornish have small pea-combs. As a purebred, a Cornish is a poor egg producer. Cornishes have yellow-colored skin, beak, and shanks. The White Cornish has pure white plumage; the Dark Cornish's plumage color varies from greenish-black to a reddish-mahogany.
Orpington 	The Orpington breed's popularity has decreased because of the broiler industry's development of crossbreeds with yellow skin. The Orpington is slightly larger than the Plymouth Rock. The Orpington breed is low-set and heavy-boned. A mature bird weighs from 8 to 10 pounds. Loose feathering and white skin has hindered the Orpington's prominence. Differing only in color, the four varieties of Orpingtons include Buff, Black, White, and Blue. Buff is the most popular

	variety.
Ancona 	The Ancona resembles the Leghorn in body conformation. A mature Ancona weighs from 4 1⁄2 to 6 pounds. appearance. The skin and shanks of the Ancona are yellow. The beak is yellow with shades of black.
Leghorn 	Hybrid Leghorns make up most of the egg production market. The Leghorn's reputation for being the number one egg layer makes it one of the most popular of all breeds in America. Known for its stylish carriage, the Leghorn varies in weight from 4 1⁄2 to 6 pounds. The varieties of Leghorns differ in plumage color – White, Buff, and Brown. Leghorns have yellow or horn- colored beaks and yellow skin and shanks. Leghorns are either single comb or rose comb.
Minorca 	The Minorca is the largest of the Mediterranean breeds. A mature Minorca weighs from 7 to 9 pounds. In conformation, the Minorca is a long-bodied bird with its back sloped downward from the shoulders to the base of the tail. In comparison, the Minorca's tail is carried lower than the Leghorn's tail. Mainly plumage color and type of comb distinguish five varieties of Minorcas. The Single-Comb White is raised in the largest numbers. Skin color is white on all varieties of Minorcas.

There are 3 basic types of chickens – broilers, cockerels and layers

Broilers 	A **broiler** (*Gallus gallusdomesticus*) is any chicken that is bred and raised specifically for meat production. Many typical broilers have white feathers and yellowish skin. Most commercial broilers reach slaughter-weight between four and seven weeks of age, although slower growing breeds reach slaughter-weight at approximately 14 weeks of age. Because the meat broilers are this young at slaughter (roughly 500g), their behaviour and physiology are that of an immature bird.
Layers (Rhode Island Red) 	The bird's feathers are rust-colored, however darker shades are known, including maroon bordering on black. Rhode Island Reds have red-orange eyes, reddish-brown beaks, and yellow feet and legs, often with a bit of reddish hue on the toes and sides of the shanks. Chicks are a light red to tan color. The roosters usually weigh in at about 8.7 pounds (3.9 kg), the hens average slightly less at 6.5 pounds (2.9 kg
Cockerel 	A rooster, also known as a **cockerel** or cock, is a male gallinaceous bird, usually a male chicken (Gallus gallus). Mature male chickens less than one year old are called **cockerels**.

2. **Pigs:** Breeds of swine can be grouped into two different catagories, “Maternal” or “Terminal” breeds. The maternal breeds are known for their large litters and are selected for replacement females. Terminal sire breeds are recognized for their growth and carcass quality and are usually used for terminal crosses.

Breeds of Pigs

Berkshire 	The third-most recorded breed of swine in the United States, Berkshires are known for fast and efficient growth, reproductive efficiency, cleanness and meat flavor and value. The first U.S. meeting of Berkshire breeders and importers was held in 1875, with the American Berkshire Association formed shortly after – making it the oldest swine registry in the world.
Chester White 	Chester Whites originated in Chester County, Pa., from which their name was formed. These white hogs with droopy, medium-sized ears are known for their mothering ability, durability and soundness. Packers also tout their muscle quality.
Duroc 	The second-most recorded breed of swine in the United States, the red pigs with the drooping ears are valued for their product quality, carcass yield, fast growth and lean-gain efficiency. They also add value through their prolificacy and longevity in the female line. Much of the U.S. breed improvement has occurred in Ohio, Kentucky, Illinois, Indiana, Iowa and Nebraska.
Hampshire 	The hogs with “the belt,” Hampshires are the fourth-most recorded breed in the United States. Most popular in the Corn Belt, Hampshires are known for producing lean muscle, high carcass quality, minimal back fat and large loin eyes. Females also are known for their mothering ability, with longevity in the sow herd.
Landrace	White hogs with droopy ears, Landrace are the fifth-most recorded breed of swine in the United States. Known as “America’s Sowherd,”

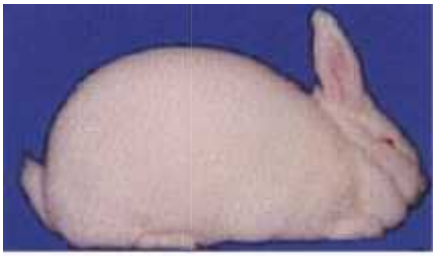
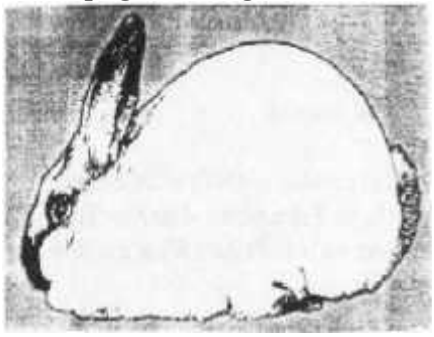
	Landrace females are heavy milkers and often farrow large pigs. Crossing well with other breeds, Landrace often possess length of body, a high percentage of carcass weight in the ham and loin and the ideal amount of finish.
Poland China 	In the early 1800s, Poland China hogs originated in Ohio. Today, Poland China hogs are known for their large frame, length of body, leanness and muscle. They also are excellent feeders, gaining well under good care and management. They also are quiet in their disposition.
Spotted 	The Spotted swine breed is characterized by large, black-and-white spots. Many breeders in central Indiana specialized in breeding Spotted hogs through the years. Today, Spots are known for their feed efficiency, rate of gain and carcass quality. In addition, commercial producers appreciate Spotted females for their productivity, docility and durability.
Yorkshire 	The most-recorded breed of swine in North America, Yorkshires are white with erect ears. They are found in almost every state, with the highest populations being in Illinois, Indiana, Iowa, Nebraska and Ohio. Yorkshires are known for their muscle, with a high proportion of lean meat and low backfat. Soundness and durability are additional strengths.

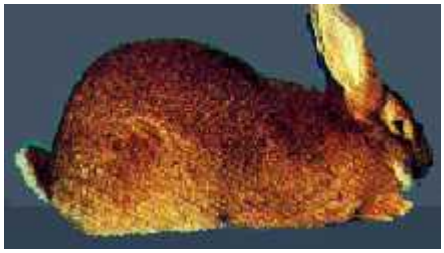
3. Rabbits: Rabbits are easily identified due to their long ears, large eyes, and short, fluffy tails. These pests typically look reddish brown or gray in color and a little more than a foot in length. As the weather gets colder, their fur tends to darken and get longer. Rabbits are prolific breeders and can produce as many as seven litters a year. Each baby

rabbit is born blind and without fur, but becomes independent within four weeks and is able to breed at two to three months old.

Breeds of Rabbits

1. Utility Breeds

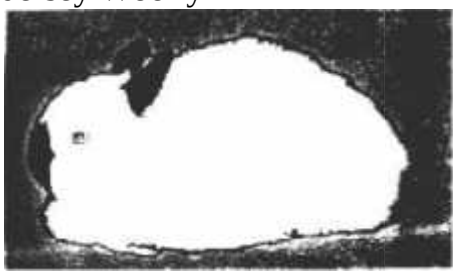
New Zealand 	The crossing originally of the Belgium Hare and the Golden Fawn produced the New Zealand Red and later the New Zealand White and New Zealand Black. It's the preferred breed of the commercial producers and has acquired an excellent reputation as a show rabbit. Its body should be of medium length, not long like the Flemish or short and cobby as in the Dutch. Its hindquarters should be well rounded and meaty with a deep well filled loin and shoulders in proportion. Weights - Senior Bucks 4.5 kg (10 lbs), Senior Does 4.9 kg (11 lbs).
Californian 	The Californian has been around since about 1930. Its lustrous coat and black point markings make it a most attractive show animal with its broad shoulders, deep well filled loin, and well rounded hindquarters. Weights - Sr. Buck 4 kg (9 lbs), Sr. Doe 4.3 kg (9.5 lbs).
Champagne D'argente 	Its fur colour is Silver, and Silver in French is Argente, hence the name Champagne D'Argente or the Silver's of Champagne. The breed is judged primarily for meat purposes. It is fined boned with good meat qualities. On the show table, in prime coat, it is very hard to beat. The young of this breed are born jet black and begin silvering out at around 6 weeks of age. Weights - Sr. Buck 4.5 kg (10 lbs), Sr. Doe 4.8 kg(10.5 kg).

Satin 	The Satin Fur is soft and silky and has a very noticeable brilliance or sheen, meaning, it does not shine like some normal furred rabbits, it glows. The Satin is an ideal exhibition and commercial rabbit. Its excellent meat producing qualities and the lustrous sheen of its fur when on the show table, will rival any breed of rabbit for Best in Show. Weights - Sr. Buck 4.3 kg (9.5 lbs), Sr. Doe 4.5 kg (10 lbs).
Flemish Giant 	The Flemish Giant is the largest of all breeds. Although it is considered a commercial breed, its slow growth and large bone make it very uneconomical to raise in a commercial situation for food. However, once it is placed on the show table it's a different matter. People just stare in silence at this gentle "Giant". Weights - Sr. Buck 6.3 kg (14 lbs), Sr. Doe 7 kg (15 lbs

2. Fancy Breeds

French Lop 	Flemish Giant is rather docile and good mannered, making it a real favourite among the public at fairs and exhibitions. With its massive size, bold head, and its ears framing the head, giving with the crown, the appearance of an inverted horseshoe, it's a hard breed to resist. Weight - Sr. Buck 5 kg (11 lbs), Sr. Doe 5.5 kg (12 lbs)
Dutch 	The person who raises Dutch must be dedicated to the breed. The cheeks, neck, blaze, undercut, feet and more must all be marked their certain ways and breeders must constantly pay attention to these markings while at the same time, placing them on the proper, compact and cobby, Dutch body. They are high spirited and inquisitive and on the show table a perfect Dutch is

	unbeatable. Weight - Sr. Buck 2 kg (4.5 lbs) , Sr. Doe 2 kg (4.5 lbs)
Rex 	The Rex breed is another breed that, like the Satin. The fur should be short and plush-like and approximately 5/8" long, extremely dense, straight and upright, and should be the same length all over its body. As a show animal they are extremely beautiful and add a lot of class to the rabbitry that raises them. Weight - Sr. Buck 3.6 kg (8 lbs), Sr. Doe 4 kg (9 lbs)
Havana 	The Havana first appeared in Holland in 1898. 4-H Members have benefited greatly from this breed. A good beginner's rabbit, the Havana normally has a mild, easy-going disposition, making it easy to handle and care for. On the show table, the lustre of their fur and their gentle manner make them one of the top contenders for the Best in Shows. Weight - Sr. Buck & Sr. Doe 2.5 kg (5.5 lbs)
Holland Lops 	This is the smallest of the lop breeds. They should resemble the French Lop in giving the appearance of a massive little lop. They are not a miniature duplicate of a French Lop though, because they do have their own individuality. The motto of its speciality club is "The Hallmark Breed" and that says it all. Weights - Sr. Buck & Sr. Doe 1.4 kg (3.0 lbs)
American Fuzzy Lop 	The American Fuzzy Lop is one of our more recent breeds, and more or less just a woolly version of the Holland Lop. With its short cobby body, covered by 2" of wool, its ears framing an endearing face, it becomes a very hard breed to resist. The body should be well rounded and well filled, with no rise to the back from the shoulders to the hindquarters. The

	Fuzzy Lop comes in numerous recognized colours, in solid and broken. Weight - Sr. Buck & Sr. Doe 1.8 kg (3.5 lbs)
Jersey Woolly 	The Jersey Woolly is another of the recent breeds. The Jersey Woolly has a gentle disposition. They arenot given to aggressiveness nor are they over excitable. The wool on a Jersey is somewhat different than other angoras; 2-3" in length and when prime, the wool is full of life. The body should be cobby, shoulders nearly equal in width with the hindquarters and well rounded.
Mini Rex 	This is another of the newer breeds. In the simplest of terms, as its name suggests, it is a miniature of the standard Rex. It should show balance and uniformity throughout. To the touch its body should be covered with firm flesh and no protruding bones should be felt. On the show table the Mini Rex has been holding its own and is showing up in the winners section more and more. They are available in solid and broken colours. Weight - Sr. buck 1.8 kg (4.0 lbs) & Sr. Doe 2 kg (4.25 lbs)
Netherland Dwarf 	This is the smallest of all breeds of rabbits. It is a truly miniature breed with a short, compact, well-rounded cobby body with wide shoulders, well- developed loin and hindquarters. When everything is put together right you could compare its body to a short piece of 2x3 with straight lines from the shoulders to the hindquarters on the top, sides, and bottom. It is very alert and inquisitive and with its bold and bright eyes, it doesn't miss a thing. They are available in 30 plus colours that are classed in 5 groups; Solids, Shaded, Agouti, Tans, and A.O.V.'s

	(any other variety). Weights -Sr. Buck & Sr. Doe 1.1 kg (2 lbs
Angora 	The Angora rabbit, which originated in Ankara, Turkey, has been around for hundreds of years. Angoras are a bit smaller than the medium weight breeds. Angora rabbit wool has some unique characteristics unlike regular Angora wool that makes it ideal for spinning. Angoras require more upkeep than normal furred rabbits but if the upkeep is regular, then it is not too time consuming.

4.0 Conclusion

Animal identification is a process done to identify and track specific animals. It is done for a variety of reasons including verification of ownership, biosecurity control, and tracking for research or agricultural purposes.

5.0 Practical Assignment

i. Visit a rabbit farm or show and learn about a variety of kinds of breeds.

ii. Name breeds of Poultry you can find in your area

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iii. Visit a poultry farm and learn about a variety of kinds of breeds.

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iv. List the names of the purebred breeds of hogs that are found in your locality.

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v. Write the name of the breed of swine in the space that is provided for each description.

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6.0 References

https://www.pork.org/facts/pig-farming/major-swine-breeds/

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HANDLING AND RESTRAINING POULTRY AND HOW TO CARRY RABBITS

1.0 Introduction

Handling poultry shows chickens being captured and moved to another area for weighing. Birds should be captured and handled only when necessary. The non-holding arm can be used to assist with restraining the bird and prevent the wings from flapping.

2.0 Objective

At the end of this unit, you will be able to:

- explain handling and restraining poultry for physical examination, vaccination, blood collection or weight taking.

3.0 Procedure

Chicken are fragile but can exercise fear when they are not approached gently.

a) Remove the chicken from the cage or catch it in the pen. When removing the chicken from a cage, come from behind and wrap your hands around its body. When catching a chicken in a pen, move it calmly into a corner or lure it with a treat and then quickly grab it by wrapping your arms around the body. Don't chase it as this can cause a lot of stress.

b) Hold the wings against the body to prevent the chicken from flapping its wings but don't squeeze too tightly - allow the chicken to breathe.

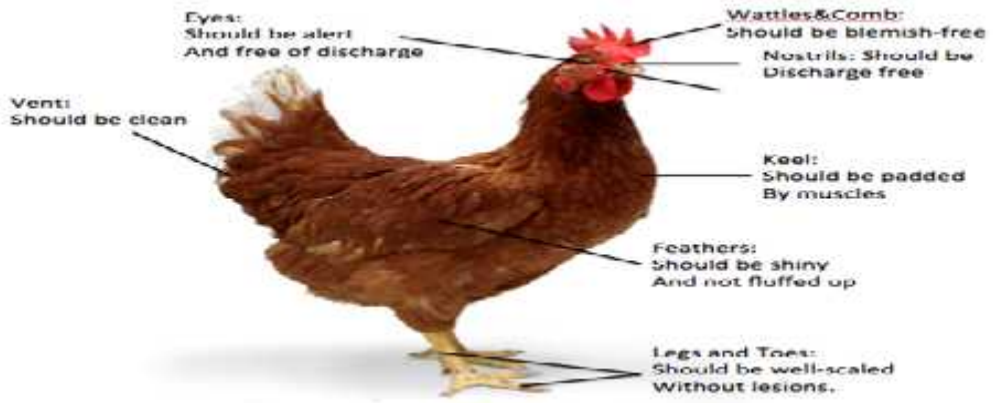
c) Lift the chicken out of the cage or up from the ground and tuck it under your arm.

d) Put one of your hands between the legs and squeeze them together gently, supporting it at the same time with the palm of your hand. Your arm can be used to gently press the wings against the body and stop it from flapping. This method leaves one hand free for examination, such as checking the feet, taking temperature, measuring respiration rate etc.

e) To turn the chicken around, wrap your hands around the body again and while turning it, tuck it under your other arm. Use your hand again for support of the body and to hold the legs together. This position allows you to take the temperature and examine the vent.

f) To put the chicken back down, hold the wings against the body and with your hands wrapped around it gently lift it down. Make sure the feet touch the ground, before you let go.

Therefore to have a good technique of handling and restraining, you have to examine the chicken first by identifying all physical body parts.



S/N	Parts of Chicken	Expected Observation
1	**Check the eyes**	They should be bright, clear and alert and show no signs of discharge. The pupils on each side should be the same size & shape.
2	**Check the nostrils**	The nostrils should be free of discharge. You should not be able to hear sounds of respiration. If you can hear the chicken breathe without strenuous exercise, this always means that it is sick.
3	**Check the wattles & the comb**	They should be blemish free. Also check for signs of parasites around the base of the wattles.
4	**Check the beak and the trachea**	This is a little bit more difficult, and you might need two people. One person holds the beak open while the other checks the inside. Chickens can have many parasites that hide around their trachea and esophagus such as gapeworm and throat worm. There should be no white lesions in the mouth and no obstructions anywhere.
5	**Check the feathers**	There should be no bald spots, the plumage should be well maintained and sleek due to regular preening. Check for parasites moving in between the feathers. Dull feathers may indicate a bad diet. Consider changing the diet.
6	**Check the keel bone**	The keel is the breastbone and birds should be well muscled around their keel. If the keel is

		pointy and sticks out, this may be a sign of undernourishment.
7	**Check the vent**	There should be no sign of faeces around the feathers of the vent. The vent should be clean.
8	**Check the legs & the toes**	They should be well-scaled and smooth. If there are lesions on the legs or bumps, this could indicate bumble foot or pox and needs to be treated.

How to carry Rabbits

i. The first and most important rule of handling your rabbit correctly is to never pick him/her up by the ears, the scruff, legs or tail. It is painful and can cause serious damage. You wouldn't want to be lifted by your ears, would you?
ii. The second rule to remember is that rabbits are fragile. They are quick indeed, but have weak skeletal systems.
iii. Thirdly, rabbits do not always enjoy being picked up. Some of them will tolerate it, but many will struggle when you try to lift them. Therefore, picking them up can be a delicate business. Sometimes it is necessary to pick up your rabbit, however, such as for nail clipping or vet checks. So here are some useful tips.
iv. Approach your rabbit slowly and get down to his/her level. It will help put your bun at ease. Petting the rabbit will also have a calming effect.
v. When you feel confident your rabbit is ready to be picked up, scoop him/her up by placing a hand under the torso and pull your bunny close to your body.
vi. Support the rabbit's hindquarters. Your bunny needs to feel secure in your arms.
vii. If your rabbit struggles when being picked up, hold him/her firmly, but be ready to put him/her down. Your rabbit may think the better alternative to being held is to leap from your arms, but this can cause serious injury.
viii. When putting your rabbit down, slowly squat down while holding your bunny close, and let him/her down gently.
ix. Your rabbit may respond with a thump or may kick up his/her hind legs at you while scampering away. It's nothing personal, he/she just disapproves of being picked up.

4.0 Conclusion

Restraining a chicken humanly is an act of holding the chicken in a way that is the least stressful from the chicken.

5.0 Practical Assignment

Write out Practical Observation in the farms you visited

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PIG HANDLING TIPS- USE OF VOICE, TOUCH AND FOOD/HANDLING AND RESTRAINING PIGS FOR INSPECTION AND ORAL TREATMENTS

1.0 Introduction

All stockmen that handle and restrain pigs should be shown the correct techniques relevant for the size/age of the pig. Correct handling and restraining a pig will reduce the risk of injury and stress to both the pig and stockman.

2.0 Objectives

At the end of this unit, you should be able to:

- safely handle young pigs.
- handle older pigs.
- restrain the pig.

3.0 Procedure

Before restraining a pig for treatment ensure:

i. All the required equipment is ready to use
ii. The equipment is easily accessible once the pig is restrained.

Young Pigs (up to 10 kg)
Outline of Work – Moving Piglets (By Lifting Them)

i. Lift the pig by a back leg, taking care not to ‘snatch’ or ‘swing’ the piglet as you lift it
ii. Support the chest with your other hand, when moving with the piglet over any distance to avoid undue pressure on the leg joints
iii. Lower the piglet back to the ground, ensuring both front legs have contact with the surface
iv. Then gently lower the back legs to the floor and release your grip Only lift one piglet at a time in each hand.
v. Never pick a piglet up by their ear - this can cause ear haematomas - or by a front leg or tail.

Outline of Work-Restraining/Handling for Inspection

i. Lift the piglet by the back leg
ii. Place your other hand under the chest of the piglet to provide support (Figure 1)
iii. Lift the piglet and hold so that it is horizontal (Figure 2)

iv. Hold the piglet firmly to minimise the piglet's ability to move
v. Alternatively after lifting, place the piglet over your forearm with the chest in the palm of your hand and the legs hanging either side of your arm.


Figure 1


Figure 2

Older Pigs (over 10 kg)
Outline of Work

i. When moving pigs, ensure the way forward is clear, secure and obvious to the pigs
ii. When moving pigs, ensure that the pigs are moved from dark to lighter areas with no shadows
iii. When restraining pigs, ensure the area will not pose a risk of injury to pig or stockman ie nonslip floor, flat sides, clear of distractions.
iv. When restraining pigs ensure the required equipment for task is ready and immediately available to you in the handling area.

Outline of Work-Moving Growing Pigs, Sows and Boars

i. Move the pig in a calm, unhurried manner
ii. Allow the pig to walk to its destination at its own pace at all times
iii. The pig can be encouraged forward by use of a pig board and voice
iv. Do not kick the pigs or use sticks/prods to directly hit the pigs
v. Pigs should only be encourage forward, when the way ahead of them is clear.
vi. Certain pieces of equipment, e.g. electric goads, are banned by Assurance schemes.

Outline of Work–Restraint

i. Ensure the area is large enough to perform the task safely, but small enough to restrict movement, e.g. at the end of a passage way or specific handling crate
ii. Ensure the pig cannot move forward
iii. Apply gentle pressure with the pig board/your leg to the hind-quarters and flank of the pig to keep them still

iv. Treat the pig as quickly as possible, and return to its pen promptly.

Restraining Using a Snare

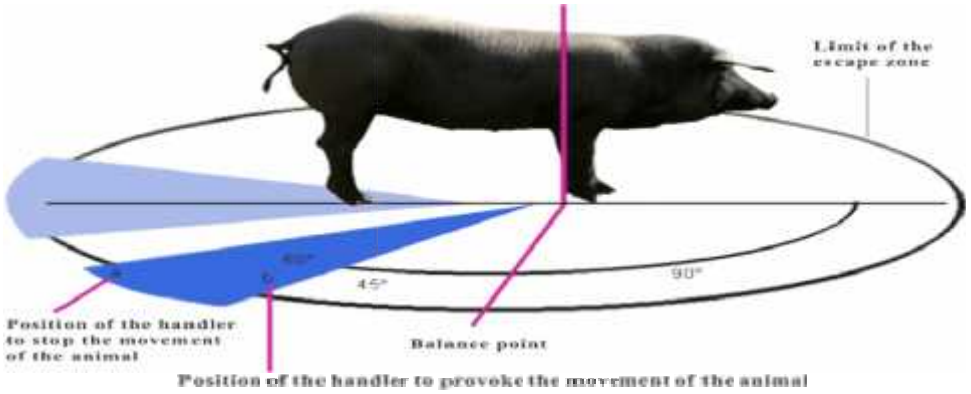
i. If the task will take a long time, e.g. to lance an abscess, the use of a restraining snare or snatch may be necessary to provide adequate restraint.
ii. They should only be used when absolutely necessary, and the person snaring should be trained and competent at this activity.
iii. The snare/snatch should be designed specifically for the purpose of restraining pigs and kept clean and hygienic.

Outline of Work

i. Set up the area of restraint as above Control the pig's movement with a pig board
ii. The size of the snare loop should be relevant to the size of the pig being restraint
iii. Place the snare loop in the mouth and over the top jaw and snout of the pig, with the snare handle held vertically in the other hand
iv. Move the loop as far back in the mouth as possible before tightening it Hold the snare securely
v. A second person can then perform the required task
vi. Release the pig as soon as possible by smoothly loosening and releasing the snare and then return the pig to its pen
vii. Pigs should not be restrained by snatching for prolonged periods. Do not attempt to move the pig by pulling the pig by the snare Pigs should not be tied up by the snare.

Recommended Practices

i. Aim for 0% of pigs being injured from handling, restraining, or moving pigs
ii. Respect the pigs' flight zone: never approach an unsuspecting animal through its blind spot. Refer to Appendix K – Pig Vision and Flight Zone
iii. Move pigs in manageable groups that are small enough for the handler to be able to affect the lead pigs and that are appropriate for the facilities and the size of pigs. Always move pigs at a pace comfortable to the animal
iv. Have non-essential people move out of the line of pigs' sight when moving pigs
v. Walk through finishing pens periodically in a calm manner so that pigs become accustomed to people.



Balance point of the pig. If the intention is to move the pig in a forward direction, the animal handler should be situated at point b.

4.0 Conclusion

Pigs will naturally head for a gap (or opening) when you approach them or try to catch them. You can use this habit to make the pig go where you want it to If two pig boards (wooden boards 0.8m square) are placed either side of the pig's head it will move forward in the direction the handlers want it to go. As the animal gets older it can be trained to move under the control of one handler who uses a board and a wooden bat about 1 m long. The handler always keeps the pig board between himself and the pig. If several people try to drive a pig it can turn and charge between them.

5.0 Practical Assignment

1. Outline of work for moving growing pigs, sows and boars in the farms you visited
2. Outline of work for restraining/handling pigs for general inspection in the piggery.

6.0 References

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MANAGING STRESS DURING HANDLING OF PIGS

1.0 Introduction

Pigs can easily be handled in the farm with a minimum of stress, if their behavior is understood Improper handling of pigs, however, causes considerable stress in the animals and can have a detrimental effect on many of their physiological functions. For example, stress can reduce weight gains, lower immune responses, alter physiological factors such as blood chemistry and interfere with reproductive processes.

2.0 Objectives

After studying this unit, you should be able to:

- minimize stress during pigs handling

3.0 Procedure

i. Use Lighting to your Advantage: Pigs are very sensitive to sharp contrasts of light and dark; Lighting should be bright, but evenly diffused; Pigs reared in enclosed buildings may balk at full daylight; Use lamps to illuminate areas into which you want the pigs to move; Lamps must not shine directly into eyes of approaching animals
ii. Be Aware of Changes in flooding or Wall: Changes in flooding types or texture or wall color can cause pigs to refuse to move. When transferring from metal/plastic floors to concrete, allow 30 minutes to become accustomed to new flooring; Ensure non-slip floor surface
iii. Reduce Excitability in Pigs: Reduce excitability in pigs by: Providing toys; Providing extra contact with people; Prefer daily contact; Playing a radio in the building; Effectiveness dependent on type of housing, genetics, husbandry, procedures, and other factors
iv. Use Appropriate Sorting and Handling Equipment: Lightweight sorting boards or panels, Nylon flags; Witch's/Matador's Cape and Shaker paddles

Procedure to Reduce Fighting in Mixed Pigs

i. Minimize other stressors
ii. Avoid overcrowding
iii. Ensure adequate ventilation
iv. Do not mix when disease is obvious
v. Mix all pigs at same time in a strange new pen

vi. Avoid mixing pigs when temperature > 90°F
vii. Provide areas for pigs to escape during fighting

4.0 Conclusion

Observations of pigs indicate that providing them with toys and positive human contact reduces their excitability. A calm animal can be trained to cooperate during restraint and handling. This makes handling less stressful for both the pigs and their handlers.

5.0 Practical Assignment

- What are the procedures for minimize stress during pigs handling

6.0 References

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MANAGEMENT OF ECTO-PARASITES IN POULTRY AND PIGS

1.0 Introduction

External parasites, including lice and mites, attack poultry by either sucking blood or feeding on the skin or feathers. Flocks infested with lice or mites can show similar symptoms: decreased egg production, reduced appetite and weight loss. Because early detection can prevent a flock outbreak, regularly check your flock for external parasites. Pigs can suffer from infection with dark coloured lice which can be seen on the animal's body. The lice feed on the skin and irritate the pig which will scratch and can cause wounds which become infected. Treatment involves spraying with coumaphos and cleaning the areas where the animals are kept. Indigenous chickens can be found in almost all households in rural areas. They are considered as an important source of income, besides providing a cheap source of protein in the form of meat and eggs to rural people (1, 2). Several species of ecto-parasites (e.g., flies, lice, mites, and ticks) can infest poultry.

Ectoparasites can be found practically in all birds, where they feed on their blood, feathers, skin, and scales. They may cause a range of symptoms, including discomfort, irritation, loss of plumage, stunted growth, reduced egg production and hatchability, anemia, increased feed costs, elevated mortality, and susceptibility to other infections. In addition, ectopara-sites transmit several infectious diseases and serve as transport or intermediate hosts for different helminthic parasites. While lice generally feed on feathers, M. stramineus is known to feed on blood and to carry the equine encephalomyelitis virus. In contrast, Chlamydia psittaci, an intracellular bacterium causing psittacosis in birds, has been isolated from Menopongalli-nae. Furthermore, a number of other poultry diseases, such as pasteurellosis, fowl pox, Newcastle disease, and in some cases, Chlamydia, can be spread by some species of ectopara-sites, especially ticks and mites. Dermanyssusgallinae has been widely reported to transmit human and animal pathogens (e.g., viruses and bacteria) and parasites (e.g., Hepatozoon) to farmers and veterinarians. Therefore, poor management of these parasites and limited accessibility to relevant resources prevent efficient poultry production through output reduction and the increasing risk of disease outbreaks.

2.0 Objective

At the end of this section, you should be able to:

- identify ecto-parasites and treatment available for each of them.

3.0 Procedure

Generally an aerosol (ACI) should be gently sprayed over the feathers and the ectoparasites should be collected after 5 min by shaking the indigenous chickens. The vent, cloacae, breast, comb, wattles, and ear areas of the animals should be inspected for fleas using a magnifying glass and/or flashlights. To collect lice, the head, neck, wings, body surface, and cloacae should thoroughly be examined using a magnifying glass.

To detect infestation with poultry red mite (PRM), the animals should be examined during the night hours. Finally, the ectoparasites should be preserved in 70% alcohol, cleared in lactophenol, and mounted in Canada balsam on a slide. They should be identified according to their morphological characteristics using key identification as described by Soulsby.

The table below shows brief information of ecto-parasites and treatment of infections.

Ectoparasites	**Descriptions**	**Treatment**
Poultry and Pig lice	Poultry lice are tiny, wingless parasites with broad heads. Lice spend their entire life cycle on the chicken, but do not suck blood. Instead, they eat feathers and dry skin usually found below the vent.	Lice can be controlled with: nicotine sulphate, malathion 4-7% dusts, or stirfos.
Mites	Mites are spider-like creatures that are so small they are hard to detect. They typically survive on a chicken's blood, tissue cells, or feathers. Mites do not need to live on chickens to survive; some types live in the chicken coop and only crawl on the bird to feed. Common poultry mites include: Northern Fowl Mites, Red Mites, and Scaly Leg Mites.	They can be controlled with: nicotine sulphate, malathion 4-7% dusts, or stirfos.
The Northern Fowl Mite	The Northern Fowl Mite is the most common external poultry parasite and can be very hard to eliminate. It lives on the bird at all times and sucks blood	Treatment includes: nicotine sulphate, malathion, stirfos and carbaryl.

	from the chicken to survive. These mites can live up to three weeks and are commonly spread through bird-to-bird contact.	
Red Mites	Red Mites live on birds during night and feed on their blood. Found throughout the chicken coop in tiny crevices or in nesting boxes, these mites can live up to one year without feeding on hens. These parasites can carry fowl cholera, fowl pox or New Castle disease.	Treatment includes: painting walls, roosts and other cracks with carbolineum, other anthracene oil or malathion.
Scaly Leg Mites	As the name indicates, Scaly Leg Mites live under the scales of chickens' legs. These mites will leave white encrustations between the scales, but, if left undetected, thick scales will build up on the legs. This parasite spreads slowly throughout the flock.	Treatment includes dipping the infected birds' legs in hot water and then in petroleum based oil.
Internal Parasites		
Internal parasites	Internal parasites can be common in backyard flocks. Common internal parasites include roundworms and tapeworms.	
Roundworm	Roundworm is picked up from the ground as chickens scratch around eating bugs - beetles, snails, slugs, grasshoppers, ants, and earthworms - that are contaminated. The adult worm lives in the intestine where it lays eggs which are excreted in the birds' droppings and transmitted throughout the flock as the chickens scratch for food. Birds suffering from roundworm infections are usually thin with poor feather quality and often suffer from diarrhea.	

4.0 Conclusion

Ectoparasites can be found practically in all birds, where they feed on their blood, feathers, skin, and scales. They may cause a range of symptoms, including discomfort, irritation, loss of plumage, stunted growth, reduced egg production and hatchability, anemia, increased feed costs, elevated mortality, and susceptibility to other infections.

Therefore, poor management of these parasites and limited accessibility to relevant resources prevent efficient poultry production through output reduction and the increasing risk of disease outbreaks. Outbreaks of ectoparasites can be controlled using good management, control, and the treatment of poultry ectoparasites infestations.

5.0 Practical Assignment

Which of the internal and external ecto-parasites did you observed in the farms you visited

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Enumerate the treatment of the infections by the farmers

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6.0 References

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CONTROL OF VICE-HABITS: DE-BEAKING, DE-SPURING AND DE-CLAWING

1.0 Introduction

De-beaking (also called beak trimming) is the act of cutting the lower and upper points of the beaks. The trimmed upper beak is usually shorter than the lower beak. Debeaking birds will help prevent feed wastage, cannibalism, feather pecking, and egg eating. Mortalities due to cannibalism can reach up to 15% in un-debeaked laying hens that are housed in aviaries, straw yards and free range systems. However when they are kept in smaller groups in cages, cannibalism is reduced. Birds that are normally debeaked are laying hens, turkeys, quail and ducks. Broilers meant for meat are not debeaked because they reach slaughter weight before injurious pecking start. However broiler breeders are debeaked because they are kept for a long time.

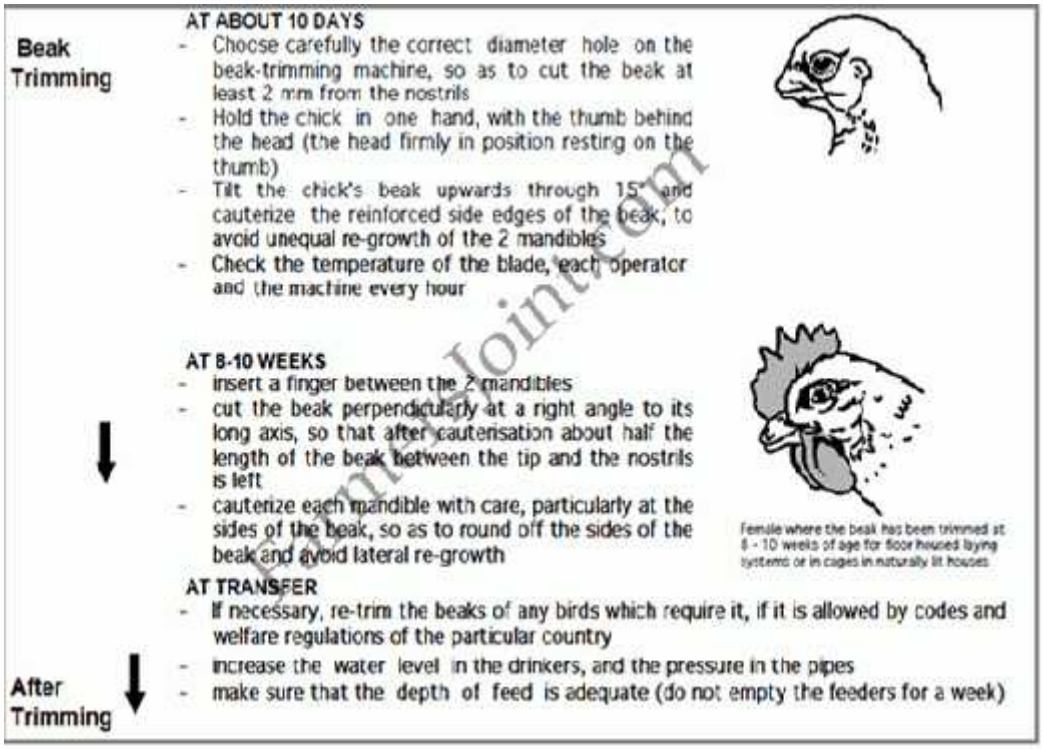
2.0 Objectives

At the end of this section, you should be able to carry out De-beaking, de-spuring and de-clawing of your birds in the farm.

3.0 Procedure

Procedure for De-beaking

i. Cut the beaks of older birds separately; always cut the upper beak first.
ii. The upper beak must be cut to two-thirds and the lower beak to one-third.
iii. Prevent stress as much as possible.



Procedure to get rid of rooster spurs and claws are:

i. File down the tip of the spur with a dremmel or other grinding instrument. Since the spur continuously grows, like the toe nails, this procedure will have to be repeated as the spur tip grows out.

ii. The spur can be removed when the rooster is still a chick. A veterinary uses electrocautery to hinder the growing cells of the spur.

iii. Instead of cutting them, which is dangerous, you can take a pair of pliers, place them at the base of the spur near the leg, and twist until they come off. It removes the outer sheath of the spur leaving a much smaller spur underneath. I do this to my show roosters as it makes them look more “classy” to the judges’ eye.

iv. The plier method will make them bleed, but I have never had one scream in pain yet and I’ve done thousands of roosters like this. Just put some water on the spur and dab some fresh household WHITE SUGAR on it. This will keep the spur clean while helping to clot the blood. The spur shell makes for unique jewelry/pendants too.

v. Wire cutters may also be used by snipping off the tip of the spur. Be careful not to snip off too much as this can cause profuse bleeding and a very unhappy rooster. Cutting too deep means that you’ve cut too far into the new soft spur that is found underneath the old cap. After snipping a metal file may be used to file the edges smooth.

vi. This method is said to remove a spur permanently. This is done when the cockerel is 10-16 weeks old and the spur is 1/4 inch long. The spur is cut off close to the cockeral's leg. After cutting the spur then rub potassium hydroxide into the wound to prevent profuse bleeding and also preventing the spur from regrowing again.

vii. Another known method is using an electric calf dehorner and burning them off. This has been said that it is a permanent form of removal. With this method you must be extremely careful not to burn too much or too little. It's said it doesn't bother the rooster and he's back to normal in a couple of days.

viii. According to Stromberg's Book of Poultry is the following: Place a hot baked potato on the spur and hold it there for a few minutes. Remove the baked potato, twist the spur and you will find it comes right off. There is no blood or mess. This technique really works well.

ix. A Dremel Motor tool with a cut off wheel attachment may also be used. With this method one person holds the rooster's leg and the other cutting the spur off just before the quik. There is the risk of cutting too close and profuse bleeding may result.

4.0 Conclusion

In some countries, beak trimming is banned and producers are forced to go for alternative measures to prevent cannibalism and other antagonistic behaviors. These alternatives include reducing light intensity so that birds can hardly see each other. This is only possible in houses where light can easily be controlled. The birds are introduced to enrichment devices at an early age. Enrichment devices are anything the birds can play with. You can use grasses, branches etc suspended from the ceiling. You can also use perches. Dividing large number of birds into smaller groups can also reduce aggressive behaviors.

5.0 Practical Assignment

1. How do the farms you visited control cannibalism?

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2. What are the errors in debeaking you observed in the farms you visited?

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3. Enumerate the precautions that is required before, during and after be-beaking a bird

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6.0 References

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REARING AND MANAGEMENT SKILLS OF DAY-OLD CHICKS, BROILERS, LAYERS AND COCKERELS

1.0 Introduction

In order to run any enterprise (poultry farming included) profitably, the operator requires good knowledge and skills in the activities involved in management of the enterprise. Management is a dynamic process and involves various factors. Upgrading small scale poultry producers' management skills will enable them to cope with the rapid changes in agribusiness environment and run their businesses more efficiently and profitably.

2.0 Objectives

At the end of this unit, you should be able to manage day-old chicks, raise layers, broilers and cockerels.

3.0 Procedure

Before Your Chicks Arrive: Setting the Stage

i. Brooder: a safe place to keep chicks warm, watered, and fed. You can buy or build elaborate brooders, but many chick growers go with a large plastic tote or large cardboard box. Be certain to have the right size (with high walls) for the number of chicks. You can also start small and move to a larger brooder as the chicks get older. Finally, you'll want a (ventilated) lid to keep brave chicks from escaping once they get bigger.

ii. Brooder location: You want to keep the brooder in a warm, dry place; many people set it up in a garage, others do it in their house, while yet others do it in the chicken coop (if there are no adult chickens in the coop).

iii. Heat lamp: Fairly essential to keeping the chicks warm and their temperature regulated, as they can't do so initially. You can use a regular lamp and light bulb, but products made for this purpose (with a guard) are a bit safer and more consistent. Attaching heat lamp to a 2x4 across top of brooder works well as does attaching it to a floor lamp's pole.

iv. Thermometer: While not absolutely crucial, a thermometer will help you more easily monitor the temperature in the brooder. -- Bedding: Pine shavings in general are the best materials, but in the first week or so, we like newspapers with a layer of paper towels on top (because the chicks will try eating the pine shavings).

v. Waterer: Absolutely essential to have one or more waterers designed specifically for chicks; other systems will lead to sad results and death.
vi. Feeder: You don't necessarily have to get chick feeders (though it's recommended); some folks use the base of an egg carton. If you don't use a chick feeder, be more vigilant about keeping the feed clean (from poop) and dry. Some experts recommend simply placing the feed on a paper plate for the first few days.
vii. Chick starter feed: It's essential to use a feed specifically designed as starter for chicks; your main choice will be deciding between regular and medicated. Feed this feed for the first 8 weeks or so.
viii. Electrolyte powder: If your chicks are arriving by mail, purchase the electrolyte powder (think Gatorade for chicks) to supplement their water starting the third day or so and give the chicks extra strength in those key early days. (Old timers used to put sugar in the chick water.)
ix. Coop: Unless you're keeping the brooder in the coop, you don't technically need to have it ready now, but it's best -- as time will pass quickly. Every imaginable type of chicken coop exists -- and your goal should be to find/build the one that best fits your needs/code/number of chickens.
x. Pen: The healthiest chickens are the ones who forage the yard for their food, thus you should have a plan for where you'll let your chickens roam, from one nicely fenced pen to a series of pens, to a moving pen, to your entire backyard. The pen should be fenced/enclosed to protect chickens from predators.

Day 1: Acclimating Chicks

i. Temperature: Brooder temp should be 90 degrees.
ii. Water: First thing to do when baby chicks arrive is to take one at a time and dip their beaks in the water and be certain they drink; this step is absolutely essential to survival. Refill waterer often.
iii. Feed: Once the chicks have had a drink, repeat the process with their feed.
iv. Location: Keep feed and water on outskirts of heat lamp, ideally on opposite sides (with heat lamp in the middle) to keep water from feed.
v. Sleep: Expect the chicks to sleep quite a lot during this first week.

Week 2: Baby (Chick) Steps

i. Temperature: Bring down brooder temperature 5 degrees to 85 degrees.

ii. Water: Check and refill waterer(s) at least twice a day. Clean regularly with diluted vinegar.
iii. Feed: Keep with the starter feed. Be vigilant about keeping feed free of moisture and chick poop. Using a piece of plywood or extra floor tile, raise waterer and feeder for less waste and mess.
iv. Feathers: You'll begin to see small feathers replacing the fluff on your chicks' wings and tail.
v. Bedding: Switch to pine shavings -- about 1-2 inches deep; clean brooder before doing so.
vi. Grit: Introduce a small amount of fine "chick" grit to chicks' diet -- needed to assist in digestion (which they would normally get if raised naturally outside).
vii. Perch: Consider adding a small, chick-sized perch in brooder for "roosting 101" -- made easily with three small branches in an H-shape.
viii. Socializing: If your chicks are going to be more than simply production birds, now is the time to acclimate the chicks to you.

Week 3: Keeping a Lid On

i. Temperature: Bring down brooder temperature 5 degrees to 80 degrees by raising heat lamp about 3 inches.
ii. Lid: Now's the time when you should start putting a lid on your brooder
iii. Waterer and Feeder: Consider raising the height again, placing them on a 2x6 -- and possibly switching to adult units to make it easier on your maintenance.
iv. Brooder: If you started with a small brooder, it may be time to upgrade to a larger one to accommodate your chicks' growth.
v. Feathers: Lots more feathers are appearing and replacing the fluff.

Week 4: Life beyond the Brooder

i. Temperature: Bring down brooder temperature 5 degrees to 75 degrees by raising heat lamp another 3 inches.
ii. Field trip: Depending on the season (assuming late spring/early summer), now is the time to introduce the pen to the chicks in small doses -- say 1-3 hours daily with supervision.

Week 5: Tweens

i. Temperature: Depending on the season, the heat lamp is done, as long as the temperature does not dip below 60s at night.
ii. Feathers: The chicks should be looking less like babies and more like miniature chickens, as adult feathers grow out.

iii. Separating the sexes: It's hard to tell the genders of most breeds of chicks, but by now you should be able to by examining their feather development -- and it's a good time to separate the sexes -- the cockerels (young roosters) and the pullets (young hens) -- especially if your focus is on keeping only hens for laying. -- Pen: The chicks can take longer day trips to the pen.
iv. Feed: It's now time to start mixing in adult chicken feed as you finish up your chick starter feed.
v. Feeders and Waterers: If you have not already, time to switch to larger (adult size) feeder and waterers.

Week 6: From Brooder to Coop

i. Acclimating: Time for the chicks to flee the brooder for the coop! If they have not been raised in the coop, take time to help the chicks get used to their new digs
ii. Feed: Provide your chicks with chicken feed, table scraps, and other tasty treats.
iii. Feeder: Consider hanging the feeder (at the proper height at top of chicks' backs) to make it easier on the chickens -- and less waste overall.
iv. Pen: Being outside (depending on the season/weather) should now be part of daily routine for the chicks, bringing them home to the coop to roost for the evening.

Week 8: Expanding the Menu

i. Treats: Chickens are omnivores, so a good mixed diet is essential. Be creative and help the chicks from being bored by hanging some of the treats (such as a head of lettuce) so the chicks can peck at them.

Week 12: Readying the Hens I

Nesting Boxes: Assuming you are raising hens for egg-laying, now is the time to install/prepare the nesting boxes. These should be raised above the ground and away from roosting area (to avoid poop contamination), ideally offering some privacy. Lots of methods for constructing the boxes, from old drawers and crates to water buckets.

Week 16: Readying the Hens II

i. Fake eggs: A great tip a veteran told us was putting a plastic egg (partially filled with sand to give it a bit of weight) in the nesting boxes to help your young hens learn.
ii. Feed (layers): Time to switch to a layer feed for your young hens.

Week 20: Laying Begins

i. Harvesting eggs: Once your hens start laying eggs (there may be a few misfires first), you'll want to check the nesting boxes for eggs twice a day (while you also refresh water/feed). Discard any broken or pooped-on eggs.
ii. Nesting Boxes: Keep clean and fresh.
iii. Extending the season: As fall arrives and daylight gets shorter, hens will slow down egg production for the winter. You can extend the season by placing a light in the coop that comes on in the late afternoon and stays on for about 5 hours -- giving the hens about 15 hours of "daylight."

4.0 Conclusion

Management skills among broiler producers are important to enable them to face challenges in high competitive business environment of poultry production. Following the recommended procedures will ensure sustainable and profitable venture in the long run.

5.0 Practical Assignment

Enumerate the traditional and modern management practices among the farms you visited.

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What are the challenges faced by poultry farms in your area?

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6.0 Reference

http://www.hansenwoodlandfarm.com/raising-chickens-checklist.html

TECHNIQUES FOR ENHANCING ANIMAL PERFORMANCE

1.0 Introduction

There exist obvious challenges to rapidly increase agricultural productivity to help feed their growing populations without depleting the natural resource base. Biotechnology is regarded as a means to meet both objectives through addressing the production constraints of small-scale or resource-poor farmers who contribute more than 70% of the food produced in developing countries. Techniques of modern biology such as molecular cloning of genes, gene transfer, genetic manipulation of animal and plant embryo transfer, genetic manipulation of rumen microbes, chemical and biological treatment of low quality animal feeds for improved nutritive value, genetically engineered immunodiagnostic and immunoprophylactic agents as well as veterinary vaccines, inter alia, are a reality today and are finding their ways into research and development programmes of developing countries. Biotechnology is offering unprecedented opportunities for increasing agricultural productivity and for protecting the environment through reduced use of agro-chemicals.

2.0 Objective

At the end this section, you should be able to:

- explain the various techniques for enhancing animal performance.

3.0 Procedure

The available biotechnologies for enhancing animal performance are as follows:

1. Reproductive physiology: One of the challenges for genetic improvement is to increase reproduction rates. Several reproduction techniques are available. The commonest of these are artificial insemination (AI), embryo transfer and associated technologies. Measurement of progesterone in milk or blood, which is a widely used technique for monitoring ovarian function and for pregnancy tests is also an important technology for managing the reproductive function of the animal.
2. Embryo transfer (ET): Although not economically feasible for commercial use on small farms at present, embryo technology can greatly contribute to research and genetic improvement in local breeds. The principal benefit of embryo transfer is the

possibility to produce several progeny from a female, just as AI can produce many offspring from one male.

3. Embryo sexing and cloning: Although embryo sexing may not have dramatic effects on rates of genetic gain it can considerably increase efficiency. If multiple sexed-embryo transfer became as routine an operation as AI is, beef operations based on this system could become competitive with pig and poultry production in terms of efficiency of food utilization.
4. Hormone use: Use of hormonal assays to monitor reproductive function can be rewarding for both research purposes and commercial livestock operations. Reproduction can also be manipulated using hormonal treatments.
5. Animal genetics and breeding: Genetic improvement of livestock depends on access to genetic variation and effective methods for exploiting this variation. Genetic diversity constitutes a buffer against changes in the environment and is a key in selection and breeding for adaptability and production on a range of environments.
6. Multiple ovulation embryo transfer and open nucleus breeding system: Multiple ovulation embryo transfer (MOET) is a composite technology which includes superovulation, fertilisation, embryo recovery, short-term in vitro culture of embryos, embryo freezing and embryo transfer. Benefits from MOET include increasing the number of offspring produced by valuable females, increasing the population base of rare or endangered breeds or species, ex situ preservation of endangered populations, progeny testing of females and increasing rates of genetic improvement in breeding programmes.
7. Genetic markers and marker-assisted selection: A genetic marker for a trait is a DNA segment which is associated with, and hence segregates in a predictable pattern as, the trait. Genetic markers facilitate the "tagging" of individual genes or small chromosome segments containing genes which influence the trait of interest. Availability of large numbers of such markers has enhanced the likelihood of detection of major genes influencing quantitative traits. Marker identification and use should enhance future prospects for breeding for such traits as tolerance or resistance to environmental stresses, including diseases. Already, identification of carriers of genes for resistance and introduction of such genes into a population seems feasible for resistance against Trichostrongyluscolubriformis and Haemonchuscontortus (Gogolin-Ewens *et al.* 1990).
8. Nutrition and feed utilization: Gene-based technologies are being increasingly used to improve animal nutrition, either through modifying the feeds to make them more digestible or through modifying the digestive and metabolic systems of the animals to

enable them to make better use of the available feeds (Bedford M.R. (2000).

4.0 Conclusion

Increasing production and the safe processing and marketing of meat and milk, and their products are big challenges for livestock producers. Biotechnology is being harnessed in various aspects of the livestock industry to hasten breed development for improved animal health and welfare, enhanced reproduction.

5.0 Practical Assignment

1. Which of these biotechnologies is in use in the farms you visited?

   _____
   _____
   _____
   _____
   _____
   _____

2. What are the major constraints on applying biotechnologies?

   _____
   _____
   _____
   _____
   _____
   _____

6.0 References

Bedford, M.R. (2000). Exogenous enzymes in monogastric nutrition: their current value and future benefits. Anim. Feed Sci. Technol., 86, 1-13.

Cunningham, E.P. (1990). Animal production. In: Persley G.J. (ed), Agricultural Biotechnology: Opportunities for International Development. CAB (Commonwealth Agricultural Bureaux) International, Wallingford, UK. pp. 169-175.

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RODENT CONTROL

1.0 Introduction

Rodents, such as rats and mice, can be a major cost factor on the poultry farm because of the food that they eat and spoil with faeces and urine, the damage they do to the housing and equipment. Further, the diseases they may carry can result in flock health problems, staff health problems and/or food safety concerns regarding the products produced on the farm. The effectiveness of rodent control programmes depends upon the people responsible for their implementation being aware of the problems involved, their motivation and their interest in achieving success.

2.0 Objectives

At the end of this practical session, you should be able to:

- learn how to prevent rodents from destroying chicks, piglets, rabbits and their feeds for maximum growth and profitability.

3.0 Procedure

For us to effectively control rodents' activities, the following steps are to be carried out:

i. Regular monitoring
ii. Well trained operators
iii. Access to labour and materials when they are needed.

A continuous integrated programme to control rodents includes:

i. Minimising points of access into buildings.
ii. Preventing access to feed, water, and shelter.
iii. Elimination of nesting places.
iv. Make sure any material that would be attractive to rodents for nesting is placed in rodent proof storage areas.
v. If the storage area cannot be rodent proofed, move the material at least every week to prevent rodents from establishing themselves in it.
vi. Appropriate sanitation conditions
vii. Baiting and/or trapping programmes
viii. Monitoring of rodent populations and control measures.
ix. Closure of Cracks and openings

4.0 Conclusion

From the above steps, the students have been exposed to the control techniques in handling the activities of rodents in livestock farms.

5.0 Practical Assignment

1. Identify and state explicitly how rodent control methods are carried out in the farms you visit.

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_____
_____
_____
_____
_____

6.0 References

https://assurance.redtractor.org.uk/contentfiles/Farmers-5439.pdf?_=635912156456821433

https://www.cieh.org/uploadedfiles/core/policy/publications_and_information_services/policy_publications/publications/pest_control_food_industry.pdf

POULTRY AND PIG HOUSE HYGIENE

1.0 Introduction

The starting point of "field biosecurity" is the reception of a healthy flock from the hatchery. This also implies healthy breeders and a good biosecurity program both at the hatchery and during the transport of the chicks to the house. But, as today's genetics became so performant, they became less and less resistant and therefore require optimum biosecurity conditions. There are different vectors for possible disease transmission, apart from unhealthy chicks. We can subdivide them as follows:

i. **Mobile: Biological:** people , rodents(able to transmit Pasteurelosis , Salmonelosis , …) ; insects (that can carry Avian Viruela , Marek, IBD, Salm. , E.Coli, Campilobacter, …) , wild birds (often carrying Avian Influenza, Pasteurella, Salmonellae, ….) **and Mechanical:** vehicles (vectors for IBD and Salmonellae)
ii. **Nutritional:** feed (possibly containing Salmonellae, paramixovirus, IBD, …) and water (*often containing enterobacteria like Salmonellae and E. coli*)
iii. **Static:** litter, fluff, surfaces (floors, walls, roofs ,able to transmit IBD and Salmonella spp.)
iv. On the macro-biological side, rodent control and excluding wild bird entrance are the main challenges. Meso-biologically, good working insecticides will be useful.

2.0 Objective

At the end of this subject matter, you should be able to:

- explain the techniques needed in keeping the poultry and pig houses hygienic.

3.0 Procedures

Hygiene consists of cleaning and disinfection. Disinfection without cleaning is a waste of money.

Cleaning

Cleaning is the management of dirt that can be seen partially: to separate and remove this dirt from a surface, through water and a detergent. In other words, to make the surface as free as possible from organic soil, that would impede the disinfectant to reach the surface.

Therefore, the characteristics of a detergent are explained below, four factors will determine the functioning of a detergent:

i. Chemical energy: pH and concentration. (Alkaline detergents remove proteins and fat; acid detergents remove mineral deposits like scale)
ii. Thermal energy (Fat starts to dissolve as from 95°F)
iii. Physical energy (e.g. a high pressure washer)
iv. Contact time: this will enable the chemical energy to do its job.

Moreover, it's the only factor that does not cost any energy, its Free of Charge.

Disinfection

The goal of disinfection is to reduce the number of pathogens , ideally with log 4 (99.99 %). Therefore, the disinfectant should comply with a number of characteristics. First of all, it should be compatible with the detergent, foam or gel cleaner. This means that if your cleaning agent contains cationic surfactants, your disinfectant should not contain anionics. (Phenols and especially their derivates like cresolics are known not to be compatible with non-ionic surfactants and cationics like quaternary ammonia).

Well formulated disinfectants should comply with a number of characteristics, such as:

1. **Composition**
    i. How many different active ingredients compose the product , so that it assures a maximum SINERGY? (eg. VIROCID® contains 1 aldehyde (glutaraldehyde), 2 different quaternary ammonia (1 single chain and one twin chain) and alcohol (isopropanol); KICK START® contains stabilised hydrogene peroxide and organic acids).
    ii. Does the products contain buffering agents (surfactants, wetting agents, sequestering agents, …) so it does work in contact with organic matter, in hard water and assures minimum a two years shelf life?
    iii. The one million dollar question: how many oz/gal active ingredients does the product have? (VIROCID®: 70 oz/gal or 522 gr/ L); or in other words: how much water is there in the drum? This concentration will determine the dilution.

2. Safety

i. For the people (e.g. not containing carcinogenic substances like formaldehyde)
ii. For the animals
iii. For the equipment (not being corrosive on galvanised feeder lines and fans, or aluminium drinker supports)
iv. For the environment (being biodegradable and therefore not containing heavy metals such as tin, silver)

3. **Efficacy**

Does the product have the FULL SPECTRUM: bactericide, fungicide, virucide and sporicide? (Beware of statics, like bacteristatics: they stop their development, but don't reduce their number).

4. Versatility

Can the product be sprayed, foamed and fogged as it is?

5. Cost/Benefit

What is the price, not per gallon, but DILUTED?

Water Treatment

Not only the cleaning and disinfection of surfaces are important, but also your waterlines should be cleaned and disinfected!

Cleaning means removing the scale and the biofilm. The biofilm is a polysaccharide layer, caused by adding vitamins, medication etc. through the water. It harbours mainly enterobacteria (Salmonella, E. coli) and impedes the good functioning of medicine, vaccines, etc. It will, as scale, block the nipples and reduce the water flow. Chlorine (that gets neutralised by organic matter) will not remove the scale and not even penetrate the biofilm. Removing the biofilm is only possible by OXIDATION. Stabilised hydrogen peroxide will do the job! In combination with organic acids, it will also remove scale. And, if the products do not contain heavy metals (like silver nitrate), it can also be given during production , avoiding a new build up and sanitising the drinking water. All this without leaving residues in the neither meat nor eggs. CID 2000® is such a product.

Procedures

The Dutch ICC (Integrated Chain Control) system describes the procedures for poultry houses as follows:

a) remove litter, empty drinkers and clean dry all visible dirt
b) wash down with a cleaning agent and allow for enough contact time (20 min) and clean drinker lines (and flush them afterwards)
c) rinse and let dry

d) disinfect (by spray or foam; foaming will visualise better where the product has been applied and stays longer on vertical surfaces and ceilings)
e) install new litter, re-install and fill the feeders and drinkers
f) do a terminal disinfection by fogging
g) do a continuous disinfection of trucks (wheel dips) , people (hand hygiene, foot dips) and drinking water.

For Best Practice in the Broiler House, It is recommended that you:

1. Establish a plan: Any good poultry house cleaning and disinfection program will start with a plan, detailing dates and times, along with the labor and equipment needed, and this should be established prior to depleting the farm.
2. Control insects: Wearing appropriate protective equipment, spray the poultry house interior with a locally recommended insecticide as soon as the flock is removed and while the house is still warm. A second treatment with insecticide should be completed before fumigation.
3. Remove dust: Remove all dust and cobwebs from interior surfaces and equipment.
4. Pre-spray: Again, wearing appropriate protective equipment, spray detergent solution throughout the broiler house interior to dampen any remaining dust. Close the curtains in open-sided poultry houses first.
5. Remove equipment: Remove all equipment from the house and raise automatic feeders and drinkers.
6. Remove and dispose of litter: Litter must be removed to a distance of at least 3.2 km (2 miles) and disposed of in accordance with government regulations.
7. Wash: Use a pressure washer with a foam detergent. Ensure the detergent is compatible with the disinfectant to be used. Rinse with hot water.

Broiler houses should be washed using a pressure washer and foam detergent, compatible with the disinfectant to be used, and then rinsed with hot water.

8. Clean water and feeding systems:

a) Drain, clean and disinfect the water system.
b) Water pipes should be cleaned at least once per flock to remove any biofilm that may have built up. If physical cleaning is not possible, use high levels (140 ppm) of chlorine.
c) Flush water lines with clean, fresh water prior to flock placement.
d) Empty, wash and disinfect all feeding equipment.
e) Empty bulk bins and connecting pipes and brush out. Clean out and seal all openings.
f) Wherever possible, fumigate.

9. **Disinfect**: Use an approved disinfectant that is effective against specific poultry bacteria and viruses. Follow manufacturer's instructions at all times. Most disinfectants are not effective against sporulated coccidial oocysts, and selective coccidial treatments should be used by trained staff only. It is always worth remembering that disinfectants are ineffective in the presence of dirt and organic matter and should not be applied to wet surfaces, as this will result in dilution.

10. Fumigate: Where permitted, formalin fumigation should be completed by trained personnel, following safety legislation and guidelines. Fumigate as soon as possible after disinfection; surfaces should be damp and the house warmed to a minimum of 21C (70F) and a relative humidity of greater than 65 percent. Seal the house for 24 hours. Prior to permitting any re-entry, ventilate the house to reduce formalin levels to 2 ppm. Repeat fumigation after the litter has been spread. Fumigation should be carried out as soon as possible after disinfection. Surfaces should be damp, and the house warmed to a minimum of 21C (70F) and a relative humidity of greater than 65 percent. Do not forget external areas External areas around the poultry house should also be cleaned and disinfected thoroughly. Particular attention should be paid to the areas under the ventilator and extractor fans, under feed bins, access routes, door surrounds and gutters.

Ideally, the poultry house should be surrounded by an area of concrete or gravel (1-3 meters/3-10 feet in width). If this is not possible, the area around the house must be free from vegetation and machinery and equipment and have a level, well-drained surface.

Evaluating farm cleaning, disinfection efficacy

- The efficacy of clean and disinfection should be monitored regularly.
- Bacterial and salmonella counts should be completed at least once per flock.
- Monitoring trends in Salmonella counts will permit continuous improvements in farm hygiene to be made.
- It should be remembered that if cleaning and disinfection have been effective, no Salmonella species should be isolated during sampling.

4.0 Conclusion

At the end of the practical session, students were practically thought the techniques of how to keep and manage the hygiene of poultry houses.

Biosecurity is about an integrated program that should be implemented and checked. Ideally, one supplier should provide you with all necessary products and advice. For integrated companies, the supplier should have both field sanitation and a hatchery sanitation program.

5.0 Practical Assignment

Highlight the techniques of hygiene adopted in the poultry houses you visited?

_____

_____

_____

6.0 Reference

http://www.thepoultrysite.com/BusinessDirectory/Focus.asp?Display=57

VACCINATIONS AND MEDICATIONS IN POULTRY AND PIG REARING

1.0 Introduction

Vaccination is an effective means to prevent and/or reduce the adverse effects of specific diseases in poultry. Poultry refers to birds that people keep for their use, and generally includes chicken, turkey, duck, goose, quail, pheasant, pigeon, guinea fowl, pea fowl, ostrich, emu, and rhea.

Disease-causing organisms can be classified, smallest to largest, as viruses, mycoplasma, bacteria, fungi, protozoa, and parasites. All these organisms are susceptible to chemotherapy, except viruses. Control of viral diseases is dependent upon prevention through sanitation and biosecurity, and by vaccination.

2.0 Objectives

At the end of this course you should be able to:

- identify various types of vaccines available for poultry
- administer different types of vaccination to poultry and pigs.

3.0 Procedure

i. Day-old vaccination is generally accomplished by giving 0.2 to 0.5 ml of vaccine subcutaneously under the skin at the back of the neck or intramuscularly in the leg.
ii. The automatic vaccination machines used in many parts of the world generally are designed for the neck injection.
iii. A skilled operator can vaccinate about 1600-2000 chicks/hour.
iv. A dye is frequently mixed with the vaccine to allow visualization of the vaccine after the injection.
v. Needles should be changed several times during the course of the day. Burred or bent needles must be replaced immediately.

Before Vaccination

i. Calibrate all vaccinators pre-vaccination for accuracy
ii. Verify the position of the needles
iii. Provide plenty of new sterile needles
iv. Check all vaccinators for dose accuracy
v. Check the pneumatic pressure
vi. Verify that the vaccine vials to be used have not been thawed.

Many hatcheries invert the vaccine vials to leave the frozen product on top. If the vaccine is thawed inadvertently, the vaccine will flow to the bottom (the cap of the vial), and be visualized.

i. Verify that the vaccine diluent has the correct color (not yellow; not purple) and that it is not cloudy or has any kind of sediment or foreign particles.
ii. Put on safety goggles and insulating gloves.

Vaccine Administration

i. Begin the vaccination process with properly sanitized equipment.
ii. Hook up the diluted vaccine to the vaccination equipment and test the system before chicks are vaccinated.
iii. The amount of vaccine delivered is usually 0.2 to 0.5 ml.
iv. Needles must be replaced with new needles at least every 1000 chicks.
v. Once reconstituted, the vaccine should be used completely within 30-45 minutes. Should the vaccination personnel need to stop or interrupt the procedure at any time, keep track of the interruption and do not allow the use of vaccine that has been sitting for more than 45 minutes.
vi. A chick sample may be taken per vaccinator to insure the quality of vaccination. Because dye has been added to the vaccine, one can look for evidence of dye in the SC tissue. Count the numbers of chicks with SC dye for every 100 chicks sampled and determine the percent chicks missed. Correct any problems immediately. The inspection must be done within 15 minutes post-vaccination or else the dye will no longer be visible under the skin.
vii. Determine the percentage of chicks with visible blood, which would be an indication of the needles being mal-positioned, burred or blunt, or of too much pressure being applied.
viii. Verify that the machine is properly calibrated to deliver the prescribed volume of vaccine.
ix. Verify that the prescribed air pressure is correct (most machines operate with 75 psi).
x. Excess pressure will hurt the chicks and may promote leakage of vaccine or break down the cells in the vaccine. Insufficient air pressure may result in reduced doses of vaccine.
xi. Post Vaccination
xii. Insure proper cleaning, sanitation, sterilization and maintenance of the vaccination equipment at the end of the day
xiii. Discard all unused vaccine, including vaccine left over during personnel “breaks”.

Spray Vaccination with Backpack Spray System Procedure

i. Walking SLOWLY, start at one end of the house and make two complete passes through the house.
ii. One person should walk ahead of the vaccinators to part the birds and to keep the birds from piling against the back wall.
iii. Each vaccinator sprays one side of the house.
iv. Direct the nozzle three feet (1m) above the birds heads.
v. Keepaconstantpressureof4.5-5.0 Bars(65-75PSI).

Water Vaccination Procedure

i. Pour the reconstituted vaccine into the drinkers, or open the valve of the water tank or the proportioner.
ii. Walk the birds to check if they are all drinking water. If using hand drinkers, redistribute drinkers if necessary.
iii. Note that the birds must drink all the vaccine solution in no more than two hours, and never in less than 1 hour.

Using Water Tanks

i. Open the water tank valve in order for the birds to consume the vaccine.
ii. After the vaccine is consumed, open the water flow normally.

Using a Water Pump Procedure

i. Once the vaccine, vaccine stabilizer and vaccine dye (usually blue in color) are mixed in the large container, the vaccine is pumped into the drinker lines with the assistance of a water pump.
ii. The end of the drinker lines is open to improve flow.
iii. Onevaccinatormustobservethewatercomingoutoftheendofthedrinkerlinesuntil the blue solution (the vaccine) is visible. When the dye is seen, close the end of the drinker lines.
iv. Lower the drinker lines to allow the chickens to consume the vaccine.
v. Alternate the drums of mixed vaccine until all of the vaccine doses are consumed.
vi. Walk through the birds at least 2-3 times while the vaccine is being consumed in order to stimulate consumption by all birds in the house.

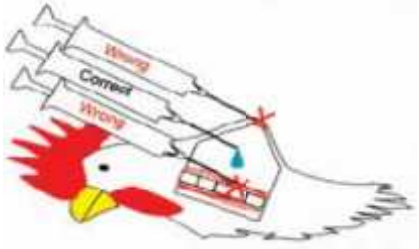
Intraocular (Eye Drop) or Nasal Drop Vaccine Procedure

i. The vaccination will only be considered successful if the drop (0.03ml) is placed into the eye or nasal cavity and absorbed. For this to occur, it is important to wait a few seconds after administering the drop, before releasing the bird.
ii. If the drop is not totally absorbed, a new drop should be administered.
iii. To prevent the contents of the vaccine vial from getting warm against the hands of the vaccinator, divide the contents of the reconstituted vaccine into two or three empty vials, and alternate their use while keeping the others in a cooler with ice.

Wing Web Vaccination Procedure

i. Administer the vaccine in the center of the wing web, using a two-pronged needle applicator or other wing web applicator (Grant innoculator or others).
ii. Remove the feathers located on the wing web before exposing it for vaccination.
iii. Dip the two-pronged applicator into the diluted vaccine and pierce the web on the underside of the wing, avoiding feathers, blood vessels and bones.
iv. Change the needle every 500 birds. The used needles can be disinfected and used again as long as they remain sharpened.
v. If during the application the wing vein is punctured, immediately change the needle and repeat vaccination.

Instructions for Each Site of Vaccine Administration

	
Neck The skin on the back of the neck should be lifted up to create a pocket between the skin and neck muscles. Insert the needle through the skin into this pocket with the needle pointing toward the bird's body. The site of injection should be the middle to lower neck region on the dorsal mid line of the neck.	**Inguinal Fold** Vaccine is injected into the pocket created by skin connecting the abdomen and the thigh. This SC space is large and creates less of an issue with spent hen processing as compared to IM injections.

	
Breast Vaccine is injected into the superficial pectoral muscle about 1 to 1.5 inches (3 to 5 cm) lateral to the keel bone, depending on the age of the bird. The needle should be directed caudally at a 45o angle to the body. This will help avoid injecting the vaccine through the muscle and into the body cavity.	Tail Head This injection is made into the underside of the tail head. The needle is directed to the side of the tail bone and pointed cranially. Care should be taken to not withdraw the needle too quickly, which can lead to leakage of vaccine out of the injection site.

Further Instruction

For all vaccines:

i. Vaccine should arrive with cool packs in a well-insulated box
ii. If vaccine arrives hot, call manufacturer or distributor
iii. Storage temperature=35-45oF(2-8oC).
iv. Avoid freezing, extreme heating and intense light.

For Live Vaccines:

i. Transport to farm in cooler with ice packs to keep temperature constant.
ii. Mix with diluent (reconstitute) just before application.

For Inactivated Vaccines:

i. Remove24hourspriortovaccinatingsothattheproductcanwarmtoroomtemperature. Also, can use warm water bath–do not exceed 100o F for more than 5 hours
ii. Do not leave bottles in direct sunlight during transport to farm.
iii. Gently agitate bottles thoroughly prior to use.

4.0 Conclusion

Strict sanitation and biosecurity are essential for successful poultry production. Vaccination is no substitute for effective management. It must be understood that vaccines may be effective in reducing clinical

disease, but exposed birds, in most cases, still become infected and shed disease organisms.

5.0 Practical Assignment

1. List the precautions of handling and storage of vaccine of the poultry farmers you visited

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2. Under what condition and situations will you use any particular vaccination methods?

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6.0 Reference

http://www.cobb-vantress.com/docs/default-source/management-guides/cobb-vaccination-procedure-guide---english.pdf

IDENTIFICATION OF FEEDSTUFFS USED IN FEEDING POULTRY AND PIGS AND FEED FORMULATION

1.0 Introduction

Feed formulation involves the judicious use of feed ingredients to supply in adequate amounts and proportions the nutrients required by poultry. Feedstuffs vary in composition. Feed costs can vary between 55 and 70 per cent of total operating costs. From a nutritional point of view, there is no "best" diet formula in terms of ingredients that are used. Ingredients should, therefore, be selected on the basis of availability, price, and the quality of the nutrients they contain. Certain ingredients invariably constitute the greatest part of diets, in terms of both amount and cost. Cereal grains and fats are the primary energy-supplying ingredients, and oilseed meals and animal-protein meals are used commonly as major sources of amino acids. Some important nutritional characteristics of many energy and protein-supplying ingredients are discussed in this chapter. Sulphur, which are common contaminants in feedstuffs, and their effects are discussed in the final section.

2.0 Objectives

Upon successful completion of this unit, you should be able to:

- practically learn the types of nutrients to be feed to non-ruminants like poultry for maximum growth
- formulate feeds for various classes of animal and understand the economic and safety regulations of a feed mill

3.0 Procedure

Generally, the sequence for feed identification and formulation are as follows:

i. Identify and prepare a list of important nutrient requirements
ii. Determine available feedstuffs
iii. Prepare a listing of nutrient composition of available feeds
iv. Balance the ration: Follow guidelines for Algebraic Equations, Pearson Square and Computer Assisted Formulation.

Note: To formulate actual/practical diets in most instances, need to balance for other major/important nutrients such as Ca & P! Also, may need to formulate a supplement or base mix [& also a vitamin and (or) mineral premixes?] that will be fed along with major energy and (or) protein sources. A simple approach used to formulate a diet with only

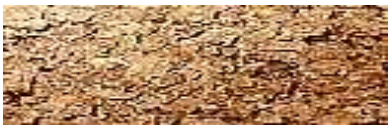
two ingredients can be used to (after some modifications, that is!) accomplish the task.

Feed Identification

Alfalta

Grass(Legume)

Barley



Wheat Bran(Energy)

Whole Cottonseed

Soybean meal

(Protein)

Red rock salt

Examples of common sources of trace minerals

Mineral	Source	Mineral %	Availability
Zinc	Zinc oxide	80.3	Excellent
	Zinc sulfate	22.7	Good
Iron	Ferrous sulfate	20.1	Excellent
	Ferrous oxide	69.9	Poor
Manganese	Manganese carbonate	47.8	Medium
	Manganese oxide	77.4	Good
	Manganese sulfate	22.8	Excellent
Copper	Cupric oxide	79.7	Poor
	Cupric sulfate	25.4	Excellent
Iodine	Calcium iodate	65.1	Excellent
	Cuprous iodide	66.6	Excellent
Selenium	Sodium selenite	45.7	Excellent
	Sodium selenate	41.8	Excellent

The Process of Feed Formulation

This involves calculation of the proportions of available raw materials, which have to be blended together to provide a mixture, which contains the appropriate concentrations of all the nutrients required for a particular class of livestock. Whilst it is possible for simple formulations to be done by mental arithmetic or manually using a small calculator this becomes impracticable as more nutrient specifications, for example amino acids, are added. It is now common practice to use computerized linear programing which has the advantages of speed, accuracy and low cost (compared with the time spent on manual calculations). lt also enables the prices of different raw materials to be taken into consideration so the proportions of raw materials in the mixture not only meet the nutrient specifications, but do so at the lowest feasible cost

given the prices of the raw materials available, that is, a least-cost formulation.

The information required to carry out least-cost formulation includes details of raw materials (quality, availability and price) and nutrient specifications relevant to the livestock systems utilizing the feed. The steps involved in least-cost formulation include listing of raw materials, listing of nutrient specifications with maximum and minimum values, listing of constraints on raw material inclusion, linear programing and manipulation of formulations after linear programing.

4.0 Conclusion

Feed formulation and operation of the mill may be balanced to supply non ruminant animal with a feed that is acceptable, available, and easily digested. The inter-dependent variables present in ingredient selection are subjects for proper understanding and practical application by farmers for sustainable balanced diets feed formulation.

5.0 Practical Assignment

Visit a feed mill in your area. Write out the ingredients commonly used as sources of these nutrients for poultry, pigs, and rabbits in the farms you visited.

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_____
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_____

6.0 References

Cooke, B. C. (1985) Prediction equations: their potential for estimating the energy content of compound animal feeds. Feed Compounder, November, pp. 7-9.

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FEED FORMULATION AND FEED MILLING

1.0 Introduction

Feed manufacturing and the associated quality control programme are keys to successful animal husbandry. Farmers' understanding and specification of the activities of the feed mill is a major key to sustainable profitable rearing of animal.

There are different types of feed milling machines (Grinding) namely: Hammer, Attritions, Roller, Cutters and Screening mills. Grinding or particle-size reduction is a major function of feed manufacturing. Many feed mills pass all incoming ingredients through a grinder for several reasons: (a) clumps and large fragments are reduced in size, (b) some moisture is removed due to aeration, and (c) additives such as antioxidants may be blended. Dry feeds may be ground, sifted, screened, mixed, compressed, expanded, texturized, coloured and flavoured. By one or more of these processes, a wide variety of ingredients can be prepared into a standardized product.

The mixing can be done using horizontal mixers or vertical Mixers. Feed mixing may include all possible combinations of solids and liquids. Within each ingredient are differences in physical properties. For solids there are differences in particle size, shape, density, electostatic charge, coefficient of friction as represented by the angle of repose, elasticity or resilience and, of course, colour, odour, and taste. For liquids there are differences in viscosity and density.

2. 0 Objective

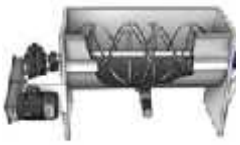
At the end of this section, you should be practically be exposed to:

- the rudiments of feed milling machine, the processes of milling livestock feed.
- basic information as to how feed milling machine can be designed, assembled and maintained
- various ingredient processing methods.

3.0 Procedure

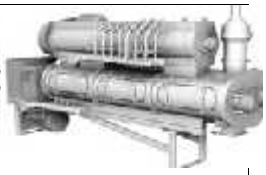
A feed mill is a very large investment and new buyers can often be overwhelmed by the different types of machinery needed, the processes and uses of each these machinery/equipment, and the components and parts of these machinery/equipment. Below are Pelleting, Mixing, Grinding and Extrusion machines.

Pelleting

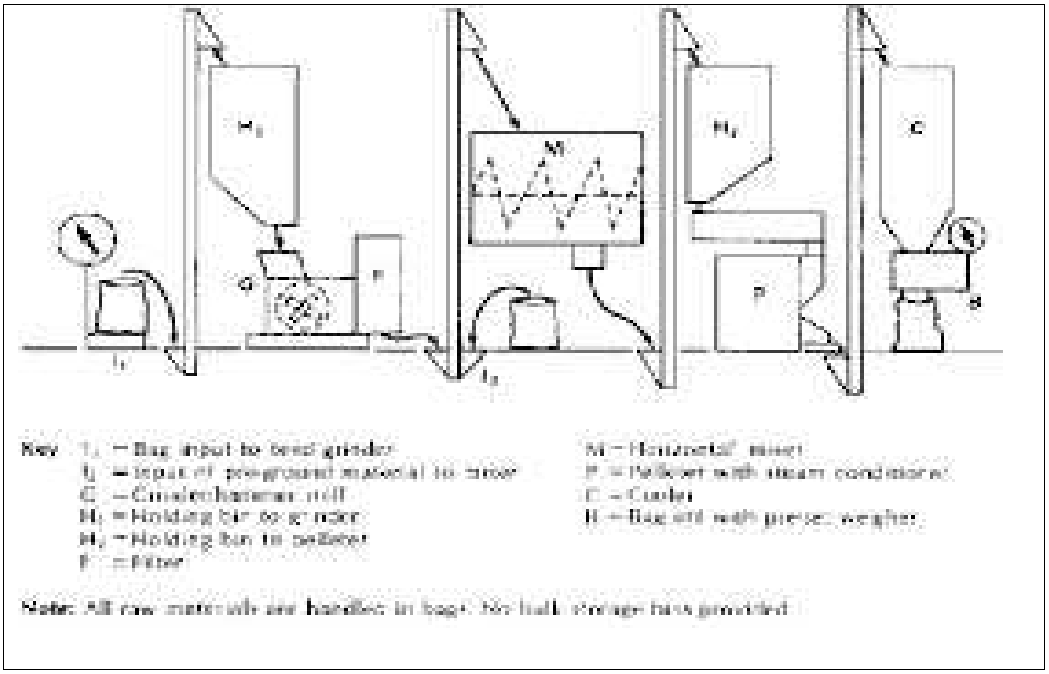


Mixing

Grinding



Extrusion



Procedure of Feed Manufacturing in a Feed Milling

The feed manufacturing process may be considered to be made up of several unit operations which, in almost all circumstances, include the following:

a) Raw material, storage and selection: The proper storage of raw materials and of finished feeds is not only essential to prevent physical losses, but is also an important aspect of quality control

b) Raw material weighing: The accurate weighing of raw materials according to the formulation for a given ration is perhaps the most important unit operation involved in feed manufacture, since no amount of mechanical processing can make up for any deficiencies in nutrients which have been omitted from the mixture. Large bin-type weighers are often used for raw materials which have been pre-ground or are free flowing and discharge readily from storage bins or silos. Bin-type weighers may be mobile or stationary.

c) Raw material grinding: In the sequence of unit operations involved in feed milling, raw material grinding may occur before or after weighing. It is a process with high power requirements

which is often noisy and dusty. The design of machine most commonly found in the feed manufacturing industry is the hammer mill. Inside the grinding chamber, hammers, which may be fixed rigidly to the central shaft, or more often swinging on steel pins, rotate at high speed. The impact of the raw material on the hammers and the continual high-velocity impact of particle on particle results in material breakdown until it is small enough in size to pass through a perforated screen.

d) Mixing of dry ingredients and addition of liquids: It is the job of the mixer to produce a homogenous blend of all the raw materials desired in a formulation, such that at each feeding period each animal receives a balanced mixture of nutrients. The smaller and younger the animals to be fed, the greater the need for good mixing. Not only are their requirements more demanding, but the daily nutrient intakes of those eating small amounts of feed will be subject to much greater variation as a result of poor mixing. Mixing often improves feed palatability if one or more of the raw materials is unpalatable to livestock.

e) Pelleting of mixed feed (optional): Pelleting involves the compression of a mixed feed through holes in a hardened steel ring or plate (a die) by means of hardened steel rollers. The die forms the feed into pencil-like extrusions which are cut by knives into pellets of desired length on leaving the die. In a ring die pelleter, the rollers or the die may be driven but in a plate die pelleter the rollers only are driven. The die and rollers of a ring die pelleter may operate in a horizontal or vertical plane according to machine design. Pelleters with horizontally running dies are most commonly found in farm-scale feed mills. The pelleting process is very energy intensive, demanding up to 50% of the total power required for feed manufacture. The diameter of feed pellets is governed by the diameter of the holes in the die ring but the smaller the die holes the greater effort is required to force meal into these holes, hence the greater the power demand, that is, the smaller the pellet, the greater the cost of manufacture.

f) Blended feed bagging, storage and dispatch: Compound feeds, whether in meal or pellet form, are usually distributed in sacks in developing countries, although for on-farm use or for distribution to a large livestock unit distribution could be in bins or trucks. Bags may be filled directly from mixers or from holding bins and may be weighed on a scale balance or through an automatic pre-set weigher and bagging unit set to weigh, for example, 25 kg of meal per bag. Bags may be of jute; cotton or paper and can be hand- or machine-stitched or tied with a string or metal tie. Stitching machines do not stand up to abuse and require a constant supply of appropriate needles and thread and are therefore more applicable to the larger feed mill models in this

bulletin. Polythene bags are not normally recommended for storing animal feeds because of the risk of sweating and mould growth. If old bags are re-used, care should be taken that they have not been used previously for the storage of fertilizers, pesticides, or other chemicals.

4.0 Conclusion

Compound feed mills may be linked to a source of raw materials, such as a wheat mill or oilseed crushing plant; to a market outlet, such as a poultry or dairy enterprise; or they may be independent. Traditionally the feed industry has been linked to the supply of the raw materials, as these were generally the by-products of other processes and of low value relative to the main product.

The process of manufacturing animal feed is a means whereby raw materials of widely ranging physical, chemical and nutritional composition can be converted into a homogenous mixture suitable for producing a desired nutritional response in the animal to which the mixture is fed. The process is basically a physical one and chemical changes are few. It should be remembered however that some raw materials will have undergone extensive processing prior to inclusion into a mixed feed, for example, extraction of oil from oilseeds by solvent or mechanical extraction, heat treatment of soya beans or other beans to denature anti-nutritive factors, or the production of fishmeal and meat meal.

5.0 Practical Assignment

Highlight the different types of feed milling machines in feed manufacturing industries in your area.

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From your assessment, write out the procedure of feed milling in the industry you visited

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Are other companies active in other area manufacturing animal feeds?

What are the sizes of these companies (estimated output of feed in tonnes/day).

Would you consider them to be competitors for a limited market or is the demand for feed greater than the ability to supply?

Is the market likely to increase?

At what rate?

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6.0 References

Church, H, D. C., Pond, W. G., (1974). Basic animal nutrition and feeding. Corvallis, Oregon, United States: D. C. Church, vii +300pp.

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Pfost, H. B. (Technical Editor) (1976). Feed Manufacturing Technology. Arlington, Virginia, United States: Feed Production Council, American Feed Manufacturers Association Inc.,

DISEASE CONTROL

1.0 Introduction

A disease is an unhealthy or abnormal physical state and/or appearance. Diseases are often a product of living organisms (infectious agents) or faulty environments due to poor management. Non-ruminant, like human beings are subjected to many diseases and parasites such as cholera, pox, typhoid, hepatitis etc. Chickens are also known to suffer from internal and external parasites. Some poultry diseases and parasites can be prevented while others cannot be prevented. Some cannot be controlled and cause death when contracted; others can be isolated and controlled. Poultry diseases can be classified under the following headings: Viral diseases; Bacterial diseases; fungal diseases; Parasitic and diseases and nutritional diseases.

2.0 Objectives

At the end of this practical section, you should be able to:

- identify common poultry diseases and parasites
- understand the appropriate preventive or control measures.

3.0 Procedure

Disease Identification Procedure
Identifying signs of disease in poultry is the best method of detecting diseases in non-ruminant animals. There are common signs of disease that you can use to detect potential illness in chicken and other poultry. Some of these include: feather loss (unless birds are going through a natural moult), general inactivity, discharges, abnormal droppings, dull and/or closed eyes, ruffled feathers, drooped wings, sitting on haunches or lying down. The following are the procedures for disease identification in poultry or other non-ruminant animals:

i. History. A good history will often provide clues that will help solve a problem. Get information on the type of bird, age, feed and water source and consumption rate, growth, production, morbidity and mortality, the description of the case, previous problems, vaccination program, medicine being used etc. The problems may relate to management, environmental factors, and stress rather than to infection so examine the yard and housing conditions. Is the ventilation adequate? Are ammonia fumes a problem? Is it too hot or too cold? Is the litter wet or is it too dry and dusty? Is the pen too light or too dark? Are there sufficient hours of light for best production? Is the nest area darkened? Are

the roosts too high? Do the birds appear comfortable? Chickens can talk and the sounds they make can indicate comfort, hunger, pain, panic, or disease.

ii. Examination of Live Birds. Check the general appearance of the individual or group and try to determine which organ or system is involved in the illness. Note any signs or lesions that might point to a diagnosis, such as small size with poor feathering that suggests infectious stunting (malabsorption syndrome). If the birds show lameness or paralysis, is the lesion in the nervous system, bones, joints, muscles or skin? Some conditions, particularly those affecting locomotion, are easier to diagnose in live birds. Botulism which produces neck paralysis in chickens (leg and wing paralysis are more obvious in turkeys, ducks and pheasants) is an example. Examine the skin of the head, body and legs for lice and mites, injury (particularly cannibalism), blood, mottling, swellings, anemia, cyanosis, or dermatitis. Listen for unusual breathing sounds (snicking, gurgling) and look for gasping or head-shaking that might indicate respiratory distress. Mouth-breathing (panting) is normal in chickens in hot weather. Exudate from nostrils and eyes and dirty feathers also suggest respiratory infection, or if just the eye, ammonia burn, ILToreyeworm. Examine the droppings for evidence of diarrhea or other abnormalities. Take a blood sample for hematology or serology if indicated.

iii. Necropsy. If a postmortem examination is to be carried out, birds that are representative of the problem in the flock must be selected. If birds have died, both sick and dead birds should be opened. Cull birds will not provide the answer. If the problem is a drop in production, try to find birds that look like they have recently stopped laying. It is important to do both an external and internal examination and to follow a specific routine to avoid missing important lesions.

iv. Live birds may be killed by cervical dislocation except when anemia or respiratory disease is suspected.

Disease Prevention Procedure

Diseases caused by infection with a living microorganism such as bacteria, virus, mycoplasma, parasite, etc. are infectious diseases. Most infectious diseases are also contagious, that is, they spread from one chicken to another but a few, like Staphylococcus infection, and aspergillosis, are not.

i. Prevention By Sanitation: Sanitation is used to reduce the numbers of disease organisms, which the chicken contacts to the level where they will no longer cause disease and to provide a

clean, healthy environment. This can be done by cleaning and disinfecting, by adequate ventilation to reduce the number of organisms in the air and by reducing contact with other chickens by keeping them in cages. Sanitation affects all levels of the birds' environment:

(a) Building and Equipment
(b) Feed
(c) Water: Open troughs are a source of contamination from the nasal and oral secretion and feces, etc. and must be cleaned regularly.
d) Air: Clean, germ-free air is a very important part of a healthy environment.
(e) The Caretaker: Workers can carry infection to birds on their hands, clothes, boots, and equipment. Good isolation requires shower-in and no contact with other chickens or other people who have chickens or work with chickens.

Sanitation is a method of eliminating or reducing the number of disease causing organisms from contacting the birds.

When the microorganisms which cause a disease are eliminated from an area or country, the disease is said to be eradicated. Whether or not a disease can be prevented by isolation depends on:

(a) Where the microorganisms that cause the disease live.
(b) The way the disease organism is spread.

Sanitation and isolation procedures are:

a. Have only one age group on the farm (an all in, all out program). Buildings over 100 meters apart can be treated as separate units if proper isolation and sanitation procedures are followed.
b. Obtain chicks or replacements from a disease-free, adequately isolated, single source or raise replacements in a different area with separate caretakers.
c. Have no neighboring poultry buildings or free ranging chickens within 300 meters.
d. Clean and sanitize buildings and equipment between crops. (wet down litter before removal to protect neighboring poultry and do not store or spread litter near poultry buildings).
e. Screen buildings against wild birds and keep out rats, cats, and dogs, and control insects. Remove dead birds from the

pens at least twice a day and dispose of sick and dead birds at least 100m from the poultry buildings. Make sure dogs, cats and wild birds or animals cannot drag or carry dead chickens onto the farm.

f. Limit the movement of workers from one building to another.
g. Bring in only new or sterilized egg cases and flats.
h. Make sure employees do not keep poultry or pet birds or come in contact with free-range chickens or their droppings and do not visit other poultry farms.
i. Keep out visitors (particularly those who may visit other poultry farms) and provide boots and protective clothing for persons entering the poultry area.
j. Disinfect necessary vehicles (feed trucks etc.) and restrict them to the loading and unloading areas which should not be near the building entrance. Keep the driver in the truck or provide boots and coveralls.
k. Make sure poultry service crews disinfect equipment, shower, and change clothing before entering the poultry area (except at cleanout).
l. Shower and change clothing after taking chickens to market or meeting with poultry workers from other farms.

ii. Prevention By Isolation: This method of disease control is simple. Stop the microorganisms that cause disease from contacting the chickens. 3. Prevention By Vaccination: Poultry have a good immune response to many diseases and to vaccination. They also pass immunity to offspring through the egg. Breeders require a special vaccination program.

iii. Prevention By Medication:

a) Preventive medication Some diseases such as coccidiosis, necrotic enteritis and enterohepatitis can be prevented by medication. Preventive medication is most useful when protection is only required for a limited time as in broiler chickens or when immunity does not develop such as in necrotic enteritis.

b) Therapeutic medication Therapeutic medication can be considered preventive when it is used to control the spread of serious infectious diseases such as coryza or cholera. Medicines given by injection should not be given into the abdomen or leg. They can be given under the skin of the back or into the muscle of the breast. Medicine given in the drinking water can be poured into the drinkers. In an automatic system they can be mixed in a large container and run into the system by gravity or a pump. Medicine can be added to a pressure system with a proportioner.

Birds drink more water in hot weather. The level of medicine must match daily consumption and should be reduced in hot weather. It could be given for just 8 to 16 hours a day. Medicine is often added to the feed at the feed plant. Most preventive medicine is used this way. In a disease outbreak medicine can be added to the water until medicated feed is available.

4.0 Conclusion

In this unit, you have been introduced to the diseases of poultry, their causes, symptoms, effects, prevention and treatments where applicable with a view to showing the importance of prevention of diseases.

5.0 Practical Assignment

Visit a veterinary unit of a large poultry farms, Use the procedure above to identify five (5) Viral, Bacterial, Fungal and Parasitic diseases of poultry broilers and their preventive measures. State your findings using the format below:

S/N	Diseases of Poultry	Symptoms	Control	Treatment
A	Viral			
1				
2				
3				
4				
5				
B	Bacterial			
1				
2				
3				
4				
5				
C	Fungal			
1				
2				
3				
4				
5				

D	Parasitic			
1				
2				
3				
4				
5				

6.0 References

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http://www.canadianpoultry.ca/lifestyle/diagnosis-of-poultry-disease