

How To Raise Ducks For Food and Project

Sustainable Agriculture



Training Pac

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1. Introduction

Duck raising has been practiced in the Philippines for such a long time that nobody can say exactly when it started. It was introduced here by early Chinese traders. The Spaniards found it already a thriving industry in Pateros, Rizal, which is still the center of the duck in the Philippines. (Fronza, 1972).

Ducks are now being raised in many other areas in the country, and they are second only to chickens in popularity and economic importance (see Table 1).

TABLE 1. Popularity of Poultry on Farm, by Kind: 1950 to 1983
(in thousand heads)

Year	Chicken	Duck
1950	25,235	709
1955	44,584	1,696
1960	52,335	2,231
1965	56,929	1,478
1970	56,999	2,132
1971	56,512	2,352
1972	50,103	2,600
1973	49,965	2,906
1976	45,671	4,104
1977	45,289	4,228
1978	58,892	5,365
1979	49,320	5,338
1980	52,761	4,725
1981	57,724	4,783
1982	59,710	4,905
1983	62,255	5,419

Note: The reference date of the population is March 1 for 1955, 1960, and 1965 and January 1 for 1950 and 1970 to 1980. Date for 1974 and 1975 are not available.

Source: Bureau of Agricultural Statistics.

2. Advantages of Raising Ducks

There are several reasons why Filipino farmers should raise ducks in their farms or backyards. Consider the following:

Good source of protein. Duck raising provides meat and eggs for the family. Duck eggs are nutritious and provide needed protein for the family. Duck meat can be cooked in even more ways than chicken and is an excellent addition to the family diet.

More economical. A farm family will have a daily supply of eggs, and you will be able to sell any surplus eggs for additional income.

More practical. Duck raising is more practical for a small backyard project than raising chickens. Ducks are productive for a longer period of time than chickens. You will need to replace your layers only once every 18 months in order to keep production high. This means saving on the cost of replacement stock. Generally, you have to replace your laying flock only twice every three years.

Don't require elaborate pens. The birds do not require any elaborate housing with a multitude of windows, dropping-boards, perches, and nest boxes. Generally, you can keep in ducks in simple sheds at night and let them loose during the day.

Rarely affected with diseases. Ducks are very rarely afflicted with coccidiosis, and when this disease strikes, its effects are not as bad as on chickens. The ducks are also not as frequently affected by such fowl diseases as fowl pest and bacillary white diarrhea.

Require little labor. Ducks lay their eggs at night or early in the morning, so eggs can be collected in the morning before letting the ducks loose to range during the day.

3. Popular Breeds of Ducks

There are several breeds of ducks raised in the country. The Philippine duck (Pateros), the Khaki Campbell, and the Indian Runner are excellent egg-layers. For meat production, raise either Peking or Muscovy. There is little purebred breeding stock available in the Philippines and most of the ducks a farmer will be able to purchase will be ducks that are crossed or upgraded.

The Philippine Duck

This is the most common breed of duck being raised in the country, thus its name. Most Filipinos call it “itik” or Pateros duck.

This breed is a good layer but is a non-sitter. Its plumage is either black, brown, or gray or various color combinations. The average weight of this duck is 1.5 kilograms; the drake, or male, is 1.75 kilograms. Egg production rate, is 175 per laying year.

The Khaki Campbell Duck

Originally from England, this a cross between the Fawn and White Runner, the Roven, and Mallard ducks. It was introduced here in 1956 by the Bureau of Animal Industry.

The males have brownish-bronze lower backs, tail coverts, head, and neck; the rest of the plumage is dull brown. The bill is green and the legs and toes, dark-orange. The female has a seal-brown head and neck, the rest of the feathers and dull brown. The adult duck weighs 1.80 kilograms, the drakes, 2.10 kilograms.

This breed is a good layer: it lays as many as 300 eggs per laying year. The eggs are fairly large, thick-shelled, and weigh about 70 to 75 grams each.

The Indian Runner Duck

This is from the East Indies, but its egg-producing capabilities were developed in Europe. It is classified into three recognized varieties: Pencilled, White, and Fawn-and-White. However, these varieties have one thing in common: their feet and shanks are either orange or reddish orange.

Generally, the Indian Runner duck is a small, hard-feathered duck with an upright carriage and active habits. Its body is elongated and somewhat cylindrical; the legs are set very far back. The adult duck weighs about 1.80 kilograms; the drake, 2.10 kilograms. Egg production rate is 225 per laying year.

The Peking Duck

A native of China, this duck was improved in North America and Europe. It has a white body and orange bill, legs and feet. The Peking duck has a large, round head; its body is broad, of medium length and without any indication of keel, except a little between the legs.

Peking ducks grow twice as fast as chickens. A bird can weigh 2.50 kilograms in seven to eight weeks. They are also hardy and resistant to most diseases.

The main problem with the Peking duck is its low hatchability. At one time this breed was very popular in the Philippines, but it lost much of its popularity because of low hatchability. Its egg production rate is only 200 per laying year.

The Moscovy Duck

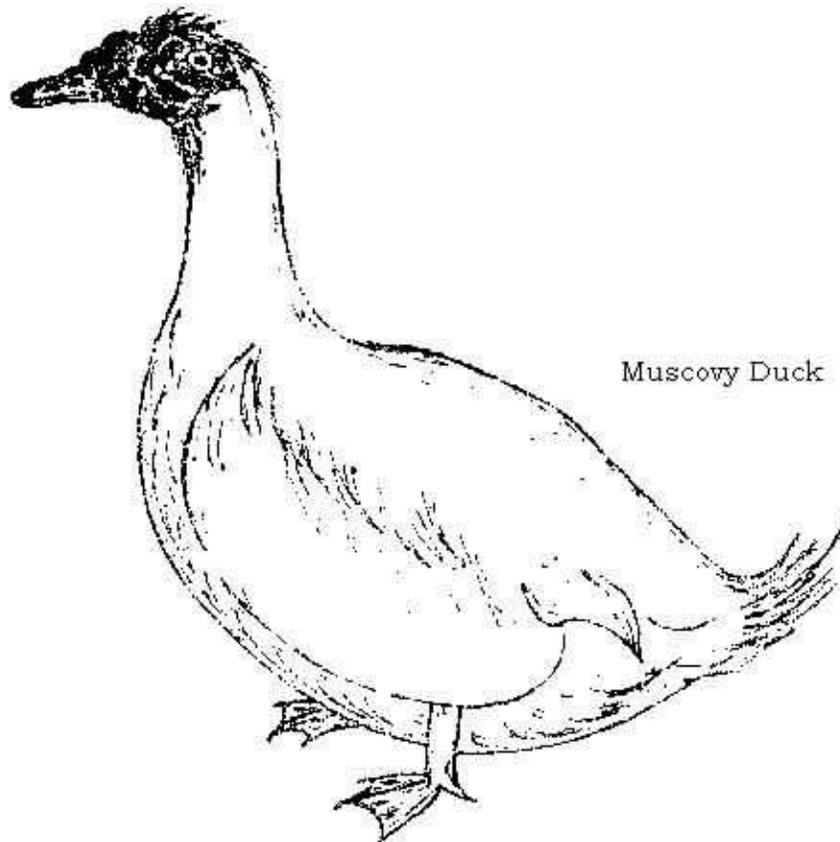
This duck is sometimes mistaken for a goose. It is a grazer, eating grass and laying eggs just like a goose. This is a common duck in Central and South America and the West Indies. A native of Brazil, it is now very popular around the world – even in Australia. In the Philippines, it is now called “pato.”

Like the itik, it requires minimal care and feed and can fend for itself. However, here is a word of caution: The Muscovy duck is armed with very long and sharp talon-like claws that could open up your wrist or hand. If a raiser must handle this bird, he should grasp it firmly by the wings where they join the body, and by the neck.

He needs to keep out of the way of its claws. The adult duck weights about 2.30 kilograms; the drake, 4.60 kilograms. Egg production is 125 per laying year.

The Muscovy is an excellent mother and can be used to hatch eggs of other egg-type ducks. The young Muscovy are excellent for food, but the older birds have a “musty” taste.

Muscovy ducks should be raised in areas where the food supply is limited and where duck technology is not well developed because the Muscovy is the hardiest of all farm poultry.



4. Selecting the Right Breed

Two Classes of Ducks

There are two classes of ducks which farmers can raise: egg class and meat class. In the Philippines most ducks are raised for eggs which are consumed by the family or made into balut and penoy. Balut – a hard-cooked 18-day incubated duck egg – is regarded as a delicacy by most Filipinos. Salted eggs – known as maalat or itlog na pula – are also very popular.

Meat class ducks, also known as green ducks, are raised commercially only on a limited scale, but with the introduction of the Peking duck in the Philippines the meat class ducks are becoming more popular.

The first thing you must do in duck raising is to select the right breed to raise. As an expert puts it: “Choosing an appropriate breed will play an important role in the success and failure of the duck project.”

Unfortunately novices often assume that a duck is a duck, and just acquire the first web-footed, quacking bird they find. This mistake frequently results in expensive eggs or meat, problems, and a discouraged duck raiser. Investing a little time at the outset in acquainting yourself with the basic characteristic attributes and weaknesses of the various breeds will go a long way toward eliminating unnecessary disappointments.

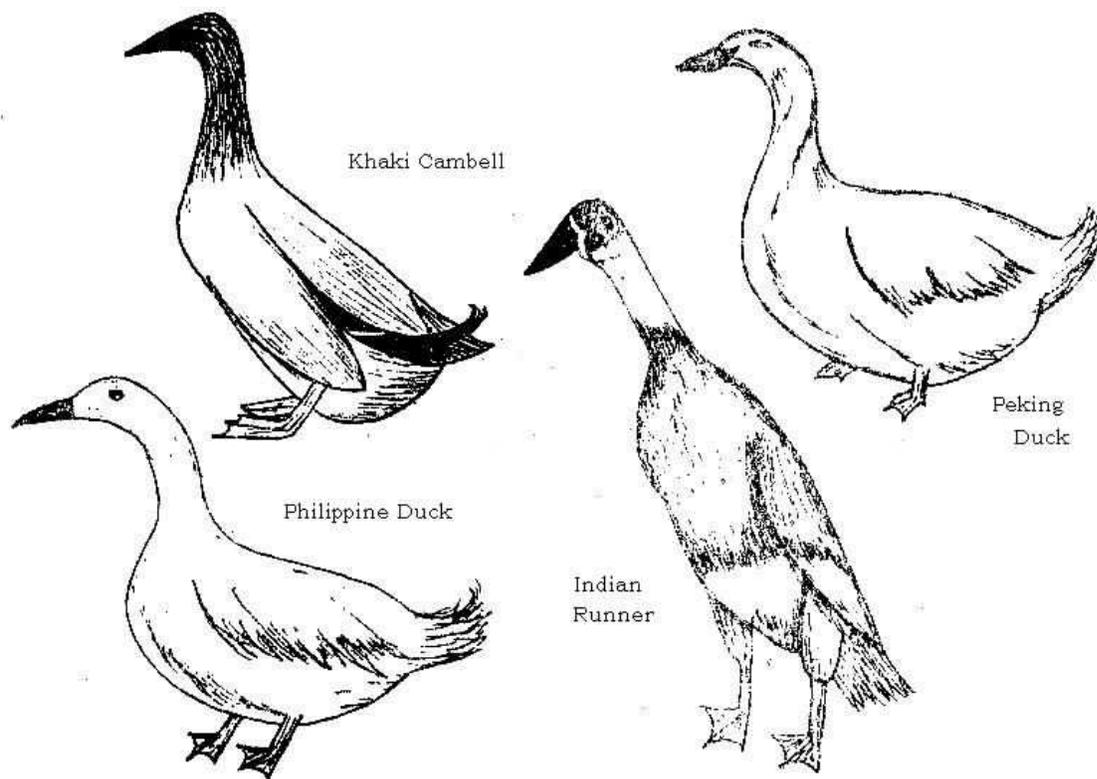
The following questions will help you identify the needed features of birds for your flock:

Purpose. What is your main purpose for raising ducks? Is it for eggs, meat, feathers, or a combination of these factors?

Location. Where are you located? Some breeds are noisier than others, a fact which you should take into consideration when neighbors are nearby. Noisy breeds also attract predators.

Management. How are you going to manage the flock? Will you confine it to a small pen or allow it to roam in a large area?

Availability. What breeds are available in your locality? Some breeds are rare, making them more expensive and difficult to attain.



5. Buying and Managing Ducks

Buy breeding stock from reliable duck raisers in your locality.

Start with day-old ducklings. But be sure to buy those birds which have the following characteristics:

- steady legs
- alert eyes
- healthy-looking down feathers
- no physical defects

Do not buy ducklings which seem to be “sleepy.” If you are buying ducklings for egg production, try to purchase from a farmer who has a good egg production from his flock.

Sexing Ducklings

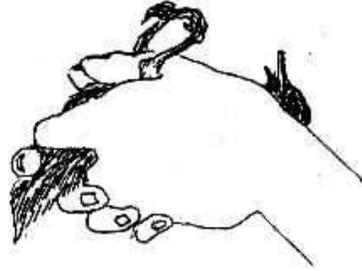
Separate the males from the females right after you get them from the seller. Male ducklings, unlike day-old chickens, possess a well-developed copulatory organ or penis.

To determine the sex, place the ducklings on the palm of the left hand upside down, with the abdomen facing the sexer. Press the thumb of that hand on the abdominal region near the vent with the forefinger resting at the base of the tail.

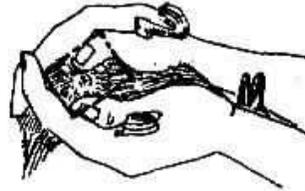
Now, with the right hand middle and forefinger press the tail backward while the thumb of the right hand is used to stretch the vent, thus everting the cloaca. In the male, a tiny projection of the sex organ (which looks the tip of a ballpoint pen) is exposed to view; in the females this is absent. The distinguishing mark will appear only when the technique is right. (See illustration on next page.)

SEXING DUCKLINGS

Hold the duckling between the palms of your hands and then push the tail back by your forefinger.



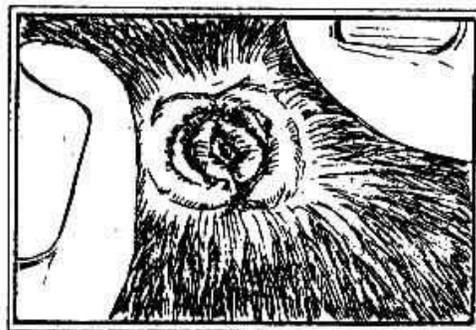
Search for the vent with your thumbs and with pressures. After doing so, stretch sideward until the sex organ protrudes, as shown in the boxes below:



MALE



FEMALE



Critical Periods

The most critical period in the life of ducklings is the first three weeks. The ducklings are very nervous during this period. A slight disturbance would cause them to stampede and crowd in a corner thus resulting in the death of the weaker ones. It is, therefore, important to approach them with care during this period. Unnecessary disturbance must be avoided.

When your ducklings show signs of sickness, give them a solution of three tablespoons of Noxal in one gallon of water for two to three days. Withdraw medication for three days, then give it again for another three days. Terramycin can also be used. Simply follow the instructions on the drug package. To prevent avian pest, immunize your ducklings with avian pest vaccine which is obtainable from the Bureau of Animal Industry (BAI).

6. Brooding

Brooding is the process of providing ducklings with outside heat to assist them in maintaining their body temperature. Egg class ducks like the Philippine duck, the Khaki Campbell, and the Indian Runner are non-sitters, thus, it is necessary for the ducklings to be brooded artificially or to use a mother hen or Muscovy duck.

Two Systems of Artificial Brooding

There are two systems of brooding ducklings artificially: litter floor brooding and wire or slat floor brooding. The former is used in large pen brooding. Litter is the material placed on top of concrete or dirt floors of duck pens. Common litter materials used are rice hulls, wood shavings, chopped rice straw, ground corn cobs, and other similar materials. These are spread on the floor of the brooding pen, and the ducklings are kept on the floor of the pen.

Wire or slat floor brooding could be a whole pen, a cage, or a battery brooder. This is different from the litter system because its floor is not covered with litter materials. However, during the first few days, the slat or wire floor is lined with paper or other similar materials to conserve heat and to provide a feeding area right where the ducklings would stay.

Construct a simple shed-type house to be used as a brooder. It should be draft-free and keep the ducklings warm and dry at all times. It should also protect them from predators and the elements.

Proper ventilation is essential in brooding. However proper ventilation does not mean exposing ducklings to rain and strong winds. In a brooder house with wire mesh or slat walls, provide curtains made of empty sacks or burlap at the sides of the house. Empty feed bags will serve this purpose. You may raise or lower the curtains depending on weather conditions.

Natural Brooding

The oldest brooder, still used particularly in most backyards, is the mother hen and/or Muscovy duck. These furnish from their bodies the additional heat needed by the ducklings. This method, which is rarely used in commercial-scale production, is the natural way of brooding ducklings and is most practical for the backyard producer.

But in all commercial duck farms, the Muscovy duck has been replaced by artificial brooders. While a Muscovy duck can brood at most only about 15 ducklings, artificial brooders can be used for hundreds of ducklings at a time. Today, there are many types of artificial brooders. They vary in design, fuel used to supply heat, and size. Some brooders can accommodate 50 ducklings while others can brood as many as several thousand at a time.

Classification of Brooders

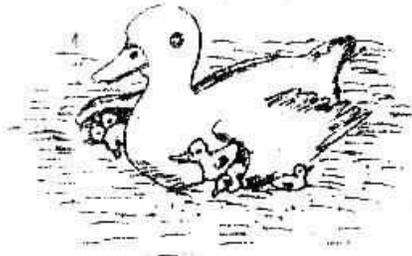
Gapuz (1973) classified brooders according to source of heat:

Electricity: This is the most common source of heat in brooders. Incandescent bulbs with or without hovers are generally used. A 50-watt bulb raised about 6 inches from the brooder floor can give enough heat for 50 ducklings. You can use an aluminum basin as a hover. The hover directs the heat and reflects the light to the ducklings.

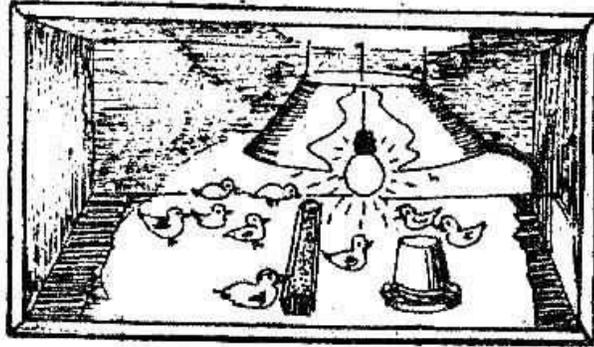
The electric heater-type brooder uses a resistant coil built with a hover. Heat is generated in the resistant coil. A thermostat automatically regulates brooder temperature.

A recent development in artificial brooders is the use of infrared electric bulbs. The infrared brooder consists of 4 large heat bulbs mounted on a disc about a foot in diameter. This is hung from the ceiling and the rays from the bulbs warm the ducklings. A thermostat automatically puts off two bulbs at a time when the desired temperature is reached.

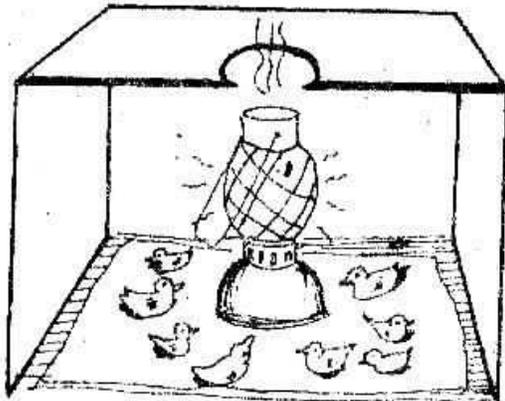
BROODING DUCKLINGS



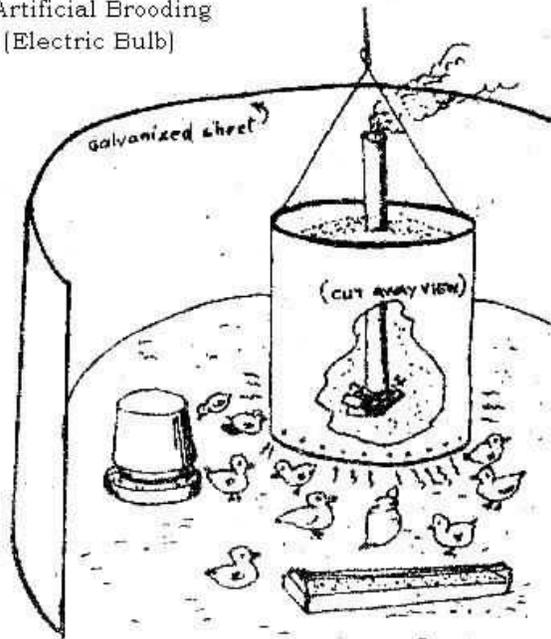
Natural Brooding



Artificial Brooding
[Electric Bulb]



Artificial Brooding
[Kerosene Lamp]



Artificial Brooding
[Rice Hulls with
littered floor]

Since it has no hover, the infrared heater has the advantage of being light and moveable. Also you can easily observe dead ducklings, trampling, and other behavior of ducklings even from outside the brooding pens. This method is not very popular, however, because of the very high cost of infrared bulbs.

Kerosene: If there is no electricity in your place, you can use kerosene lamps as the source of heat. You can easily brood 30 or more ducklings with an ordinary kerosene lamp with a glass casing. The temperature can be raised or lowered by adjusting the wick. There are commercially manufactured kerosene brooders equipped with supply tank, thermostat, and hover.

When you use kerosene brooders, be sure that the brooding pen is adequately ventilated. You will notice that in commercially manufactured brooders, there are holes on the hover directly above the flame. These holes allow carbon monoxide fumes to escape. A large amount of these fumes inside the brooder is very harmful to ducklings. Watch out, too, for tanks that leak and for spilled kerosene. The open flame in this type of brooder is a fire hazard especially if you practice litter-floor brooding.

Charcoal or Wood and Rice Hulls: In places where electricity or kerosene is expensive or not readily available, you can improvise a heater or stove out of a can, charcoal or wood, and rice hulls. This is how you make this heater: Get a large empty kerosene or paint can and punch small holes around it. Hang the can about 8 inches from the floor. Put burning charcoal or wood inside and gradually add rice hulls until the can is full.

Be sure, however, that ducklings have enough space in which to draw away in case the can becomes too hot. This type of brooder requires a lot of work. Also, there is the risk that burning may drop to the floor and start a fire. Because of this danger, charcoal heaters are not recommended for use in littered pens.

When brooding ducklings, the temperature should be 95 degrees Fahrenheit in the first week, 85 degrees Fahrenheit in the second week, 75 degrees Fahrenheit in the third week, and 70 degrees Fahrenheit in the succeeding weeks. The behavior of the ducklings is a good indicator of whether the brooding temperature is right. They huddle close together when the temperature is low; they scatter or spread out when it is too hot.

If you're having trouble deciding how much floor space to allow for each duckling in the brooder, Table 2 will help you.

TABLE 2

Recommended Minimum Floor Space per Duckling in the Brooder

<u>Age (in weeks)</u>	<u>Floor space per bird (in sq. meters)</u>
Day-old to one	0.03
1-2	0.05
2-3	0.07
3-4	0.09

Source: The Philippines recommends for Duck Raising 1977.

7. Housing and Other Facilities

Site Selection

Although raising ducks near bodies of fresh water like creeks, rivers, lakes, or irrigation canals is ideal because of the natural food that is available, it's not a requisite. Duck raising experts say that the bird only expends more energy (and, consequently, requires more nourishment) in swimming. Moreover, bodies of water are susceptible to pollution.

The Duck House

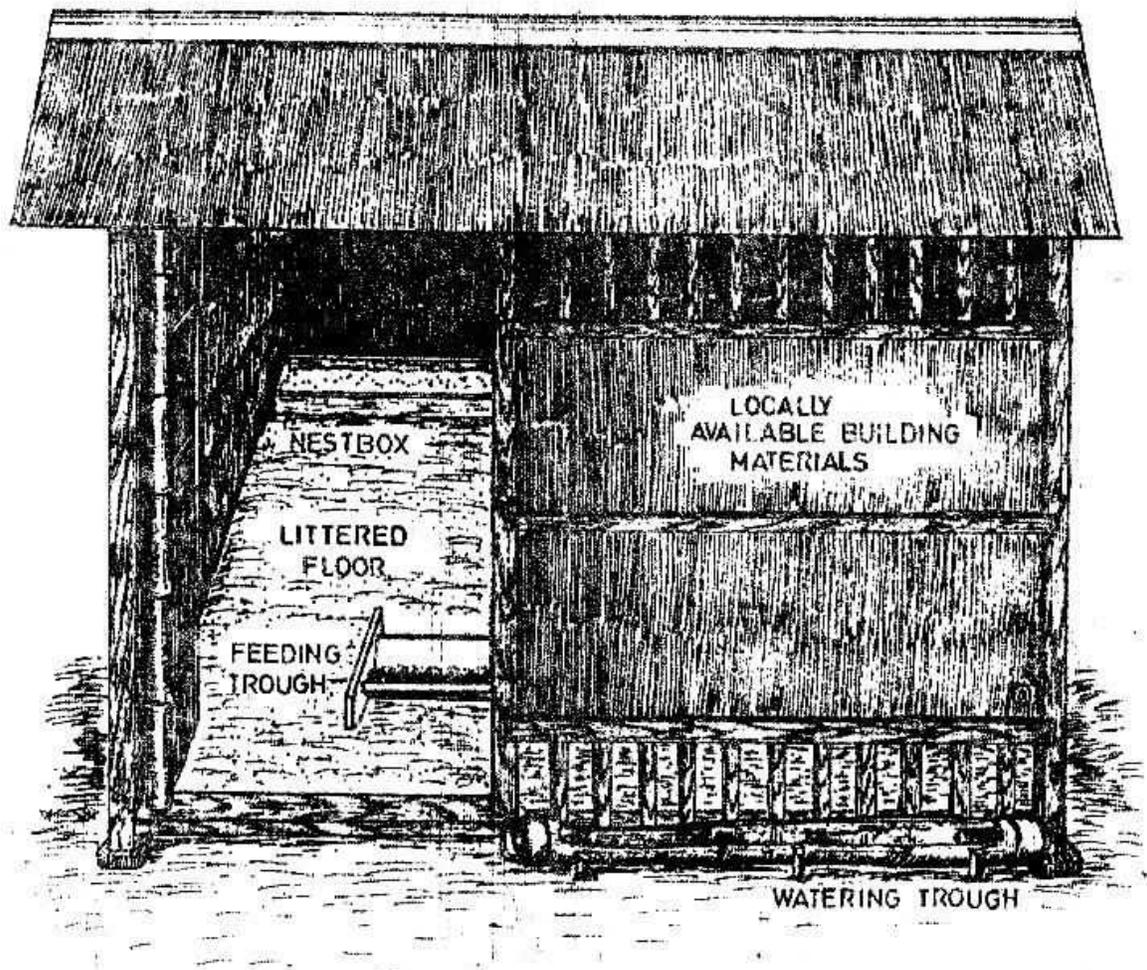
Build duck houses using easily available and cheap materials such as bamboo, ipil-ipil, kakawate, coconut wood, nipa shingles, cogon or talahib. Construct a one-compartment shed with only the front side open. This side may face the body of water in your area and serve as the entrance for the flock and its caretaker.

Fence an open area in front of the shed to serve as the flock's feeding – playing space. If you do not have a body of water, you may provide clay or plastic water tubs or concrete ponds for the ducks to swim or wade in. In you'd prefer the latter, it should measure about 10 by 8 feet, with water two feet deep, for a flock of about 50 ducks.

Elevate the floor of the shed at least 15 centimeters higher than the level of the ground in the feeding area, then cover it with a 10-centimeter layer of rice hull litter. Always keep the litter dry and replace it as often as possible. Old hulls can be composted and used as fertilizer for your farm or garden.

Ducks should be housed in groups based on age to facilitate management and to avoid the quarrels common among ducks of different ages. Old ducks tend to bully out young ones from feeding troughs.

DUCK FIXTURES



Fixtures

The following fixtures are needed in raising ducks:

Nests: Ducks make temporary nests in the litter and nest boxes are not essential; however, to produce cleaner eggs they may be provided with simple communal nests along the wall. Muscovy ducks particularly should be provided with nests.

Watering Troughs: It is recommended that watering troughs be placed above wire flooring or screen-drained (putting screen above the ground level) if placed inside the house. This is to prevent the floor from becoming wet. It is recommended that water be made available at all times.

Waterers should be near the feed trough as the ducks have the habit of gulping the feed and running to the waterer to wash the feed down their crop.

Feeding Troughs: There are various kinds of feeders. Select the kind that will best suit your purpose. The design should be adapted to the housing need. The construction should avoid wastage of feed. You can make feeding troughs of bamboo.

8. Feeds and Feeding

The primary function of feed is to help maintain life. The feed that is supplied – whether it be vegetable, animal or mineral in origin – is transformed into something useful to the body.

In other words, the feed must be able to supply materials needed for the manufacture of the different tissues and organs of the body of the ducks, as well as those for building up energy needed in the proper functioning of the different organs concerned in the complicated processes of living.

In addition, there should be excess materials so that the ducks can reproduce. Because no one feed can supply all of these materials in the proper amount and proportion, a number of feeds are combined so that whatever deficiencies one may have can be supplied by others.

The Nutrients

The constituents of feeds that are needed by ducks are called nutrients. These are (1) water, (2) carbohydrates, (3) protein, (4) minerals, and (5) vitamins.

Water: An abundant supply of water is essential for maximum egg production and growth. Lack of water affects digestion and feed efficiency. When water supply is deficient or irregularly given, egg production goes down immediately. Water softens feed and aids in the digestion, absorption, and transport of feed nutrients. It cools the body and equalizes body temperature.

Carbohydrates: These constitute the bulk of poultry feeds. They are the energy source which is essential to supply body heat. All of kinds of feedstuff rich in starch, sugar, and fat are good sources of carbohydrates. The principal sources of energy for feeding ducks are grains or cereals of all kinds. For example, corn and its by-products, rice and its by-products, and sorghum. Fats and oils from both animal and plant sources are concentrated sources of energy.

Protein: Second in bulk among the nutrients for duck feeding, it is essential for building of body tissues. It is very important for both growth and reproduction.

Minerals: This group of nutrients is essential to growth and reproduction. Bone formation is impossible without minerals. Eggs will be laid without any shell in the absence of calcium. The minerals needed by poultry are calcium, chloride, iron, sodium, iodine, copper, sulfur, zinc, manganese, magnesium, selenium, molybdenum, and fluorine. Of these minerals, only calcium and phosphorus are needed in large amounts, and they must be supplied in concentrate form in the diet.

Vitamins: These are food nutrients needed in very small quantities but essential to life. They are grouped into the fat soluble and the water-soluble one. The former is represented by vitamins A, D, E and K. The latter group includes all the vitamin B-complex such as thiamin or vitamin B-1, riboflavin, niacin, (nicotinic acid) pyridoxine (vitamin B6), pantothenic acid, inositol, folic acid, biotin, choline, and vitamin B12.

Feeding Practices

For backyard duck raising, feed your day-old ducklings with moistened cooked rice to five times in 24 hours for three weeks. Starting on the fifth day, include finely mashed Golden Apple snails in the ration. Increase the quantity of rice as the ducklings grow older. Be sure to provide clean water in the troughs every day. You can also feed your ducklings with a recommended starter ration.

Starting on the second month, give the birds tiny snails. Then gradually mix rice bran in the ration until the ducks reach laying age. If the eggs are intended for balut or hatching, place drakes (males) with the layers.

Many duck raisers give their ducks concentrate feed ration in mash form. While concentrate feed rations are good for your ducks, they are rather expensive and not recommended for backyard duck raising. Mash is a feed mixture containing ingredients in ground form.

It contains a specified amount of protein and the ingredients are concentrate feedstuffs. They contain all the food nutrients in proper amount and proportion to meet the specific requirement of different classes of ducks. Commercial brands of mashes differ in some ingredients and in the proportion of ingredients.

Ration

In duck raising, the word ration refers to composition of daily diet of the fowls. There are rations for a number of purposes, such as laying, starting, growing and fattening.

The ration should be adapted to the purpose in view; otherwise, there will be unnecessary waste of nutrients. For instance, laying rations should contain more protein. The starting ration may be about the same as laying ration, but the fattening ration differs from either of these in that it is composed largely of carbohydrates and fats. You need to give your ducks a balanced ration ... one that furnishes the nutrients in a proportion that will properly and without waste or excess of the nutrients, feed a flock of fowl for a certain length of time.

Feeding is very important in raising ducks. It is necessary that a raiser must be familiar with the common feed ingredients that supply each nutrient. Below are the common feed ingredients which can be secured locally.

1. Sources of carbohydrates and fats (energy)

- a. Rice bran – The composition of rice bran varies according to its kind and quality. The good quality fine rice bran contains about 11 percent protein. It can be a good source of energy. It is usually high in fiber but contains an adequate amount of fat.
- b. Ground corn – There are two common varieties for feeds: the yellow and the white. Both contain the same amount of energy and protein. The yellow corn, however, contains carotene (pro-vitamin A) which is the precursor or forerunner of vitamin A. This is why some duck raisers prefer or demand yellow corn. The ground corn has a crude protein content of 8.9 per cent.

- c. Copra meal – This is the by-product of coconut meat after the oil is extracted. It contains an adequate amount of carbohydrates but is used for its proteins. It has about 21 percent crude protein but is low in the amino acid methionine.

2. Sources of protein

- a. Fish meal – This is a good source of high-quality protein. On the average, a good fish meal contains 60 to 65 percent protein. It also contains an adequate amount of carbohydrates and fats. The value of fish meal depends upon the amount of protein in it.
- b. Soybean oil meal – This contains about 44 percent crude protein and is also a good source of energy. This is the only plant protein source that can replace animal protein in the diet of ducks.
- c. Shrimp meal – This is another good source of protein. It contains about 56 percent crude protein but is low in energy. It may be used as a substitute for fish meal.
- d. Ipil-ipil leaf meal – This is very common in the country and is considered “the alfalfa of the Philippines.” It contains about 21 percent protein and is a good source of Vitamin A.
- e. Snails – An excellent source of protein. It also contains almost all nutrients that ducks need. For further information about snails, read the next chapter.

3. Source of Usually Added Minerals

- a. Oyster shells and limestone – These two products are good sources of calcium for ducks.
- b. Bone Meal and rock phosphate – These are the most widely used sources of phosphorus for duck feeding.

- c. Salt – Common table salt (sodium chloride) is the most common source of sodium and chloride for poultry. Be sure that the proper amount of salt is given to the fowls. Too much salt is dangerous to them.

4. Vitamin Supplements Vitamin-mineral and antibiotic feed supplements are available in concentrate forms commercially.

Compounding of feeds: The most common duck feed ingredients in the country are ground corn, rice bran, copra meal, soybean oil meal, fish meal, ipil-ipil leaf meal, oyster shell powder, bone meal and common table salt. With these feedstuffs you can compound a feed for different classes of birds (ducklings, growing ducks, and layers). In the same way that a carpenter must have a plan before constructing a house, you must have a feed formula before mixing a feed. Formulas are computed so that proper amounts of protein, vitamins, and minerals are included for maximum growth and production.

The success of your project greatly depends on the quality of feed you give to your ducks. Tables 3, 4, and 5 are feed formulas recommended by the Bureau of Animal Industry (BAI) for starter ration, grower ration, and layer ration.

TABLE 3. Starter ration (To be given when ducks are 1 day to 6 weeks old).

Ingredients	Volume (kilograms)
Ground corn	40
Rice bran, first class	15
Copra meal	4.5
Soybean oil meal, 44%	20
Fish meal, 50%	10
Ipil-ipil leaf meal	5
Oyster shell powder	1
Bone meal	1
Salt	0.5

TABLE 4. Grower ration (To be given when ducks are 6 weeks old and above).

<u>Ingredients</u>	<u>Volume (in kilograms)</u>
Ground corn	45
Rice bran, first class	15
Copra meal	4.5
Soybean oil meal, 44%	15
Fish meal, 50%	10
Dried whey	2
Ipil-ipil leaf meal	5
Oyster shell powder	2
Bone meal	1
Salt	0.5

TABLE 5. Layer ration

<u>Ingredients</u>	<u>Volume (in kilograms)</u>
Ground corn	40
Rice bran	20
Soybean oil meal	10
Copra meal	10
Fish meal	7.5
Ipil-ipil leaf meal	5
Oyster shell powder	4
Bone meal	1
Salt	0.5

In addition to these mixed feeds, you can also feed your ducks plenty of chopped green leaves like kangkong, camote, and cassava. Give each duck at least 10 grams of chopped green leaves every day.

Ducks can also be fed with fresh Golden Apple snails. Studies at the MBRLC show that Golden Apple snails in the ducks' diet help increase egg production. Read Chapter 9 for a ration using snails.

For a complete, all purpose feed for your ducks, the MBRLC recommends the following ration:

TABLE 7. All purpose feed ration.

Ingredients	Volume (in kilograms)
Binlid	30
Tiki-tiki, first class	34
Ipil-ipil leaf meal	4
Soybean oil meal	15
Copra meal	8
Meat and bone meal	7
Shell powder (lime)	2
Salt	0.50
Afsillin	0.25

You can modify this formula by substituting some of its ingredients with locally available feeds such as chopped kangkong, crushed snails and grated coconut. You can substitute kangkong for ipil-ipil and soybean oil meal, grated coconut for copra meal, snails for meat and bone meal or fish meal and shell powder.

You can also reduce feed costs by practicing field pasturing. This involves bringing laying flocks to fields where rice has just been harvested and letting the ducks loose to feed on fallen rice grain, grass seed, snails, and insects.

Depending on the length of the rice harvest, the ducks may stay on pasture for as long as one month. A raiser may keep transferring his birds from one harvested area to another. He can drive the ducks into improvised enclosures at night. In the morning he can gather the eggs before driving the flocks back to the fields.

9. The Importance of Snails in Duck Raising

Duck raising is often located along bodies of fresh water because snails are readily available. In places where snails are plentiful, the feeding of ducks is very simple. Snails contain almost all the nutrients that ducks need. Snail meat provides protein and its fat gives energy. The shell contains calcium, phosphorus, vitamins, and minerals. Ducks fed with good quality snails have a very high egg production rate.

A problem that has plagued duck raisers even in the old days is the scarcity of snails at certain times of the year, particularly during the rainy season. On rainy days, the water becomes cloudy and rises to a level that makes gathering snails virtually impossible. Snails gathered at this time are generally of poor quality; the gatherer also gets a lot of empty or dead snails.

When fed to ducks, dead snails could cause effects similar to poisoning. In the past, the raisers were confident that they could recover their losses once they got over the scarce period, which did not last for more than three months.

1) The big demand for balut and red salted eggs has encouraged more people to raise ducks for eggs and meat. The increase in the duck population has contributed to a much larger demand for snails.

2) Many rivers, streams and lakes have been heavily polluted by the residues of pesticides, chemical fertilizers, industrial wastes and waste of people who reside beside these bodies of water.

3) The proliferation of fishpens in lakes and rivers has reduced the snail-gathering areas and disturbed the ecology of these bodies of water.

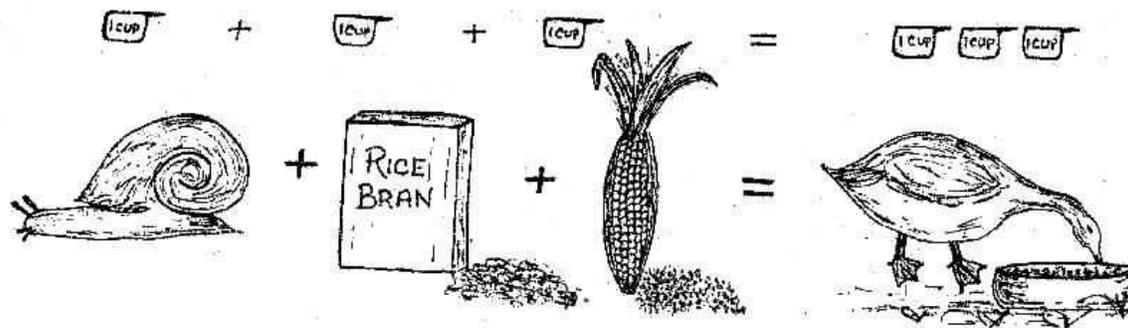
4) Siltation, the occasional inflow of salt water from the seas and the presence of other aquatic animals have contributed to the reduction of the natural snail population.

The introduction of the Golden Apple snail in the country in 1984 was very much welcomed by the duck raisers. A study was made by the Asian Rural Development Foundation to determine if this kind of snail can increase the egg production of ducks. We are feeding our ducks with this formula: crushed Golden Apple snail plus rice bran mixed with broken corn at ratio of one part snail, one part rice bran and one part corn.

Some green leaves like kangkong and leguminous cover crops are given at free access. Preliminary results show that these ducks give 60 to 70 percent egg production which are of high quality.

For further information about raising Golden Apple snails, turn to Chapter 15.

RAISING SNAILS FOR DUCKS



10. Mating Laying Ducks

The selection of ducks for breeding purposes should be done as early as the eighth week, and again at the fourth and fifth months before placing the breeders in the breeding pens. On the fifth month, healthy ducks show well-developed bodies.

Drakes should be the same age as the females, or even a month older. They should be raised separately from the females and put together only when they are ready for mating.

Local duck raisers generally allow one male to every ten laying ducks. With this ratio, a high percentage of fertility is obtained in the eggs produced. A study was conducted in the College of Agriculture at Los Banos, Laguna to determine if it would be possible to increase the number of laying ducks allowed to a drake and still get a profitable fertility of the eggs produced. It was observed that the more laying ducks allowed to a drake beyond ten, the lower was the fertility of the egg obtained. Where the ratio of drakes to ducks was 1:25, 2:50, or 3:50, a profitable fertility may be obtained only after the second week that the drakes have been placed in the pens. However, where the ratio is 4:50 or 5:50, eggs for hatching may be collected after the first week. The number of males to females apparently does not affect the rate of decrease of fertility of the eggs produced after the removal of the drakes from the pens. Eggs produced up to the fourth day after the removal of the drakes from the breeding pens may be considered fertile to a profitable degree. (Fronza 1972)

11. Collecting and Handling Eggs

Ducks lay eggs at night and early in the morning. It is advisable to gather the eggs immediately after releasing the layers for their early morning feeding. Ducks still laying should be allowed to continue nesting; their eggs could be collected later.

If you are producing eggs commercially, you should wash dirty eggs carefully in warm water after collection. Using cold water will cause the egg contents to contract, and dirt and microorganisms may be drawn through the pores of the shell. Egg sanitizers can be purchased to clean the eggs and kill the bacteria. Hard-to-wash dirt on eggshells may be removed by buffing carefully with fine sandpaper. Eggs may be fumigated before storing. To fumigate 100 cubic feet of holding space, place 40 grams of potassium permanganate crystals in non-corrosive containers like earthenware or glass dishes. Place the dishes at the bottom of the compartment and add 80 cc of formally to the crystals. Shut the door and vent tightly for 20 minutes, then open the door to let the fumes dissipate. If you are incubating the eggs, care should be taken not to fumigate them between the 24th and 84th hour of incubation. In addition, be sure to avoid overheating during fumigation treatment.

If the eggs are for hatching, be sure they come from a mated healthy flock. Eggs from mated birds are generally fertile. Select those eggs that are free from defects. Do not set eggs with shells that are cracked, thin and porous or dirty. Thin and porous or cracked shells can be detected by inspection or by listening to the sound emitted when the egg is gently tapped with the finger. A distinct resonant sound is heard from good shells; a dull and hollow sound from defective shells. Eggs with defective shells seldom hatch. They usually rot from bacterial or fungus infection which may contaminate other good eggs.

12. Incubation

The Philippine duck very seldom becomes broody, and if it does, only for a short time. The Khaki Campbell, the Indian Runner, and the Peking duck are also non-sitters. Since almost all the ducks raised in the country are non-sitters, except for the Muscovy duck, artificial incubation of duck eggs is done in many places.

Fresh eggs are the best for incubation. Hatching eggs should not be stored for more than one week under ordinary room temperature (27 degrees centigrade) before incubation. Prolonged storage at room temperature lowers hatchability. Under low temperature (27 degrees centigrade), hatching eggs can be stored for ten days without adversely affecting their hatchability.

Whenever possible, avoid holding eggs intended for hatching purposes. They should be set soon after they have been laid. When it is necessary to wait until a sufficient number have been accumulated, as is usually the case, they should be gathered every day, leaving one in the nest to serve as "bait." The longest time that hatching eggs may be held under the best of conditions is ten days.

When holding eggs for hatching, care should be taken to keep them in a dry, airy, cool place. A common practice in the Philippines is to store them in a small receptacle containing unhulled rice, rice bran, or rice hulls. Breakage is minimized in this way while holding them, but such places are apt to be warm, a condition favorable to the development of the embryo ducklings inside the eggs. For this reason, this method is wasteful and the number of spoiled eggs, particularly during the dry season, is large. A good storage for them is a basket lined with stripped fresh banana leaves renewed from time to time. Such a holder is cool and well-ventilated. Hatching eggs should not be kept near odorous substances, such as kerosene, gasoline, oil and onions, as they absorb these odors readily and become spoiled. (Gapuz, 1973)

There are two kinds of incubators used to hatch duck eggs. The first is the native type known as the balutan, which consists of a closed, semi-insulated room with a small door and deep bamboo baskets placed in wooden boxes. The hatchery operator heats unmilled rice to 42 to 45 degrees centigrade in vats (kawa), then puts the rice in the boxes where the baskets of eggs in abaca cloth bags are placed. A cloth bag holds 100 to 125 eggs; a basket holds 500 to 1,000 eggs.

The operator heats rice and turns the egg bags every morning and afternoon until the 20th day when the embryos develop feathers and can generate enough body heat to continue the incubation. On the 25th day, the operator places the eggs on trays where these will hatch, covering the eggs with a thick cloth to keep them warm. The shells of the eggs start to crack on the 28th day. On the 29th day, the ducklings are ready to be taken from the hatching tray, sexed, and put in brooding boxes.

The other method of hatching is with the use of kerosene or electric incubators where the temperature is maintained at 100 degrees Fahrenheit and humidity at 55 to 60 degrees. A pan of water placed under the egg trays helps maintain the humidity level. The operator turns the eggs three to four times daily.

On the seventh day of incubation, the operator candles the eggs to determine those that are infertile. Candling is done by placing the eggs before a bright light to determine development, if any, taking place inside the egg. Infertile eggs and eggs with dead embryos can be boiled and eaten.

The second candling may be done on the 14th day of incubation. Eggs with live embryos will show enlargement of the dark area and further proliferation of the blood vessels. Eggs with dead embryos will not show this development.

The third candling may be done on the 21st day. If the embryo is alive, the air sack is smaller and there is movement of the embryo as you turn the egg. If the embryo is dead, no visible movement could be seen even as the egg is turned.

Hatching starts on the 28th day, after which the ducklings are sexed and transferred to brooding boxes.

The duck eggs can also be incubated the natural way; this is known as natural incubation. This method is frequently used in small farms, where Muscovy ducks are also being raised at the same time. This breed of ducks are excellent sitters and will incubate eggs without difficulty. (If Muscovy ducks are not available, broody chicken hens may be used but set not more than 10 eggs at a time.) Leave the Muscovy duck (or mother hen) to do everything for you – except to candle the eggs.

13. How to Raise Golden Apple Snails

The Golden Apple snail, known locally as “gintong kuhol” is a hybrid specie of snail to similar to the *Ampullaria luzonica*, a mollusk indigenous to the Philippines. Compared with the native black kuhol which is only 1.5 inches in diameter and whose meat is black and tough, the Golden Apple snail can grow to the size of a human fist. In addition, it has a tender, creamy, golden meat that is comparable to that of the Mexican abalone, another culinary delicacy. The native kuhol has a thick shell while that of the Golden Apple snail is thinner. Hence, weight for weight, the latter has more meat.

The Golden Apple snail originates in the Amazon River in South America, particularly Brazil and Argentina. It is becoming popular as food for humans and feed supplements for livestock and poultry.

What makes this snail more attractive than the common kuhol is its large size, pinkish flesh, golden-colored shelf and its way of laying a cluster of deep pink eggs high up the tip sticks protruding from the water.

Gintong kuhol moves faster than the native ones. It easily rises up to the surface of the water and goes down to the bottom by filling and discharging air from its shell.

Farmers can raise the Golden Apple snail in their farms or backyards, provided there's a regular supply of water in the area. Dig a pond so that the water stays at more or less 30 centimeters from the bottom. Use the mud you dug for building dikes. If the field is flooded, raise the dikes higher than the flood level to prevent washing out of the snails.

Snail ponds differ from fishponds since the snails do not need deep and wide water area. You can dig a series of longitudinal ponds (1 to 2 meters wide) with land space at the center where you can plant vegetables like kangkong or cassava to feed to your snails.

Before putting your breeder snails in the pond, push $\frac{3}{4}$ meter sticks firmly into tile soil in a row $\frac{1}{4}$ meter apart.

About 2 to 3 months after hatching, with the size about that of a thumb, tile Golden Apple snail becomes sexually mature and starts laying pink eggs. When she finds a firm stick just about a foot down from the water surface, she climbs it and starts secreting a slimy substance in which she attaches her eggs in a cluster of 150 to 300 pieces. About 15 to 20 days later the eggs hatch and the young snails as small as a grain of sand crawl down into the water and start their own life.

The Golden Apple snails naturally feed on algae and vegetables growing in the pond such as kangkong, azolla or other water weeds. Rotten fruits or their peels can also be utilized as feed for the snails.

To have abundant natural feeds in the pond, fertilize the water regularly with chicken, goat or duck manure. Or you can raise caged poultry, preferably ducks, at the end of the pond. This will supply the regular fertilizer needs of the pond.

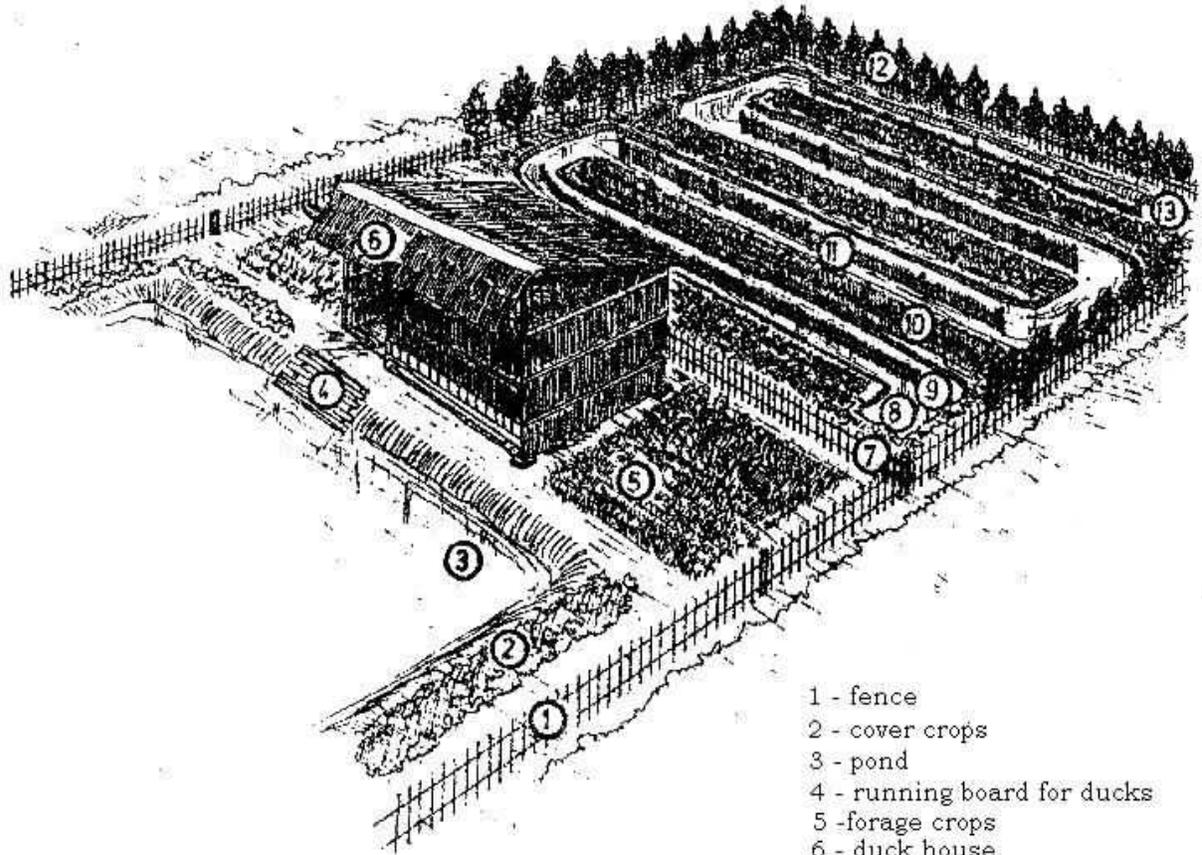
Golden Apple snails need oxygen; therefore, do not let the water become crowded with debris. Clean the pond when necessary and keep the water running slowly through your pond or at least change water when it becomes muddy or too polluted.

You can start harvesting the snails at two months old or at the size of a thumb. Crush them with a piece of wood or bottle and give them to the ducks raw.

Golden Apple snails also are delicious for human consumption. A handful of snails (about two dozen breeders) can provide the table a bowl of nutritious food in just two to three months time.

WARNING: It should be noted that in some areas farmers consider the golden snails as pests in their rice growing areas. However, snails can be controlled very easily by two methods:

1. Lower the water in the paddy during transplanting time and harvest the snails in the low areas where there is water. After about two weeks snails will not bother the rice unless the rice is totally submerged under water.
2. Before planting rice, run ducks on the rice paddies and then go through and pick up any large snails that the ducks cannot catch You should remember that snails are excellent food for hogs, ducks, and for humans.



- 1 - fence
- 2 - cover crops
- 3 - pond
- 4 - running board for ducks
- 5 - forage crops
- 6 - duck house
- 7 - gate to snail pond
- 8 - water inlet
- 9 - snail pond
- 10 - hedgerows as feed for snails
- 11 - laying stakes for snails
- 12 - nitrogen fixing shrubs
[e.g. flemingia, sesbania, etc.]
- 13 - water outlet

14. How to Integrate Ducks with Fish, Snail, and Clam

Do you have a fishpond in your backyard? Well, here is good news for you: You can increase your income from your backyard fishpond by integrating it with ducks, snails, and clams. By adopting the natural relationship between duck, fish, snail and clam, you can maximize food production from the present area that you have.

A pond area of 50 square meters is enough to start this project. If you follow carefully the procedures stated below, you can provide your family with a regular supply of eggs. Fish, and delicious fresh water clams and snails. If you are still planning to build your pond, be sure to select a site where a steady supply of water is available. The dikes must be thicker at the base than at the top to prevent them from eroding.

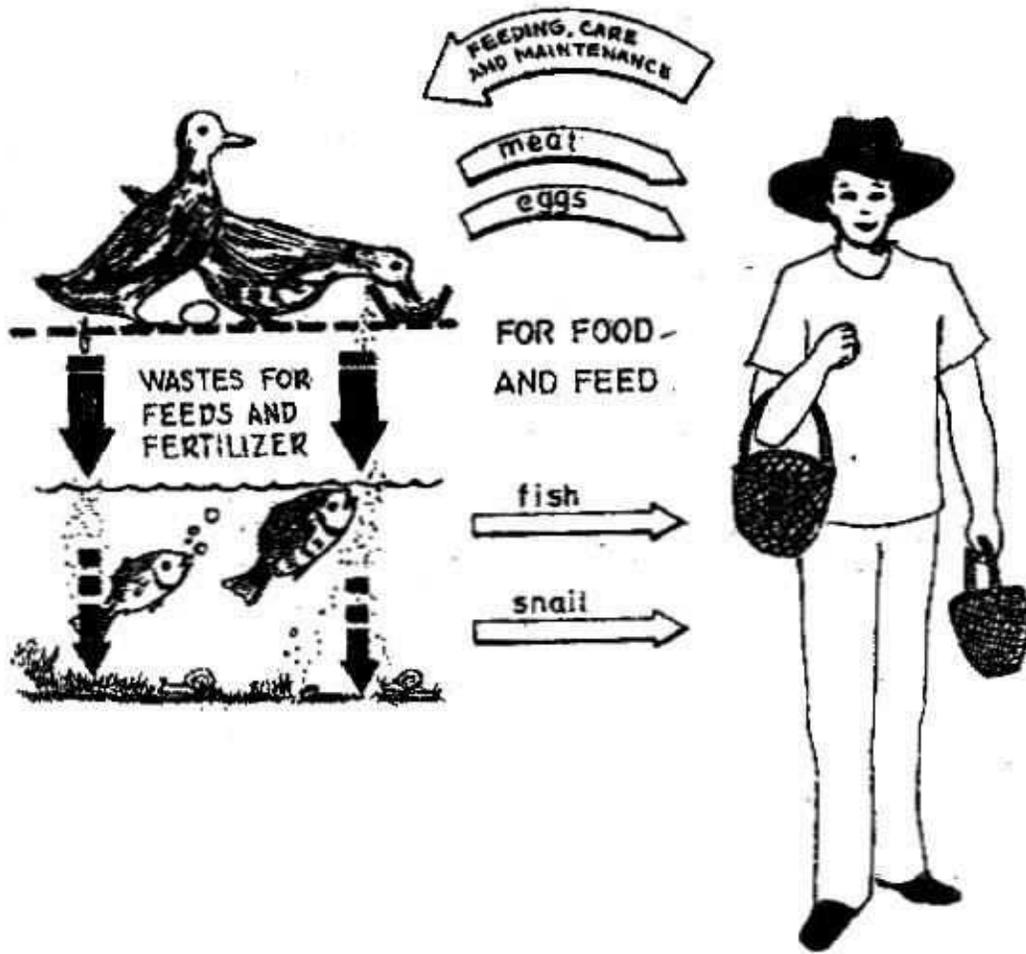
When you dig your pond, see to it that the side where you can drain the water is deeper than the other side. This will help in draining the pond and in harvesting the fish. Dig just enough soil to maintain a water depth of three-fourth to one-and-a-half meters. Shallow ponds will facilitate harvesting by seine net.

Before putting water in the pond, fertilize it first with manure or complete fertilizer. Spread manure on the surface at the rate of five kilograms per fifty square meters or broadcast evenly one-fourth kilogram area and one-fourth kilogram 12-24-12 per 50 square meters. Fertilization is important in growing algae (lumot), the natural food and oxygen source for the fish. After filling with water, let the algae grow for two weeks, then stock the pond with fish fingerlings. Subsequent fertilization will be done by your ducks.

The Asian Rural Development Foundation recommends raising tilapia, specifically nilotica. *Tilapia nilotica* grows fast and takes five months before it starts to breed; thus, you are assured of a bigger harvest before they begin multiplying. Unlike *Tilapia mossambica*, nilotica does not need frequent restocking of pond and separation of male from female.

Build your duck house on one side and above the water of your pond. You may start building it before or after you let water into your pond. For a pond area of 50 square meters, twelve to fifteen ducks are sufficient. Provide 2 males and 10 to 13 females. Build a house with a floor area of four square meters of 6x6 feet. The floor can be made of bamboo or wooden slats.

DUCK - FISH - SNAIL - INTEGRATION



Fence off a swimming pen beside the duck house with an area equal to the floor area of the house.

For the breed of ducks to raise, ABRLC is recommending Khaki Campbell. This is bigger and best for egg production. However, if you can't secure this breed, start with the native or Pateros duck.

Feed and water your ducks regularly every morning and afternoon. At the age of 5 to 6 months, they start to lay eggs. Their maximum production will last up to about two years.

Before gathering eggs, allow the ducks to go out into their playing pen. Gather their eggs and clean their feeding trough by just scraping and tapping it down towards the water where your fish are waiting. The otherwise wasted feeds are eaten by the fish and the portion which was converted to the pond for the growth of algae.

To get more from your pond without requiring extra feed cost, throw some mature Taiwan clams into it. Even two or three of these clams are enough to fill your pond in a year. Clams feed from under the mud where organic sediments settle.

Snails and clams are an excellent source of calcium and animal protein. Raise them in your pond as supplementary feed for you and your animals.

Your duck-fish-snail-clam integration project is actually an efficient feed conversion project which will provide nutritious food and a source of income.

If you want to maximize your income from your pond, try this suggestion in your area. This has been practiced in the farms of ABRLC for many years now.

If you desire further information about duck-raising, visit our project in Kinuskusan, Bansalan, Davao del Sur... or write to us at the following address:

ASIAN RURAL DEVELOPMENT FOUNDATION
P.O. Box 80322
8000 Davao City, Philippines

GLOSSARY OF TERMS

Algae: A group of plants, variously one-celled or colonial, containing chlorophyll and found in water or damp places.

Bran: The husks separated from grains of corn, rice, wheat, etc.

Breeding: The mating of male and female in order to produce offspring.

Brooding: The rearing of ducklings either by a sitting duck or mother hen or by artificial heat.

Carbohydrate: An organic compound, as a sugar or starch, composed of carbon, hydrogen, and oxygen.

Carbon monoxide: A colorless, odorless, highly poisonous gas.

Drain: To draw off liquid (water) gradually.

Drake: A male duck.

Duckling: A young duck.

Embryo: A bird in the earliest stages of its development in the egg.

Feed: To supply with what maintains or furthers growth, development, etc.

Fowl: A collective term applying to ducks, chickens, and other poultry species.

Fumigate: To expose to fumes, especially to disinfect or kill the vermin in.

Hatch: To bring forth young from an egg or eggs.

Hover: To stay suspended or flutter in the air near one place.

Incubation: To process of subjecting selected eggs from mated flocks to proper conditions outside the bird's body for the embryo to develop and hatch into a duckling.

Infertile: Sterile; incapable of or unfitted for reproduction. In the case of an egg, one which shows no germ.

Integrate: To bring (parts) together into a whole.

Sexual maturity: The time when the first egg was laid.

Sinamay: Woven abaca cloth.

"Stolen Eggs": Eggs hidden by the layers after laying.

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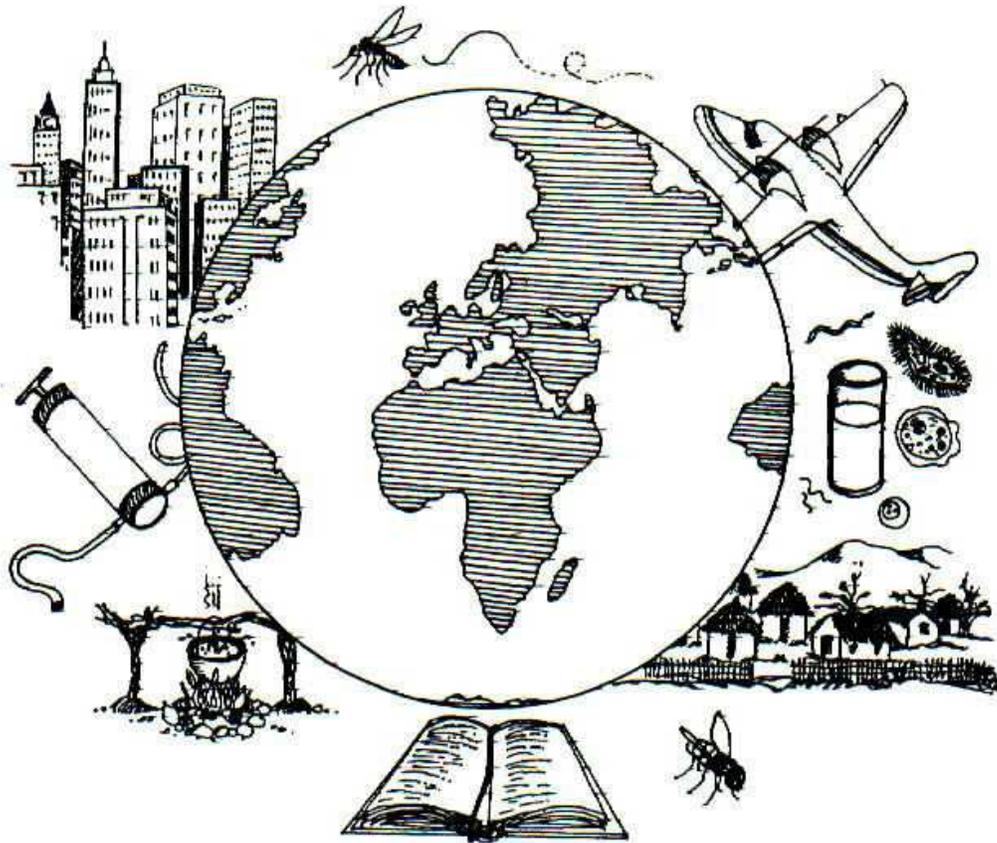
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How To Raise Ducks For Food And Project

Sustainable Agriculture



Workbook

Name: _____

Read page 2 Advantages of Raising Ducks

True or False

1. _____ Duck raising provides meat and eggs for the family.
2. _____ The farm will be able to sell the extra eggs for money.
3. _____ Ducks need simple housing.
4. _____ Ducks get diseases easily.
5. _____ A great amount of work is needed to keep ducks.

Matching

- | | |
|----------------------------------|---|
| 6. _____ The Muscovy Duck | (a) most common duck. Also called "itik", it is a good layer with 175 per year and has black, brown, or gray color. |
| 7. _____ The Philippine Duck | (b) looks like a goose, can be raised where food supply is limited, good mother, dangerous claws, excellent for meat. |
| 8. _____ The Khaki Campbell Duck | (c) lays 300 eggs per year, has bronze color, eggs are large (70 - 75 kg) |

Read page 6 Selecting the Right Breed

Fill in the blanks

Problems green balut breed noisy eggs meat

9. Farmers can raise ducks for eggs or _____.
10. Meat ducks are also known as _____ ducks.
11. Selecting the right _____ is the first thing you must do.
12. Most ducks are raised for their _____.
13. Many _____ can occur if you don't take time to pick a right breed.
14. _____ is a type of egg eaten.
15. If a bird is _____ it will attract predators.

Score exercises 1 - 15

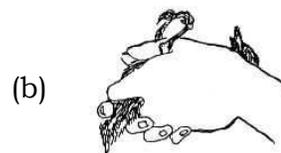
Read page 7 - 9 Buying and Managing Ducks

Underline the correct word

16. You must obtain ducks from (reliable, unknown) duck raisers in your locality.
17. Do not purchase ducklings which seem to be (alert, sleepy).
18. Pick ducks that have (steady, weak) legs and look (healthy, sick).
19. If buying for egg production, purchase from a farmer who has (good, low) egg production.
20. (Separate, Place together) the male and female ducklings as soon as you can.

Matching

21. ___ Search for the vent with your thumbs and with pressure
22. ___ Female
23. ___ Male
24. ___ Hold the duckling between the palms of your hands and then push the tail back with your forefinger.



Fill in the blanks

three care vaccine Terramycin must Noxal

25. The most critical period in the life of a duckling is the first _____ weeks.
26. Unnecessary disturbance _____ be avoided.
27. In case of sickness, treat with _____ or _____.
28. Approach the ducklings with _____.

Score exercises 17 – 28

DO NOT look back at the Training Pac while completing the Review.

Review #1
(5 points each answer)

True or False (Write "T" if the answer is True and "F" if the answer is False)

1. _____ Ducks require a lot of labor.
2. _____ A Muscovy Duck has sharp claws and is excellent for its meat.
3. _____ Duck eggs provide needed protein and excellent nutrition.
4. _____ When ducklings are young, they are nervous and require great care.
5. _____ A slight disturbance will stampede the ducks.

Fill in the blanks

money alert meat Philippine Duck important

6. Buy ducklings which are _____ and active.
7. The extra eggs can be sold for _____.
8. The _____ is a common duck laying about 175 eggs a year.
9. Selecting the correct breed is very _____.
10. Ducks can be raised for _____ or egg production.

Matching

- | | |
|-------------------------------|--|
| 11. ___ Khaki Campbell Ducks | (a) there's no planning and the correct breed is picked. |
| 12. ___ Ducks are | (b) ducklings locally. |
| 13. ___ Try to purchase | (c) is better than trying to save a sick duck. |
| 14. ___ Problems occur if | (d) rarely affected by disease, |
| 15. ___ Prevention of disease | (e) are excellent egg layers with up to 300 eggs a year. |

Underline the correct answer

16. The (Muscovy, Indian Runner) Duck is the hardest of all farm poultry.
17. You may replace your laying flock only (two, four) times every two or three years.
18. The Muscovy is an (excellent, unreliable) mother and (can, cannot) be used to hatch eggs of other ducks.
19. Ducks lay their eggs during the (night, day).
20. A small disturbance may cause the ducklings to (go to sleep, crowd) and hurt the weaker ones.

Score exercises 1 - 20

Read page 10 – 13 Brooding

Fill in the blanks

proper ventilation excellent brooding non-sitters

1. _____ is the way of keeping ducklings warm and alive.
2. The Philippine Duck, Khaki Campbell ducks and Indian Runner ducks are _____ - _____.
3. Muscovy ducks are _____ mothers and will sit on other ducklings.
4. _____ is essential in brooding.

True or False

5. _____ The brooder house is a simple shed-like building.
6. _____ Ducklings can be exposed to rain and winds.
7. _____ Brood houses should have plenty of air flow but be draft free.
8. _____ Two types of natural brooding are litter floor and wire mesh.
9. _____ A Muscovy duck is a natural brooder.
10. _____ Electricity, kerosene and charcoal are ways to heat in an artificial brooder.

Underline the correct word

11. If the ducklings are crowded together, the temperature of the brooder house is (too high, too low).
12. The space needed for 1 day – old duckling is about (.03 sq. meter, 1 sq. meter).
13. When brooding ducklings, the temperature should be (95°F, 85°F) for the first week.

Read pages 14 – 15 Housing and Other Facilities

Fill in the blanks

fence in clay or plastic swimming water bamboo

14. _____ is not needed in order to raise ducks.
15. Any kind of local material can be used to build the duck house such as _____.
16. _____ an open area in front of the duck house to make a feeding area.
17. You may provide _____ tubs for the ducks to wade in.

Matching

18. ___ Elevate the floor (a) make simple nests.
19. ___ Ducks should be housed in (b) push out younger ones at feeder troughs.
20. ___ Water should be (c) dry and replace it often.
21. ___ Always keep the litter (d) at least 15 cm. higher than ground with 10 cm. of layer of litter.
22. ___ To have cleaner eggs (e) groups by age, to avoid fights with different age ducks.
23. ___ Older ducks (f) put higher than the ground, available at all times and near the feeders.

Score exercises 1 – 23

Read pages 16 – 22 Feeds and Feeding

Fill in with the correct word

water extra need all balanced energy egg

24. Ducks _____ different foods for right feeding.
25. Ducks need feed to keep them alive plus _____ food for laying eggs.
26. An abundant supply of drinking _____ is needed for best egg laying.
27. The best source of _____ for ducks is grains and cereals such as corn or rice.
28. When water is not given all the time, _____ laying goes down right away.
29. You need to give your ducks a _____ ration for proper feeding.

True or False

30. _____ Fats and oils are good sources of protein.
31. _____ Good sources of protein would be fish, shrimp and snails.
32. _____ Mash is not costly.
33. _____ A laying ration would be the same as a fattening ration.
34. _____ Copra meal is good source of protein and gives energy.
35. _____ Feeding is not important in raising ducks.

Underline the correct word

36. Oyster shells and limestone are (good, poor) sources of calcium.
37. You can feed your ducks (little, plenty) of chopped green leaves such as kangkong, camote and cassava.

38. By letting the ducks eat in the fields, you can (increase, lower) feed costs.
39. Water (heats, cools) the body and maintains body temperature.
40. Plenty of water (is, is not) needed for proper growth and egg laying.

Matching

- | | |
|--|---|
| 41. ___ Bone meal and rock phosphate are | (a) clean water every day |
| 42. ___ Ducks get | (b) without shell if the ducks are not fed calcium |
| 43. ___ Eggs will be laid | (c) moistened cooked rice 5 times a day for 3 weeks |
| 44. ___ Feed day old ducklings | (d) most of their food from carbohydrates such as corn and rice |
| 45. ___ Be sure to give | (e) the most common source of phosphorous |

Score exercises 24 – 45

DO NOT look back at the Training Pac while completing the Review.

Review # 2
(3 points each answer)

Matching

- | | |
|-------------------------------|---|
| 1. ___ It is good to refer | (a) excellent mother and the best brooder |
| 2. ___ Natural brooding | (b) and helps with digestion |
| 3. ___ Corn and rice are | (c) protect from wind and rain |
| 4. ___ Brooding is | (d) excellent sources of energy. |
| 5. ___ The Muscovy Duck is an | (e) scattered, temperature in house is too high |
| 6. ___ No one feed can | (f) taking care of ducklings keeping them warm and protecting them. |
| 7. ___ If the ducklings are | (g) the food table for correct feed ingredients. |
| 8. ___ Ducklings must be | (h) is the most practical for the backyard farmer. |
| 9. ___ Water softens feed | (i) supply all that is needed. |

Underline the correct word

10. (Sugar, Starch, Fat) are good source of energy.
11. (Electricity, Charcoal) is the most common source of heat in brooders.
12. The duck house may be a (one, three) room shed with the front side open.
13. Older ducks will (welcome, push away) the younger ducks from the feed trough.
14. Old hulls can be (tossed-out, composted) and used as fertilizer in the garden.
15. A feeder should be built (not to waste, to waste) feed.

True or False

16. _____ Good ventilation is needed for fresh air.
17. _____ Protein, such as fish or snail, is needed for growth and reproduction.
18. _____ You need about .03 square meter for 1 duckling.
19. _____ It does not matter if the litter in the duck house gets wet.
20. _____ Commercial mash is not expensive.
21. _____ The trough is where you put the feed.
22. _____ If there is no electricity in your place, you can use kerosene lamps as a source of heat for a brooder.
23. _____ It's too hot if the ducklings are crowded together.
24. _____ It is necessary for the farmer to know about the feed ingredients.
25. _____ You may build the duck house using bamboo, ipil-ipil, kakawate or coconut wood.
26. _____ The brooder house or pen should be strong enough to protect from predators and bad weather.
27. _____ For feeding, lower the amount of rice as the ducklings get older.
28. _____ A cold draft may injure the ducklings.

Fill in with the correct word

grazing salt Ipil-ipil vitamins

29. _____ called "alfalfa of the Philippines", is a good source of protein and vitamin A.
30. _____ can be purchased commercially.
31. After _____ during the day, ducks can be driven into simple shelters at night.
32. Too much _____ is harmful to ducks and must be given proper amounts.

Score exercises 1 – 32

Read pages 23 – 24 Importance of Snails in Duck Raising

Fill in the blanks

fresh dead egg balut all Golden Apple Snails

1. Duck raising is often located along bodies of _____ water because snails are readily available.
2. Snails contain almost _____ the nutrition that ducks need.
3. Ducks fed with good quality snails have a very good _____ laying.
4. When fed to ducks, _____ snails could cause poisoning.
5. _____ and red salted eggs has helped more people want to raise ducks for eggs and meat.
6. One part crushed _____ is one part rice bran and one part broken corn.

Read page 25 Mating Laying Ducks

Underline the correct word

7. Pick ducks for mating purposes as early as the (third week, fifth week, eighth week).
8. On the fifth month (healthy, immature) ducks will show well-developed bodies.
9. A drake is a (male, female) duck.
10. For mating, a drake should be the same age or (older, younger) than the females.
11. The drakes and female ducks should be raised (together, separately).
12. Local duck raisers allow one male to every (10, 20) laying ducks.

Read page 26 Collecting and Handling Eggs

True or False

13. _____ Ducks always lay eggs during the day.
14. _____ You should wash dirty duck eggs carefully in warm water after collection.
15. _____ Ducks still laying should not be allowed to continue.
16. _____ Gather the eggs after letting the ducks out for feeding.
17. _____ The eggs for hatching must come from a healthy flock.
18. _____ Select eggs that are free from defects.
19. _____ Eggs with defective shells often hatch.

Score exercises 1 – 19

DO NOT look back at the Training Pac while completing the Review.

Review #3
(6.6 points each answer)

Fill in the blanks

cracked feeding energy separately egg Ipil-ipil

1. Males and females should be raised _____.
2. Green leaves like _____ are given at all times.
3. Snail meat provides protein and _____.
4. In a place where snails are available, _____ the ducks is very simple.
5. In picking for hatching, don't select eggs that are _____ thin, or dirty.
6. A defective _____ will contaminate good eggs.

True or False

7. _____ The eggs should be washed in cold water.
8. _____ If the egg is tapped and the sound is dull and hollow the egg is defective.
9. _____ When mating, the females should be older.
10. _____ Eggs with bad shells almost never hatch.

Matching

- | | |
|------------------------------------|--|
| 11. ____ It is advisable to | (a) can be cleaned with fine sandpaper |
| 12. ____ There usually is 1 drake | (b) to 10 females in mating. |
| 13. ____ Hard to wash egg shells | (c) gather the eggs in the morning. |
| 14. ____ Eggs may be | (d) and contaminate good eggs. |
| 15. ____ A defective shell may rot | (e) fumigated before storing. |

Score exercises 1 – 15

Read pages 27 – 28 Incubation

Fill in the blanks

water candling non-sitters Muscovy Duck storage cool

1. Long _____ room temperature lowers hatchability.
2. When holding eggs for hatching, keep them in a dry, airy and _____ place.
3. The Philippine Duck, Khaki Campbell and Indian Runner are all _____.
4. The _____ is an excellent sitter and good choice for natural incubation.
5. _____ is done by placing the eggs before a bright light.
6. Feed and _____ should be kept close to sitting ducks, so hatching eggs will not get cold.

Matching

7. ____ Hatching starts (a) should not be kept near things that smell strong because they may spoil.
8. ____ Fresh eggs are (b) must be given clean, dry nesting materials.
9. ____ Artificial Incubation (c) on the 28th day.
10. ____ Hatching eggs (d) best for incubation.
11. ____ Muscovy Ducks (e) of duck egg is common.

True or False

12. _____ Hatching eggs should not be stored for more than 1 week at room temperature before incubation.
13. _____ Under high temperatures, hatching eggs can be stored for 10 days without affecting their hatchability.
14. _____ Ducks hatch in 50 days.
15. _____ A good storage for holding eggs is a basket lined with stripped fresh banana leaves changed.
16. _____ On the 28th day, the ducklings are ready to be sexed and put in brooding boxes.
17. _____ One the 7th day, it is good to candle the eggs to remove the infertile ones.

Score exercises 1 – 17

DO NOT look back at the Training Pac while completing the Review.

Review #4
(10 points each answer)

True or False

1. _____ The Philippine Duck is a good brooder.
2. _____ The 1st candling is at day 7, 2nd candling at day 14, the 3rd candling at day 21.
3. _____ The best natural brooder is the Muscovy Duck.
4. _____ There is a lot of difference in the way you raise ducks for eggs compared to meat.
5. _____ Avoid holding eggs meant for hatching.
6. _____ The longest time hatching eggs may be held under the best conditions is 20 days.
7. _____ Eggs should be placed next to kerosene and onions.
8. _____ Water and feed should be close to sitting ducks.
9. _____ Once checked on the 7th day, infertile eggs can be boiled and eaten.
10. _____ On the 21st day, the embryo will show movement as the egg is turned.

Score exercises 1 – 10

Read page 32 – 34 How to Raise Golden Apple Snails

Matching

- | | |
|---|---|
| 1. ____ Golden Apple Snail | (a) on algae and rotten fruits and their peelings. |
| 2. ____ Farmers can raise Golden Apple Snails | (b) black and tough but Golden Apple Snail is tender, creamy, golden meat |
| 3. ____ The native black kuhol is | (c) Golden Apple Snails are mature and start laying eggs |
| 4. ____ About 2-3 months after | (d) known as “gintong kuhol” grow to the size of a human fist. |
| 5. ____ Golden Apple snails feed | (e) as long as there is water nearby. |

Underline the correct word

6. Weight for weight (native Kuhol, Golden Apple) Snails have more meat because its shell is thinner.
7. You can start harvesting snails at (2 weeks, 2 months) or at size of a thumb.

8. Snail ponds need (more, less) water than fish ponds.
9. The pond should be around (30, 150) centimeters deep.

Read page 35 How to Integrate Ducks with Fish, Snail and Clam

Matching

10. ___ Algae is (a) important in growing algae (lumot)
11. ___ Fertilization is (b) for about two years.
12. ___ Ducks produce eggs well (c) a natural food and oxygen source for fish.

True or False

13. ___ A fish pond should be about 50 square meters to start this project.
14. ___ The dikes must be thinner at the base to stop eroding.
15. ___ Snails and clams are excellent sources of calcium and animal protein.

Underline the correct word

16. (12 to 15, 25 to 30) ducks is the right amount for a pond of 50 square meters.
17. Clean the feeding trough by scraping it down towards the (pond, duck house).
18. (2 or 3, 10 or 20) Taiwan clams are enough to fill your pond in a year.

Score exercises 1 – 24

DO NOT look back at the Training Pac while completing the Review.

Review #5
(8.3 points each answer)

True or False

1. _____ You can start harvesting snails at 2 months or about the size of a thumb.
2. _____ Fertilization is not important in growing algae.
3. _____ Ducks produce eggs well for about 2 years.

Matching

4. ___ Snails and clams are (a) wider at the bottom to stop eroding.
5. ___ Ducks that die from disease (b) 50 square meters
6. ___ A fish pond should be about (c) should be burned right away in a hole and then buried.
7. ___ The dike must be (d) excellent sources of protein and calcium.

Fill in with the correct word

water trough tough 12 to 15 twice

8. _____ ducks is the right amount for 50 square meters.
9. Feed your ducks _____ a day.
10. Native black Kuhol is _____.
11. Farmers can raise Golden Apple Snails as long as _____ is nearby.
12. Clean the feeding _____ by scraping it towards the fish pond.

Score exercises 1 – 12

DO NOT look back at the Training Pac while completing the Pre-Test.

STOP!

You must now prepare yourself for the Pre-Test. In preparation, you may want to follow one or more of these suggestions:

1. Review the Objectives.
2. Rewrite every incorrect exercise in the Workbook.
3. Reread each section of the Training Pac.
4. Relearn each section you still do not completely understand.

Pre-Test
(5 points each answer)

True or False

1. _____ The farm will be able to sell extra eggs for money.
2. _____ Buy ducks which are alert and healthy.
3. _____ Ducks lay their eggs during the day.
4. _____ Ducks require little labor.
5. _____ The ducklings must be protected from wind or rain.

Fill the correct word

Separate Muscovy Duck locally Proper disturbance

6. _____ airflow is important in brooding.
7. The _____ is an excellent mother and can be raised where food is limited.
8. Try to buy your ducks _____.
9. Unnecessary _____ of the ducklings should be avoided.
10. _____ the males and the females as soon as you can.

Matching

- | | |
|---|---|
| 11. ____ The duck house should be | (a) the temperature of the brooder house is too cold. |
| 12. ____ Natural brooding is | (b) before letting out for morning feeding. |
| 13. ____ If the ducklings are crowded | (c) older than the females |
| 14. ____ Gather the eggs | (d) strong enough to protect from predators. |
| 15. ____ When mating, the males should be | (e) the most practical for the backyard farmer. |

Underline the correct word

16. Selecting the right breed is of (little value, great importance).
17. Feed and water your ducks (once, twice) a day.
18. Store the eggs in a (cool and dry, hot and wet) place.
19. Golden Apple Snails have (more, less) meat than native Kuhol.
20. Water and feed should be (near, away from) the sitting ducks.

Score exercises 1- 20

STOP!

You must now prepare yourself for the Final Test. In preparation, you may want to follow one or more of these suggestions:

1. Review the Objectives.
2. Rewrite every incorrect exercises in the Pre-Test.
3. Reread each section of the Training Pac.
4. Relearn each section you still do not completely understand.

How To Raise Ducks For Food And Project

Score Key

HOW TO RAISE DUCKS FOR FOOD AND PROJECT
SCORE KEY

Page A

- 1) T
- 2) T
- 3) T
- 4) F
- 5) F
- 6) b
- 7) a
- 8) c
- 9) meat
- 10) green
- 11) breed
- 12) eggs
- 13) problems
- 14) balut
- 15) noisy

Page B

- 16) reliable
- 17) sleepy
- 18) steady, healthy
- 19) good
- 20) separate
- 21) d
- 22) c
- 23) a
- 24) b
- 25) three
- 26) must
- 27) noxal, terramycin
- 28) care

Page C (Review #1)

- 1) F
- 2) T
- 3) T
- 4) T
- 5) T
- 6) alert
- 7) money
- 8) Philippine Duck
- 9) important
- 10) meat
- 11) e
- 12) d
- 13) b
- 14) a
- 15) c

Page C (Review #1 continued)

- 16) Muscovy
- 17) money
- 18) Philippine Duck
- 19) Night
- 20) crowd

Page D

- 1) brooding
- 2) non-sitters
- 3) excellent
- 4) proper ventilation
- 5) T
- 6) F
- 7) T
- 8) F
- 9) T
- 10) T
- 11) Too low
- 12) .03 square meter
- 13) 95°F
- 14) swimming water
- 15) bamboo
- 16) fence-in
- 17) clay or plastic

Page E

- 18) d
- 19) e
- 20) f
- 21) c
- 22) a
- 23) b
- 24) need
- 25) extra
- 26) water
- 27) energy
- 28) egg
- 29) balanced
- 30) F
- 31) T
- 32) F
- 33) F
- 34) T
- 35) F
- 36) good
- 37) plenty

Page F

- 38) lower
- 39) cools
- 40) is
- 41) e
- 42) d
- 43) b
- 44) c
- 45) a

(Review #2)

- 1) g
- 2) h
- 3) d
- 4) f
- 5) a
- 6) i
- 7) e
- 8) c
- 9) b

Page G

- 10) Starch
- 11) Electricity
- 12) one
- 13) push away
- 14) composted
- 15) not to waste
- 16) T
- 17) T
- 18) T
- 19) F
- 20) F
- 21) T
- 22) T
- 23) F
- 24) T
- 25) T
- 26) T
- 27) F
- 28) T
- 29) Ipil-ipil
- 30) vitamins
- 31) grazing
- 32) salt

Page H

- 1) fresh
- 2) all
- 3) egg
- 4) dead

Page H (continued)

- 5) balut
- 6) Golden Apple Snails
- 7) eighth
- 8) healthy
- 9) male
- 10) older
- 11) separately
- 12) 10
- 13) F
- 14) T
- 15) F
- 16) T
- 17) T
- 18) T
- 19) F

Page I (Review #3)

- 1) separately
- 2) Ipil-ipil
- 3) energy
- 4) feeding
- 5) cracked
- 6) egg
- 7) F
- 8) T
- 9) F
- 10) T
- 11) c
- 12) b
- 13) a
- 14) e
- 15) d

- 1) storage
- 2) cool
- 3) Non-sitters
- 4) Muscovy
- 5) candling
- 6) water

Page J

- 7) c
- 8) d
- 9) e
- 10) a
- 11) b
- 12) T
- 13) F
- 14) F
- 15) T
- 16) F
- 17) T

Page K (Review #4)

- 1) F
- 2) T
- 3) T
- 4) F
- 5) T
- 6) F
- 7) F
- 8) T
- 9) T
- 10) T

- 1) d
- 2) e
- 3) b
- 4) c
- 5) a
- 6) Golden Apple
- 7) 2 months

Page L

- 8) less
- 9) 30
- 10) c
- 11) a
- 12) b
- 13) T
- 14) F
- 15) T
- 16) 12 - 15
- 17) pond
- 18) 2 or 3

(Review #5)

- 1) T
- 2) F
- 3) T
- 4) d
- 5) c
- 6) b
- 7) a

Page M (Review #5 continued)

- 8) 12 to 15
- 9) twice
- 10) tough
- 11) water
- 12) trough

Page N (Pre-Test)

- 1) T
- 2) T
- 3) F
- 4) T
- 5) T
- 6) proper
- 7) Muscovy Duck
- 8) locally
- 9) disturbance
- 10) separate
- 11) d
- 12) e
- 13) a
- 14) b
- 15) c
- 16) great importance
- 17) twice
- 18) cool and dry
- 19) more
- 20) near

FINAL TEST

How To Raise Ducks For Food And Project

NAME: _____

DATE: _____

SCORE: _____

HOW TO RAISE DUCKS FOR FOOD AND PROJECT
FINAL TEST
(4 points each)

Underline the correct word

1. The Khaki Campbell duck is the (best, worst) egg layer with 300 eggs a year.
2. A drake is a (male, female) duck.
3. When selecting eggs for hatching, cracked shells (often, rarely) hatch.
4. On day (7, 15), it is good to candle eggs to remove the infertile ones to boil and eat.
5. (Always, Never) leave one egg in the nest to use as bait for the brooder.
6. Drinking water should be (always, sometimes) available for your ducks.

True or False

7. _____ The Philippine Duck, Khaki Campbell and Indian Runner are all non-sitters.
8. _____ The older ducks will push out the younger ones at the feeder.
9. _____ Clean water should be on hand at all times and near the feeders.
10. _____ Snails contain almost all the nutrition that ducks need.
11. _____ Hatching starts on the 40th day.
12. _____ Ducks always lay eggs during the day.
13. _____ You should wash dirty duck eggs carefully in warm water after collection.
14. _____ The Muscovy Duck provides excellent nest.

Matching

- | | |
|-----------------------------------|--|
| 15. ____ The Philippine Duck is | (a) around 30 cm. deep |
| 16. ____ When dressing a duck | (b) excellent sources of protein and Calcium |
| 17. ____ Golden Apple Snails | (c) soak in hot water for 5 minutes |
| 18. ____ Snails and clams are | (d) are tender and golden |
| 19. ____ The snail pond should be | (e) a common duck, laying 175 eggs a year. |

Fill in the correct word

male eggs reliable 2 or 3 age three

20. Group together ducks of the same _____.
21. You should allow one _____ to every 10 laying ducks.
22. Buy ducks from _____ raisers in your area.
23. _____ Taiwan clams are enough to fill your pond in a year.
24. Most ducks are raised for their _____.
25. The most critical period in the life of a duck is the first _____ weeks.

HOW TO RAISE DUCKS FOR FOOD AND PROJECT
FINAL TEST KEY

1. best
2. male
3. rarely
4. 7
5. Always
6. always
7. T
8. T
9. T
10. T
11. F
12. F
13. T
14. T
15. e
16. c
17. d
18. b
19. a
20. age
21. male
22. reliable
23. 2 or 3
24. eggs
25. three