

ture and store for 18 days. On the 19th day, wash and hard-boil the eggs. Finally, dip salted eggs in a solution or red dye.

The next batch of eggs can be processed using the previous mixture, but add one canful of salt. Eggs are stored in a box measuring 14 x 14 x 21 inches.

References:

*Philippine Recommends for Duck Raising - PCARRD, DOST
LDC Technical Bulletin on Duck Raising*

Tips on Duck Raising - LDC Publication

DUCK PRODUCTION

An Investment



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DUCK RAISING

Duck Raising is a lucrative livestock industry in the Philippines because of its egg. Its most important product, the “balut” (boiled incubated duck’s egg) is sold daily throughout the archipelago for its delicious flavor and nutritive value.

Duck raising is especially recommended in baytowns like those bordering the shores of Laguna de Bay, where there are abundant supplies of fresh water snails which make a good duck food.

Ducks are generally raised for eggs but when snail food gets scarce, they are sold for meat.

KINDS OF DUCKS

Egg-Type Ducks

Native or Pateros Duck

The native or Pateros duck, commonly called “itik”, is the most popularly raised locally. Although, smaller than imported breeds, they are good layers and non-sitters. Their eggs are large.



Its predominant colors are **Native or Pateros Duck . . .** black and gray. Some are barred (bulek), others are known to have white feathers mixed with black/green. Males have coarser heads and heavier bodies than females. Males emit shrill high-pitched sounds. They have curly feathers on top of their tails.

Females emit low-pitched quaking sounds. Their tail feathers lie flat or close to the bodies.

Eggs with weak embryos take 18 to 20 days to be released; these are hard-boiled and sold.

Eggs intended for hatching are left in the balutan for 28 days when duckling will hatch. After 20 days, palay bags are not heated anymore since embryos can generate enough heat to keep them warm.

When using kerosene or electric incubators for hatching ducks eggs, maintain a temperature of 100°F and a humidity from 55°F to 60°F.

Do not hatch duck and hen’s eggs together in one incubator as duck eggs require a temperature of 100°F but a higher rate of humidity. A pan of water kept in the bottom of the incubator helps maintain humidity level.

During incubation period, turn eggs at least 3 to 4 times a day to obtain better percentage of hatchability.

Clean hatching eggs with slightly moist, clean rag before storing to prevent contamination of the developing embryo, or newly hatched chicks.

How to make salted red eggs (Itlog na Maalat)

Eggs with fissures are sold as sariwa or fresh duck eggs. Eggs with thin shells but have no crack are made into salted red eggs.

Dip eggs in a mixture of salt, garden soil, and water. As a starter, put 3 canfulls of salt (using common powdered milk can) to 1/2 pail of garden soil that have been strained. Add water gradually.

Stop adding water to soil when mixture sticks to your fingers when you dip these in the salty muck. Coat eggs with soil-salt mix-

Balut Making

Select duck eggs using the pitik system-tap eggs with the fingers to cull out with cracks or thin-shelled. Eggs with cracks have hollow sound; thin-shelled eggs have brittle sound.

Only thick-shelled eggs are used for balut making because these can withstand stresses of egg placement and removal in cylindrical baskets called "toong". These are open on both ends, 34 inches high and 21 inches in diameter; spaces around are filled with rice hull up to 4 inches from the brim. Ideally, eggs made into balut should not be older than 5 days from the time these are laid by ducks.

Heat is needed to develop the embryos. Roast or heat palay to a temperature of 107°F or 43°C in an iron vat or cauldron. Remove palay when you can still hold the palay in your hand when you remove it.

Egg bags are then placed in the toong; these are alternated with heated palay bags. The number of heated palay bags is one for every egg bag. However, place two heated palay bags on the bottom and two on the top level of the toong to ensure heat convection.

For every toong containing 10 layers of eggs, you should need 13 bags of roasted palay. Each toong can hold 10 bags or tikbo. Cover with jusi sacks to conserve heat further.

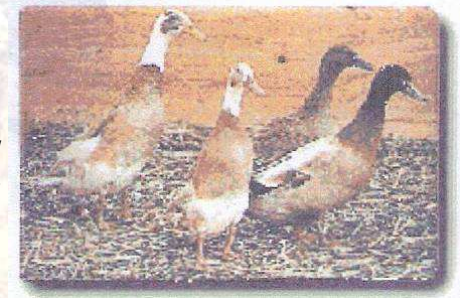
Candling is the process of holding egg against the hole of a lighted box in a dark room to separate infertile eggs from fertile one. Infertile eggs are called penoy; these are also boiled like balut but fetch a lower price.

First candling is done on the 11th day after eggs are placed in toong. Candling is again done on the 17th day to separate eggs with dead embryos (abnoy) and those that are ready to be sold as balut.

In all commercial duck hatcheries, determining the sex of duckling is done at the age of 2 to 3 days.

Khaki Campbell Duck

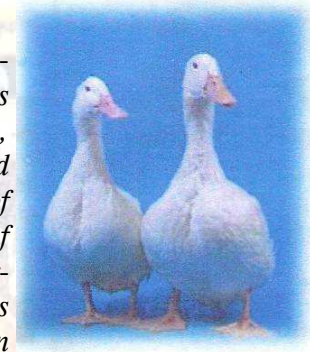
Khaki Campbell ducks have characteristic brown color, have extremely active habits, do well in good range and show little desire in swimming. These ducks are good layers; they lay as many as 300 or more eggs a year which are fairly large, thick-shelled and weigh 70 to 75 grams each.



Khaki Campbell ducks . . .

Commercial Hybrid Duck

The world's first hybrid egg-type duck known as CV2000 was developed at Cherry Valley Farms, England. It has white plumage and lays its egg at about 20 weeks of age. The body weight at point of lay is about 1.5 kg. On the average, this duck could lay 285 eggs up to 72 weeks of age, with a mean egg weight of 75 g. This duck can be distinguished by their pure white feathers. Their eggs are either white or greenish.



Cherry Valley ducks . . .

Indian Runner

This breed originated in the West Indies, but its egg production capability was developed in Western Europe. This duck assumes a very erect normal posture with an almost straight neck. The back is long, straight and narrow. An adult male weighs about 2.1 kg while and adult female weighs about 1.8 kg. the egg production characteristics of this breed resemble that of Khaki Campbell.



Indian Runner ducks . . .

Tsaiya

This breed was developed in Taiwan. The original color ranges from black in the neck to pure white. Due to farmers' preference, the brown breed was selected and raised as a major variety, while the white variety was developed for the production of male ducks (Hybrid of Mallard and Muscovy). Tsaiya ducks has small body size. An adult female weighs about 1.30 kg while the adult male weighs about 1.4 kgs. They could lay about 207 eggs in 360 days.



Tsaiya ducks . . .

The main clinical signs are lethargy, spasmodic paddling of feet, sudden death, and high mortality rate. It only affects ducklings below four weeks old. On necropsy, the constant lesion is enlargement of the liver with hemorrhages of various sizes.

Control. This viral disease can be controlled by strict sanitation and vaccination of healthy flock.

TABLE 2. RECOMMENDED MEDICATION AND VACCINATION PROGRAM

* During the laying period, sulfa drugs should not be given unless very necessary

Age	Type of Medication	Preferred Route of Administration	Remarks
1-7 days	Antibiotic or sulfa drug preparation	Drinking water	Prevention against bacterial infections such salmonellosis, colibacillosis and staphylococcosis
8-14 days	Antibiotic-vitamin-mineral mixture	Drinking water	To increase resistance of ducklings against bacterial infections
21-28 days	Multi-vitamins	Drinking water	To increase resistance of ducklings
2 months	Antibiotic-vitamin-mineral mixture	Drinking water	May be given only during stressful condition, e.g. change in climate
4 months	Antibiotic-vitamin-mineral mixture	Drinking water	May be given only during stressful condition, e.g. change in climate
4.5 months	Fowl cholera Vaccine	Intramuscular or subcutaneous injections	Give antibiotic vitamin-mineral mixture 3 days before and 3 days after vaccination to combat stress
Laying months*	Antibiotic-vitamin-mineral mixture	Drinking water	Given only when needed

sulfa drug therapy.

Prevention. *This disease can be prevented by a) strict sanitation; b) thorough and frequent cleaning and disaffection of feeding and watering troughs; an c) cleaning, drying, and draining of liter and ground.*

Viral Diseases

Two dreaded viral diseases of ducks which have not been confirmed locally but present in most neighboring countries are duck plague and duck hepatitis. Disease outbreaks of these nature may have occurred locally but not properly documented. Guides for the recognition of these diseases are given below. Suspected outbreak should be reported immediately to the Bureau of Animal Industry, Department of Agriculture.

1. Duck plague. *This is an acute contagious disease of ducks of all aged, characterized by sudden onset, high mortality and extreme weakness. It is caused by a herpes virus acquired usually by direct contact or ingestion of contaminated feed and water.*

The significant clinical manifestations are sudden onset, extreme weakness, lethargy, loss of appetite, watery diarrhea, soiled vent, eye and nasal discharges labored breathing decreased egg production, and high mortality rate of 40-80%. The important lesions are hemorrhages throughout the body which are more pronounced in the visceral organs.

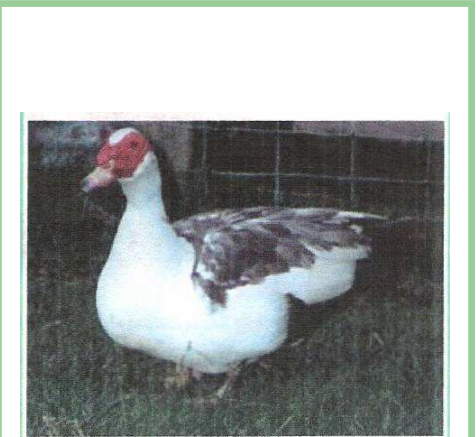
Control. *This viral disease can be controlled by a) vaccination of healthy ducks; b) strict sanitation; c) immediate isolation of sick ducks; and d) high level antibiotic vitamin mineral-medication.*

2. Viral hepatitis. *This is an acute highly contagious viral disease of ducklings below four weeks old. It is characterized by short incubation period, sudden onset, and high mortality rate of up to 900/0. it is caused by a virus and transmitted usually through direct contact or ingestion of contaminated feed and water.*

Meat-Type Ducks

Muscovy Duck - Meat Type

Muscovy duck (palo) is easily identified by its carunculated face or red, knobby nodules along the eyes and above the base of the bill.



Muscovy is a heavy breed. It has plump body and yellow skin. It has three varieties : the white, the colored and the blue.

Unlike other breeds, Muscovy ducks prefer to stay on land. They are good foragers, so they require less care and can subsist on what they can pick up in the field supplemented only with palay and corn.

Muscovy has low egg production but is more self-sustaining than Pateros duck. It hatches her eggs in 33 to 35 days.

The objection to this breed is its tendency to fly far away from home and get lost. It is therefore necessary to clip their flight feathers regularly. Clip only those of one wings to re move the bird's balance in flying.

Muscovy Duck . . .

Pekin Duck

Pekin duck is a native of China belonging to the meat type of ducks. Sometimes it is mistaken for a goose because it carries its body rather upright. It is docile and well-adapted to Philippine climate.

Pekin ducks are good layers, and ducklings are ready for market

at 2 or 3 months old.

HOUSING

Build your duck house in a quiet, cool place and near as possible to a stream or pond. Local materials like bamboo, nipa and cogon are cool.

Provide each duck with at least 3 to 4 square feet of floor space. Cover the floor with rice hulls, corn cobs, peanut hulls or similar materials to keep it dry and clean and help prevent spread of pests and diseases. A house of 100 ducks measures 4x4 meters and 3 meters high or high enough to let a man stand inside.

You may provide a swimming pond 10 feet wide and 20 feet long for 50 birds. However, the pond is not necessary in duck raising as they lay just as many eggs without it.

House ducks in groups according to size or age to facilitate management and to avoid quarrels common among ducks of different ages. Older ducks tend to push out younger ones from feeding troughs.

Separate duck houses from one another by bamboo fences low enough to go over them from one pen to another. Fence should extend down to the shallow edge of the water to prevent ducks from straying away too far.



Pekin Duck . . .

SELECTION AND MATING

neck in stooping position. Other signs are ventro-lateral recumbency with twisted head and neck, depression, weakness, loss of appetite, absence of egg production, and excessive intake of water (polydypsia). Sick ducks do not smeared with feces and dirt. Mortality is lower than that of 'tanga' but morbidity may reach 90%.

'Tuyo' is the chronic form of 'dapa' characterized by progressive emaciation and dehydration, weakness, poor appetite, and ruffled skin and bone condition; hence, the term 'tuyo'. 'Tuyo' usually occurs after an outbreak of 'dapa' and persist for weeks or month before death.

'Buto-buto' is another chronic form of duck cholera characterized by hard swelling of the leg joints (bony prominences). It can persist for long periods. Affected ducks may have limping gait and left behind when flock is driven away.

Treatment. It can be treated by high level antibiotic and sulfa drug therapy.

Prevention. This disease can be prevented by a) strict sanitation; b) thorough cleaning of feeding and drinking troughs; c) provision of fresh and clean water at all times; d) immediate isolation of sick ducks; and e) vaccination with polyvalent vaccine.

2. Salmonellosis. This is a destructive disease of ducklings caused by *Salmonella anatum* and *S. typhimurium* characterized by sudden collapse, diarrhea and dehydration ruffled feathers, dry sunken eyes, and leg swelling. It is principally transmitted through direct contact and ingestion of contaminated feed and water.

Treatment. It can be treated by high level antibiotic or

can cause adverse effects on the health and production of the ducks.

- Maintain good production and health records.
- Supervise good production and health records.
- Avoid mixing new stock to the flock. Quarantine newly arrived ducks for at least two weeks. Outbreak of disease may occur through introduction of sick or carrier ducks.

Some important duck diseases confirmed reported to be present locally are as follows:

Bacterial Diseases

Ducks are susceptible to a number of bacterial infections. In most cases, mixed infection with two or more pathogenic microorganisms were isolated, thus making specific diagnosis difficult.

1. Duck Cholera. This is the most common disease in most duck farms, it is an acute or chronic, localized or generalized infectious disease with high morbidity and mortality rates. It occurs in four forms based on clinical manifestations named locally as 'tanga', 'dapa', 'tuyo', and 'buto-buto'. It is caused principally by a microorganism known as *Pasteurella multocida*, but other pathogens like *Salmonella*, *Escherichia*, *Clostridium*, and *Aspergillus* have been implicated. Duck cholera can be transmitted by direct contact, ingestion of contaminated feed and drinking water, and by blood-sucking insects particularly mosquitoes.

Clinical Sign. 'Tanga' is the most acute form of the disease. The ducks may die suddenly, assuming a ventral recumbent position with extended head, open eyes in a staring manner, and open mouth. Some dead ducks may appear like statues and only close scrutiny will reveal that they are dead mortality ranges from 70-90%.

'Dapa' is characterized by egg-laying posture with head and

Select vigorous breeding stock. Select breeders when birds are about 8 weeks old, and again at 4 to 5 months old before they are placed in breeding pens.

Eggs for hatching purposes should come from ducks not less than 7 months old to ensure better fertility, hatchability and livability of offspring.

Drakes (male duck) should have the same age as ducks or even a month older. They should be raised separately from ducks. They are put together only when ready for mating.

One drake maybe mated to 6 to 10 ducks. Heavier breeding, however, should have a closer ratio of males to females than light breeds.

Pateros ducks start laying when they are 4 to 6 months old. Muscovy and Pekin ducks start laying at 6 to 7 months old.

HATCHING

The period of incubation for duck eggs is 28 days, except Muscovy which is 33 to 35 days. Breeds of ducks that have high degree of laying are non-sitters and their eggs are hatched through artificial incubation.

The Muscovy is a natural mother. She hatches and breeds her own duckling with none or little assistance from man. Native or Pateros duck is a non-sitter, so her eggs are incubated under the native method of incubation called balutan.

The balutan or hatchery is a simple one-room house made of bamboo, wood or hollow blocks and roofed with nipa or galvanized iron. Or some convert the first floor of their house into balutan, commonly called kamalig or barn. It is provided with only one door to avoid drafts; some have windows that are opened only during hot months. Its floor is of hard earth or con-

crete and covered with 3-inch layer of rice hull.

Egg containers are wooden boxes (kahon) measuring 4x4x4 feet.

CARE OF DUCKLINGS

Ducklings need to be brooded or warmed either by natural or artificial method until they are one month old. Most ducks are non-sitters and are not expected to brood. Hens maybe made to sit on duck eggs and brood ducklings.

After removing duckling from incubator, transfer them to hardening boxes. Place these boxes in the brooding room that is draft-free and rat-proof. If boxes are not available, raise duckling on straw-covered floor. Woven bamboo mat or sawali maybe used as floor mat.

Heat is necessary when brooding duckling at least during the first week. When nights become cooler, especially during the months of January and February, artificial heat maybe necessary for at least 10 days. Kerosene lamps or electric bulbs maybe used for brooding.

The brooder should have a temperature of 95 degrees F for the first week; 85-90 degrees F for the second week; 70-85 degrees F for the third week; and 70 degrees F for the last week.

The behavior of ducklings is a good indicator whether brooding temperature is correct. Duckling huddle close together toward the source of heat when temperature is low; scattered or spread evenly when temperature is correct; but panting and moving away from the source of heat when temperature is too hot.

A good brooding area is at least 1 square foot per duckling during the first week. Increase the area by about 2 square feet every week until the fourth week.

When ducklings show signs of sickness, add 3 tablespoons of Nexal for every gallon of water for 2-3 days. Skip or withdraw after 3

them with same medication.

- Keep the farm and its surroundings clean. Ducks should be provided with clean and dry litter and well drained areas.
- Provide well-ventilated with dry flooring or litter. Do not overstock the animals in the pen.
- Secure constructed buildings so that dogs, cats, rats and other possible diseases vectors cannot enter.
- Burn or bury dead ducks as soon as possible to avoid flies from breeding on the decomposing matter. This will also prevent infected maggots from being eaten by ducks.
- Minimize activities that can cause stress to the ducks and thus lower their production.
- Prohibit delivery trucks and visitors from entering the production areas as disease organisms are often introduced into the farm by these delivery vehicles and/or visitors.
- Install footpath in strategic locations to prevent entry of infective agents into the farm.
- Vaccinate ducklings against duck cholera with prevalent bacteria if available. Give antibiotic-vitamin mineral supplement to suppress build-up of bacteria infection and improve the ducks health condition.
- Spray the animals with insecticides at least once a year to control lice and mites, beetles and other arthropods that can cause annoyance to the ducks.
- Avoid giving decomposed food such as shrimps, fish, and meat which may contain virulent microorganisms or their toxins.
- Make sure that palays are free from insecticides which

Ducks are most resistant to diseases than chicken and other fowls. Losses from various causes can be minimized through proper management, adequate appropriate feeding and housing, strict sanitary practices, and effective prevention medication and vaccination program. However, even with all precautionary measures, substantial losses are incurred in duck farming operation due to various causes. Duck diseases are those caused by pathogenic viruses, bacteria, fungi and parasites while non-infectious types are due to chemical poisons, toxins, inferior feed or ration and environmental factors.

Useful Tips in Preventing Duck Diseases

Some tips to prevent ducks from being infected by diseases are as follows:

- Purchase stock from reliable sources or hatcheries.
- Raise only healthy stocks. Sick birds should be culled immediately and disposed properly to avoid spread of infection.
- Feed ducks with balanced ration. Ducks fed with unbalanced ration are prone to diseases.
- Provide cool, fresh, and clean drinking water at all times. Clean waterers at least once a day. Highly polluted water is detrimental to the duck's health and can affect overall performance.
- Provide clean and dry feeders at all times. Wet feeders are prone to the growth of yeasts, harmful bacteria and harmful molds which are sources of mycotoxin, ocratoxin and other related toxins. Since ducks are highly susceptible to aflatoxicosis, the above activity should be strictly followed.
- Keep ducks of the same age in the same pen and provide

days. Then continue for another 3 days. Terramycin poultry formula can also be used. Follow instructions on the package carefully.

To prevent Avian Pest Disease, immunize your ducks with Avian Pest Vaccine.

DETERMINING THE SEX

Ducklings are sexed before placing in the brooder. This is done by pressing the region of the crop inward, and with two fingers, press the vent slightly outward. By this process, the male organ protrudes and is exposed to view, while in the female, this remains flat.

If you desire to fatten extra males for meat purpose, raise them separately from females. When ducklings are 6 weeks old, they can be transferred from brooder to growing house. Transfer the layers to laying house when they are 4 months old.

FEEDING

Feed duckling with wet starter mash for 8 weeks. Native ducklings raised the native way are fed moistened boiled rice for the first 33 weeks, 4 to 5 times a day. During the first few days, give feed at night. Start giving water in drinking troughs or fountains on the 2nd day. On the fifth day, add finely chopped small shrimps to boiled rice. Increase their feed as ducklings grow older.

At the age of one month, feed ducklings with tiny fresh water snails and boiled unhulled rice or palay. Give only enough feed to be consumed as they tend to spoil when left long in the troughs.

Mashed feed for ducklings is composed of corn, soybean meal, fish meal, dried whey, rice bran and oyster shell and bone meal

with vitamin-mineral supplements. Feed one can to 6 weeks old ducklings with starter mash with 10-20% crude protein; for 6-week old to four months old duckling feed with grower mash with 16% crude protein; and 4-month old ducks and above with layer mash or ration with 16% crude protein.

If mashed feed is preferred, give only enough to be consumed quickly at one time for 10 to 15 minutes. Wet mash tends to spoil when left long in the hoppers. If feed is given at an intervals, ducklings learn to eat more readily and their appetites developed to stuff themselves in between drinking, digest food quickly and be ready to eat at their fill for the next feeding time.

Four to five feedings a day are sufficient for ducklings over 2 weeks old. Provide plenty of clean, fresh water as ducks drink after every mouthful of food.

Ducks are wasteful and slovenly while feeding. Provide proper adequate feeding hoppers to prevent much waste of food.

Fine gravel or grits are necessary for grazing ducks to help them grind their feed. After the 5th week, give green feeds such as chopped kangkong leaves, camote, ipil-ipil and legumes at least three times a day. 10 grams of chopped green leaves per duck per day.

As a feed saving device, the pellet system of feeding has been introduced in duck nutrition. Pellets of each kind of feeds are recommended but the size of particles must be suitable to duck's age.

Table 1. Sample Ration for Different Growth Stages of Ducks

using Focal Indigenous Feedstuffs

* Starter ration is given when ducks are 1 day old to 6 weeks only.

Ingredient	Starter Ration % in Ration	Grower Ration % in Ration	Grower-Developer % in Ration	Finisher/ Layer % in Ration
Ground Yellow Corn	45	40	40	40
Rice Bran	25	33	33	33
Grated Coconut	3	4	10	5
Ipil-ipil Leaf Meal	3	3	8	5
Shrimp Meal	23	19	8	16
Salt	0.5	0.5	0.5	0.5
Vitamin-Mineral Premix	0.5	0.5	0.5	0.5
	100	100	100	100

DISEASE PREVENTION AND CONTROL