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**Record keeping**  
**Status: under construction**

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**Introduction**

**What Is Record?**

**Record is information that has been systematically and carefully collected and appropriately stored for intended use. To be able to run any economic enterprise successfully, carefully thought out, properly collected and kept records are a must. For the purpose of keeping track and decision making in any economic enterprise, comprehensive and well kept records must be kept.**

**Goats**

**Pigs**

**Poultry:**

**Chicken**

**Poultry:**

**Geese**

**Rabbits**

**Animal  
diseases**

**Fodder  
Production  
and  
Conservation**

**Products**

**The records will:**

- **Be used in determining profitability of various techniques of production or systems**
- **Be used to compare the efficiency of use of inputs, such as land, labour and capital, with that of alternative production activities**
- **Help the investor in improving the efficiency of farm's operations**
- **Be used to preserve institutional memory of the enterprise for future reference**

**Records should be used for decision making on a farm/ranch and should be interpreted in the right way, otherwise there will be a waste of time, money and energy. Too often, records are only kept for the purpose of official reporting, e.g. to the Ministry headquarters for the parasitological and not used as a tool on the farm/ranch for making the decision in time. A good memory can be very useful but it is never entirely reliable. Good facts tend to be remembered and the others forgotten.**

**Adequate and correct record keeping is also a valuable tool for assessing the performance of your herd or flock and making good management decisions.**

- **The records should be simple, easy and quick to interpret.**
- **In all records, there should be a 'Remarks' column/entry explaining the reasons behind any unusual observation. This is very essential in interpreting the implications of the records, particularly for a third party who may have not been directly involved in taking the records, but needs to make informed/accurate decisions.**

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**Record keeping for Cattle production**

**Excellent records are the cornerstone of building a financially successful beef/Dairy enterprise and they will be of great help in the development of the Beef/dairy husbandry and beef/dairy industry of any country.**

**In summary, the importance of good record keeping include:**

- **Aids in efficient management of the herd**
- **Improves bargaining power on products**
- **Evaluation of livestock for selection**
- **Adding value to livestock**
- **Control of inbreeding and aid in breeding planning**
- **Aid in culling low performers**
- **To assess profitability/losses**
- **Aid in gross margin analysis**
- **Credit/loan access**
- **To rationalize labour**
- **Aids in disease management**
- **Aids in feed planning and management**

### **Types of Records**

**The major types of records are:**

- **Physical (identification)**
- **Breeding**
- **Production (Performance)**
- **Feeding**
- **Health**
- **Financial records**

### **Identification Records**

The needs are for an identification method that is cheap, not damaging to the animal and reliable at a distance of at least 2-3 metres and by preference permanent.

Identification of animals is usually through use of numbering, by marking of the animal and by description of certain characteristics of the animal. Methods of identification can be subdivided into 2 categories: permanent and non-permanent.

#### **Permanent Identification**

1. Tattooing (ear or under)
2. Description (diagrams, sketches and photographs)
3. Ear-notching/Punching
4. Brands (Hot iron, freeze and chemicals)

#### **Non-Permanent identification**

1. Tags (Ear-tags, Flank-tags, tail-tags and Brisket-tags)
2. Collars or neck straps (chains)
3. Paint and dyes
4. Hair Braiding
5. Naming

### **Breeding Records**

The importance of breeding is to measure the productive efficiency of the herd and to enable culling and selection exercise to be carried out for breeding and genetic improvement. A good farmer would like a cow which gives a calf yearly. Therefore, an accurate breeding record of each individual cow which is up-to-date is needed and also a breeding record for the total herd. An indicator for that is e. g the number of inseminations needed to get a cow in calf. In addition

to this, the data for the breeding record provides information about when certain cows have to be dried off and when certain cows are due to calve while others need to be insemination for proper herd management. The important data in breeding records include:

- Pedigree/parentage (Dam name, grand dam, sire name, grand sire)
- Growth (Date of birth, birth weight, date of weaning, weaning weight, sale weight, sale date)
- Fertility (Age at first service, age at first calving, date of calving, number of services per conception)

### **Production (Performance) Records**

These records are useful in measuring the performance of the herd/flock and for the economic appraisal of the enterprise. Production and breeding records will give the farmer direct profit but also indirect profit by using progeny tested bulls from Artificial Insemination (AI) stations. Progeny testing is only possible if production and breeding figures of daughters are available. At the moment many farmers in Africa are importing semen of purebred and progeny tested bulls from Western Europe, North America, New Zealand, and Australia to improve the genetic ability of their cattle. This would have been impossible if those countries did not have a highly developed recording system. Breeding recording system would be a great help in selecting the bulls for the National AI services and would make imports of often very expensive semen superfluous.

Records however, are worth the most when they are used the most. For dairy industry, the important records are:

- Daily milk yield
- Milk content (Butter fat content, protein, Solid Non Fat)
- Lactation length
- Milk fed to calves
- Milk consumed at home
- Milk sold

- **Milk spoil**

### **Feeding Records**

**These should indicate the amount of feeding given as well as the type of feed. Feeding records should be used the most for day-to-day management, evaluating pasture management practices and for planning of activities in the future. The day to day management decisions which are to be made are for instance, which cows need concentrates and how much, cows to be culled and why etc. Thus the important records are:**

- **Available fodder on farm**
- **Quantity fed**
- **Concentrate supplemented**
- **Minerals**
- **Left-over ( per head and per feed, if possible)**
- **Spoilage (per batch)**

### **Health records**

**Health records are needed to do the required vaccinations at the right time and to prevent disasters like foot and moth epidemic. They also provide information about the health status of each individual animal and the whole heard. Only with the breeding and health records can a good and wise decision be made.**

- **Vaccination**
- **Dipping/spraying**
- **Treatment**
- **De-worming**
- **Postmortem**

### **Financial Records**

**The records of the expenditure and revenue should be kept for cash analysis and enterprise appraisal. Economic records are of paramount interest in providing the farmer with information concerning the profitability of his farm. Moreover they are of great help in decision making at the right time.**

**For example, is it profitable to feed concentrates, is it advisable to apply for a loan or credit to invest in a machinery or technology, is it more economic to raise the calves with whole or skimmed milk? Answering these questions is only possible if adequate records are available. Moreover, for tax purposes and for the purpose of getting loans or credit, economic records are required.**

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### **Record keeping for Pig production**

**The prime objective of a pig farmer is to manage his farm in such a way that it is a continuing source of income. In order to achieve this he needs to implement a set of good management measures and technical skills through good record keeping and administration. This makes it possible to control and monitor production and reproduction activities and to identify the results both technical and financial.**

### **Identification Systems**

**A means of animal identification is an essential part of any record-keeping system. The most common identification systems are ear notching, tattooing and ear tagging. Other identification systems include, naming, colour differences, ear shapes, however this is only applicable for**

**small number of sows.**

**Being able to identify the pigs is essential if records are to be kept and for managing the pigs accordingly. As long as you do not have large numbers of pigs there is no problem recognising them and no need to worry about marking them. However, when you have more pigs it is needful to introduce an identification system. All the animals should be marked when they are young.**

### **Notching**

**Notching involves cutting small pieces of skin out of the edges of the ears. This is a very cheap method of marking using only a very sharp knife. The wounds made by the cutting should be disinfected with iodine. By having different patterns of the cuts, these can be used for the identification of pigs.**



#### **Notching step-by-step:**

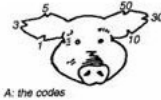
- **Catch the pig and secure it well.**
- **Clean the ears with methylated spirit.**
- **Clean the knife or pliers to be used for cutting with methylated spirit.**
- **Cut off the edge of the ear flap on the parts of the ear that correspond to the number you want to give the pig**
- **Apply some disinfectant like iodine, healing oil or wound spray to the cuts in the ear flap.**

**Example of notching on the ears of a pig**

**The picture on the left shows the right ear of an adult pig with notches, which were made when the pig was very young.**

**© Stephen  
Gikonyo,  
Kenya**





**The disadvantages of the method are that it takes time 'to read' the patterns (or codes), and that problems can arise if the ears are damaged.**

### Example of ear notching codes

© Stephen Gikonyo, Kenya

### What does record keeping involve?

Good record keeping means noting down all important details and events, in a simple and clear manner. It can also be used to provide and record information for future activities. To keep records, use a notebook or exercise book. Dedicate a few pages for each pig, and a few pages for what you buy and what you sell. Other information should also be marked on a calendar (sow calendar), so that any necessary preparation can start well in advance (for example preparing the farrowing pen for the sow).

Records will help when comparing the production or growth of different animals. Records will indeed make it easier for you to carry out day to day activities on and for the pigs. When pigs are sick, you may note down the symptoms, the treatment, and whether the pig recovered or not. This will improve your knowledge on how to treat your animals successfully. It will also help you to keep track of expenses and incomes from sales. This information will tell you whether you are running a profitable business or not.

### Records

- Litter records
- Birth weight (1.5.kg is good)

**-Weaning weight (18kg is good)**

- Dams record
- Number of piglets weaned per year (18 is good)
- Marketing
- Age and weight
- Conversion rate
- Pigs that gain more weight from a given amount of food.
- A satisfactory conversion ratio should be 1 kg live weight gain for 3 to 5 kg of feed.

**NB:** Simple and necessary record should be kept for all piglets e.g. date of birth, dam and sire record, and weaning weight, feed type and feed consumption, decrease etc.

**A good record keeping system will permit constant surveillance and monitoring of animal health and performance. It will assist the farmer in maintaining a steady flow of pigs through his enterprise and in identification of problem areas in the production programme.**

**Considerations to be made while designing a record keeping system**

- The records should be as simple as possible
- Records should be kept in a place where they are readily accessible
- Transferring of information from one record sheet to another should be minimized
- The information that should be included in the records varies with the type of operation being run. A swine operation that is engaged in an expensive breeding stock improvement programme will require more detailed records and more individual pig records than will a commercial operation
- Individual records are of value in culling non-productive breeding stock and in selecting replacement animals

**Individual records**

- Sow identification

- **Reproduction Records**

**Date of first Oestrus/heat, Breeding dates, Farrowing dates, Number of pigs born alive and number born dead, Average birth weight (comments on evenness of litter should be included), Abnormalities**

- **Weaning Records**

**Weaning date, weaning weight**

- **Litter management records**

**Dates of routine management practices e.g. Iron treatment, castration**

- **Health Records**

**A record sheet summarizing important aspects of herd production on weekly or monthly basis should be kept. The farmer can compare these records which are a good measure of production efficiency with previous figures as well as with production goals he has set for his production.**

**Herd records should include:**

- **Reproduction Records**

- **Females services (categorise as to the first and repeat breeders).**
- **Litters farrowed**
- **Pigs born alive and number born dead**

- **Feed Consumed**

- **Either herd total or by ration i.e dry sow, starter finisher etc**
- **Pigs marketed (sows, boars, market or breeding stock)**
- **Pigs added (breeding stock from outside the herd)**

- **Market Information**

- **Age at marketing of at least a sample number of pigs and their weight**
- **Carcass indices of pigs marketed.**

**The data above can used to compute the following parameters:**

- **Average litter size born and weight**
- **Average litter size weaned and weight**
- **Percentage of pigs born dead**
- **Percentage death loss in any category**
- **Repeat breeding as a percentage of the total breeding**
- **Feed conversion ratio (fcr), - Average daily gain (adg)**
- **Average market index**

**NB:**

- **The above indicators tell how well the production programme is managed.**
- **The secret to the success of any record keeping system is not the particular design of the system but rather regular manner in which the records are kept.**

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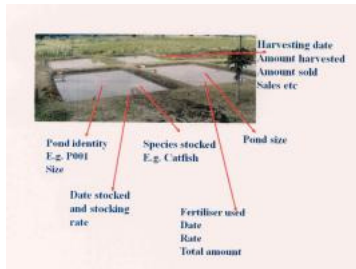
### **Record keeping for Fish Farming/ aquaculture**

**The main drawback on the economic operation of aquaculture investment in Kenya is lack of deliberately kept economic records of production operations. Investors who operate without records are likely to make wrong decisions. The best sources of information needed to advice on proper running of aquaculture investments are farm records.**

**Good records will, for example;**

- **Be useful in projection of expected production**
- **Be useful in determining the amount of inputs requirements for specific ponds at various stages of production**
- **Be useful determine the expected harvesting time**

- **Determine the financial health of the enterprise**



**Important record parameters in aquaculture include:**

- **Total area under culture**
- **Individual pond identity**
- **Individual pond treatments**
- **Stocking densities and time of stocking**
- **Species stocked**
- **Kinds, quantities and cost of inputs used**
- **Pond productions in amounts and values**
- **Other productions and values**
- **Daily occurrences**

**Record parameters in aquaculture**

© Mbugua Mwangi, Kenya

- **Specific pond production (Quantity and values) by species**
- **Costs of acquisition of inputs**
- **Cost incurred in new constructions or repairs**
- **Salaries (both in cash and in kind)**

**Aquaculture records can be classified into:**

- **Daily records kept for input usage like feeds, fertilisers, labour and daily occurrence**
- **Occasional record which are kept for events that do not happen on daily basis. Such records would include:**

**How much and how comprehensive kept records are, is dependent on:**

- **Level of investment; Complex investments require complex records**
- **Motivation of investor; Serious investors will have more comprehensive records**
- **Level of aquaculture management: Intensive operations will have more complex records as compared to semi intensive operations**
- **Skills of the investor (or manager); Well trained managers will keep better records**

**As the management levels rises, culture systems become more complex and so is the record keeping. This is the reason the farmer must think very carefully of what he needs to record.**

#### **Examples of aquaculture records**

- **Fish farming biological management records**
- **Financial management records**
  - **Purchase of inputs**
  - **Salary records**
  - **Inventory of equipment**
  - **Records on payment of rents and hire of equipment, machinery, services etc**
- **Occurrence book**

**It is very important for individual farmers to clearly know what they need record and the intended use of this. This will assist them in preparing the most effective way of capturing the needed information.**

**Examples of aquaculture records would include (but not limited to) the following:**

#### **Pond management records**

<b>Pond identity</b>	.	.	.	.	.	.
<b>Date</b>	<b>Type of input</b>	<b>Rage of usage</b>	<b>Total usage</b>	<b>Unit cost</b>	<b>Total cost</b>	<b>Remarks</b>

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### Stocking records

Date	Pond identity	Size (m2)	Species	Source	Stocking rate	Average Weight	Total number /weight	Unit cost	Total cost
.	.	.	.	.	.	.	.	.	.
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### Harvesting records

Pond No.	Date	.	.	Amount sold	.	.	Amount consumed on farm	.	Amount given away	.	Payme in kind
.	.	.	.	.	.	.	.	.	.	.	.

		Species harvested	Quantity harvested Kg	Quantity Kg	Unit Price Ksh/Kg	Total value Kshs	Quantity Kg	Value Kshs	Quantity Kg	Value Kshs	Quantity Kg
.	.	.	.	.	.	.	.	.	.	.	.
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### Cash flow records

Cash inflow				Cash outflow			
Date	Source	Amount	Comments	Date	Source	Amount	Comments
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.

### Other records could include

- Salary records
- Inventory of equipment
- Records on payment of rents and hire of equipment, machinery, services etc



- **Pond sampling records**

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### Record keeping for Chicken production

Management of poultry requires detailed records on a daily or weekly basis. It is important to spend some time each day observing your flock carefully. In this way early signs of disease, malnutrition, or other problems may be detected and the necessary action taken.

Table: Record keeping for small-scale chicken production

Month \_\_\_\_\_  
 No. Cocks \_\_\_\_\_  
 No. of hens \_\_\_\_\_

Date	Age(wks)	No. birds	Mortality	Feed	consumed Eggs	Sales	Remarks
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.

### Materials and feed

Records should be kept on all poultry noting their approximate age or time of hatching. Most hens under good management will start laying at 22-32 weeks of age. Keep records such as age

**at first egg and production over time. If egg production is delayed or drops suddenly check for housing condition, access to feed, water etc. However, when egg production drops gradually, it may be a sign of old age. Sell the older hens in the flock and replace them with young hens. If your costs for feed exceed the income from selling cocks and/or eggs, you may also consider selling birds, or reducing the amount of feed given.**

**All expenditures for feed or feed ingredients should be recorded carefully, noting quantities, price and date of purchase. If purchasing commercial feeds note the name of the seller/manufacturer and the time of purchase to keep track of poor quality feeds. Keep records of disease control activities such as type, price and date of vaccines and medication purchases.**

**Supplementary feed consumed on a daily or weekly basis should be noted for each flock housed separately. Sudden changes in feed intake may be the first indicators of poor health. Income from sale of eggs, cockerels or chickens should also be recorded. Gifts and consumption of eggs and birds by house hold members and others should also be noted.**

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## **Record keeping for Camel production**

### **Why keep records**

- By keeping records, a camel keeper can monitor the camel herd in terms of trends which are occurring. This is important for planning.**
- Records provide information which can be used to make decisions on future management of the herd in terms of when to breed, which camels to keep and which ones to sell, when to market and the quantities of products and income which may be expected, among other information**

- **Records help the camel keeper in doing economic analysis in order to assess the profitability of the camel rearing enterprise.**

**Some worth keeping records, suggested recording interval and importance of the records**

<b>Type of records</b>	<b>Recording Interval</b>	<b>Why keep these particular records</b>	<b>Useful tools for record keeping</b>
<b>Herd size</b>	<b>At the end of every calving season</b>	<b>To know whether the herd is growing or not</b>	
<b>Live weight estimation</b>	<b>Every two months</b>	<ul style="list-style-type: none"> <li>• To know the growth performance of calves and decide on feeding regimes including milk allowance, know when the camel is likely to be ready for breeding etc</li> <li>• To estimate the sale value</li> </ul>	<b>Cloth tape measure (in metres)</b>
<b>Milk yield of individual camels</b>	<b>Every two weeks</b>	<b>For selection and breeding, deciding on which camels to keep and which to cull</b>	<b>Milk measuring jug (plastic)</b>
<b>Reproductive performance of individual</b>	<b>During</b>	<b>For selection and</b>	<b>Record</b>

<b>camels (bull and females) including: number of females served, number conceived, cases of heat repeat, cases of abortion, incidences of difficult birth, cases of deformities</b>	<b>breeding seasons</b>	<b>breeding, deciding on which camels to keep and which to cull</b>	<b>sheets Writing materials</b>
<b>Mortality rates, main causes and the seasonality</b>	<b>As they occur</b>	<b>Plan the health management in terms of drugs that may be required and when</b>	
<b>Economic data including cost of labor (hired or family), drugs, mineral supplements, water fees, money value of camels which may die, equipments, materials, value of products consumed at home, income from milk sales, live camels, meat &amp; hides</b>	<b>Monthly</b>	<b>Assess profitability of the enterprise</b>	

### Samples of data collection sheets

#### Milk production data

	<b>Milk yield (cups of known volume/litres)</b>											
<b>Camel name/brand</b>	<b>Week 1</b>	<b>Week 2</b>	<b>Week 3</b>	<b>Week 4</b>	<b>Week 5</b>	<b>Week 6</b>	<b>Week 7</b>	<b>Week 8</b>	<b>Week 9</b>	<b>Week 10</b>	<b>Week 11</b>	<b>Week 12</b>

number												
1		X	X	X	X	X	X	X	X	X	X	X
2		X	X	X	X	X	X	X	X	X	X	X
3		X	X	X	X	X	X	X	X	X	X	X
4		X	X	X	X	X	X	X	X	X	X	X
5		X	X	X	X	X	X	X	X	X	X	X
6		X	X	X	X	X	X	X	X	X	X	X
7		X	X	X	X	X	X	X	X	X	X	X
8		X	X	X	X	X	X	X	X	X	X	X
9		X	X	X	X	X	X	X	X	X	X	X
10		X	X	X	X	X	X	X	X	X	X	X
11		X	X	X	X	X	X	X	X	X	X	X
12		X	X	X	X	X	X	X	X	X	X	X
13		X	X	X	X	X	X	X	X	X	X	X

**Live weight data**

	Live weight (kg)							
Camel name/brand number	Period 1	Period 1	Period 1	Period 1	Period 2	Period 2	Period 2	Period 2
	Heart	Abdominal	Shoulder	Heart girth**	Heart	Abdominal	Shoulder	Heart

	girth (m)	girth (m)	height (m)	Abdominal girth**Shoulder height***50 is a constant factor****	girth* (m)	girth** (m)	height*** (m)	girth*Abdo girth**Sho height***50 constant factor****
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								

**Reproductive performance data**

	Reproductive parameters							
Months	Number of dams ready	Number of	Number of dams	Number of	Number of	Number of	Cases of	Calves born with

	for service	dams served	conceived	females that do not conceive	abortions	calves born alive	difficult birth	deformities
January								
February								
March								
April								
May								
June								
July								
August								
September								
October								
November								
December								

**Economic data**

	Cost (KES)									
Cost items	Months 1	Months 2	Months 3	Months 4	Months 5	Months 6	Months 7	Months 8	Months 9	Months 10

<b>Family labor</b>										
<b>Hired labor</b>										
<b>Drugs</b>										
<b>Mineral supplements</b>										
<b>Water fees</b>										
<b>Equipment &amp; material</b>										
<b>Money value of dead camels</b>										
<b>Value of products consumed at home</b>										
<b>TOTAL</b>										
	<b>Income Items (KES)</b>									
<b>Income from milk sales</b>										
<b>Live camel &amp; or meat sales</b>										



Hide sales										
<b>TOTAL</b>										

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## Record keeping for disease management

Some important records for planned disease control include the following:

### 1. Calf management and disease control records sheet

Calf identification Number			Sire Number		.
Date of birth			Dam Number		
sex					
	Kg	Date	Remarks	date	
Birth weight			1st insemination		
Weaning weight			2nd insemination		
Age and breeding weight			Date due to calf		
Average pre weaning growth rate (grams)			Bull used		
Average post weaning growth rate (grams)					
Body condition score			Vaccinations		

### 2. Cow cards for planned fertility management

Cow No.				
Last calving date	Date of vet examination	Examination remarks e.g. pregnancy diagnosis	Service date	Expected calving date

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**3. Disease occurrence and treatment record sheet**

Date	Animal no.	Kind of disease	treatment	Remarks
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**4. Mastitis management and treatment record sheet**

Farm code				1st treatment		2nd Treatment		3rd treatment		4th treatment		
Cow	Quarter	Sample	Remarks	date		date		date		date		Sample

no.												results
				am	pm	am	pm	am	pm	am	pm	
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### 5. Vaccination records for planned disease control

Date	Vaccination done	Type of vaccine and quantity	Remarks
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**6. Deworming records for planned disease control**

Date	Deworming done	Type of drug and quantity	Remarks
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**Introduction**

Geese are part of the duck family but are much bigger than ducks and, unlike ducks, they feed entirely on grass and other herbage and spend very little time in water. When they do swim, they do not dive.

The flesh of a goose is delicious but is a dark meat and contains a high % of fat, making it very rich. A goose can live in excess of 20 years, so if looked after and managed properly, it is an easy domestic animal to keep and can be a cheap and productive asset. They have a reputation for being very good askaris, and some farmers keep them penned with livestock at night as they make a lot of noise if they are disturbed and can be intimidating if they attack as a flock.

**Origins**

Geese were one of the first animals to be domesticated, probably in Egypt about 3000 years ago (Buckland and Guy, 2002). They are found in most parts of the world, and can adapt to both hot and cold climates- as long as adequate shelter, especially shade, is provided. However,

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**commercial production of geese is currently important in only a few countries in Europe and Asia.**

**Geese belong to the family Anatidae, and were one of the first domesticated animals. The name "Goose" itself has its origins as one of the oldest words of the Indo-European languages - the proto-Indo-European root, ghas, from which the Sanskrit, Latin, Greek, Germanic, Norse, English, Irish and Russian names for the goose are derived.**

**A majority of wild geese of Europe, Asia and North America are migratory. There are two main types of domestic geese, derived from the wild Greylag goose (*Anser anser*) in Europe, and from the wild Swan goose (*Anser cygnoides*) in Asia. The FAO's Animal Genetic Resources database (AnGR) identifies 204 different breeds or varieties of geese. Many of these are thought to have little economic importance because of their relatively low production or performance levels, or a limited geographic distribution.**

**Domestic geese come in a wide range of colours, sizes and shapes. In general, domestic breeds are much larger than their wild ancestors although they have in many cases retained their ability to fly. There are two main types of domestic geese. The first are thought to have their origins in Europe, descendants of the wild Greylag goose (*Anser anser*) and the second are thought to have their origins in Asia, descendants of the wild Swan goose (*Anser cygnoides*). Crosses between the domestic breeds which have originated from these two species of wild geese are fertile and in fact have resulted in a number of recognized breeds.**

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### **Breeds of geese**

**There are two main types of domestic geese, derived from the wild Greylag goose (*Anser anser*) in Europe, and from the wild Swan goose (*Anser cygnoides*) in Asia. The FAO's Animal Genetic**

**Resources database (AnGR) identifies 204 different breeds or varieties of geese. Many of these are thought to have little economic importance because of their relatively low production or performance levels, or a limited geographic distribution.**

#### **CZECHOSLOVAKIAN WHITE (*Anser anser*)**

**This goose is a white goose with orange shanks and an orange beak. It is also known as the Bohemian goose. It has a relatively small body size, with the males weighing 5.0 kg and the females 4.0 kg but its egg production, averaging 45 eggs with an egg weight of 140 g, is fairly good for *Anser anser* type geese. This means it can be useful as a female line in the production of a crossbred commercial goose.**

#### **EMBDEN (*Anser anser*)**

**The Embden is a white goose with relatively tight feathering, an erect stand, orange shanks and an orange beak. Most strains of Embden can be sexed on the down colour of the goslings, as males are a lighter grey than females. This difference is evident until the goslings are two to three weeks of age. The breed has been relatively popular for many years in both Europe and North America. It is one of the larger breeds with males weighing up to 10.0 kg and females up to 9.0 kg. It has a moderate egg production producing 40 eggs per year with an egg size of 170 g. The Embden is suitable for heavy type meat production but is probably of more value when used as a male line in the production of a crossbred commercial goose.**

#### **KUBAN (*Anser cygnoides*)**

**This breed was developed at the Kuban Agricultural Institute (southern Russia) by crossing Gorki and Chinese geese. The feather colour is brown which results in relatively dark pin-feathers and thus an unattractive carcass. These birds have orange shanks while their beaks and knobs are black to dark green. The adult body weight for the male is 5.2 kg and 4.8 kg for the female. The advantage of this breed is that they have a relatively high egg production of**

between 50-60 eggs with an average egg weight of 150 g. This makes the Kuban suitable for use as a female line in a crossbreeding programme provided it is used in such a way that the resulting commercial crossbreeds are essentially white and that the poor body conformation associated with the Kuban can be overcome.

#### **LANDES (*Anser anser*)**

Both the males and females of this breed are grey and their shanks and beaks are orange to yellow. This breed originated in France but has been widely used in a number of other countries, notably Hungary, for the production of fatty livers (Foie Gras). Today there are a number of lines of the Landes that have been selected for their ability to produce fatty livers. They originate from the grey Toulouse geese, but today their feather phenotype is similar to the wild Greylag goose although they are much larger in body size. The adult body weight of the male is 6.0 kg while that of the female is 5.0 kg. The annual egg production is 40 eggs per female per year with an egg weight of 170 g.

#### **POMERANIAN (*Anser anser*)**

Pomeranian geese originated from the north-western part of Poland but they are also present in northeastern Germany and the south of Sweden. They come in three colours: white, grey or white and grey. In all cases, they have orange shanks and beaks. The Pomeranian has been described as a solidly built goose with the adult body weight of the male being 6.0 kg and that of the female being 5.0 kg. The average egg production is 40 eggs per female with an average weight of 170 g.

#### **WHITE ITALIAN (*Anser anser*)**

The White Italian is a very popular breed in Europe and one often finds reference to it in the formation of local stocks. It is also a breed that has been well researched. The White Italians reported on in this publication are those kept at the Koluda Wielka Experimental Station in



**Poland where they have been under genetic selection since the 1960s and where separate male and female lines have been developed.**

**Goslings of both lines can be sexed during the first ten days of life on down colour, as males are lighter in colour than females. As the name indicates, the adult plumage is white while the shanks and beaks are orange. In the male line, the average body weight of males is 7.0 kg and of females is 6.5 kg, while in the female line the average is 6.5 kg for the males and 6.2 kg for the females. Annual egg production for the male line is 55-65 eggs while for the female line it is 60-70 eggs and egg weight for both is 160-180 g. The White Italian, at least for these strains, has the highest egg production of any of the Anser anser type breeds. Thus these lines can be used directly as male and female lines respectively to produce two-way commercial crosses or the female line can be used to produce a crossbred female parent line. The White Italian and, particularly, these lines are therefore one of the breeds of choice for anyone wanting to produce geese for meat production.**

**For more information on goose production see the publication by Buckland and Guy, which includes sections on reproduction, breeding, flock management, housing, meat production, killing and processing. This publication also includes papers on goose production in South America, Indonesia, and Poland and Eastern Europe. References and Further Reading Buckland, R. and Guy, G. (2002). Goose Production. FAO Animal Production and Health Paper 154. FAO, Rome. FAO's DAD-IS: Information system for the Global Strategy**

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### **Goose diseases**

**In this chapter the most common goose diseases are listed, described, and the appropriate treatments/prevention proposed. A well-managed production system which includes cleanliness, know-how, and disease prophylactic practices can greatly reduce the incidence of many diseases.**

**Recomendations for the control and prevention of disease**

- **Examine the geese before buying them. Buy geese only from a reliable breeder**
- **Before the arrival of new geese, make sure that there is adequate good quality feed and water**
- **Keep feed troughs and drinkers clean**
- **Provide a stress-free environment for the geese (away from noise and other disturbing elements)**
- **Do not add birds from an outside source to your own flock; if you must have additional geese, it is better to establish a second flock**
- **Keep breeders away from growing geese**
- **The younger the geese, the more susceptible they are to diseases so never mix geese of different ages**
- **Give timely vaccines and medications. Always use the correct vaccine or medication at the recommended dose**
- **When inspecting the geese, always go from the youngest to the oldest**
- **Isolate any sick geese immediately. Removing sick geese from a flock reduces the number of infectious organisms available to pen mates**
- **Safely destroy dead geese immediately by either incinerating or burying them. Get an early diagnostic report by sending sample carcasses to a veterinary laboratory for a diagnosis of the cause of death**
- **When selling geese, do not allow a buyer to bring unclean crates and/or boxes onto the farm for transporting the geese**
- **Thoroughly clean and disinfect the building and equipment between flocks of geese. This may not render the building sterile but it can reduce the number of infectious organisms to such a low level that they cannot initiate a flock infection**
- **As much as possible, keep wild birds out of your pens**
- **Maintain complete records at all times**

**In the following pages a list of goose diseases classified alphabetically is provided. An alternative classification could be according to infectious agent i.e. bacteria, fungi, protozoa or viruses.**

### **ASPERGILLOSIS**

**Aspergillosis is a condition caused by a member of the fungal genus Aspergillus. In the goose, as in most other classes of poultry, the organs most affected are the lungs, hence the term Pulmonary Aspergillosis. The disease can be quite severe in young goslings as they may become infected during hatching and even embryos may become infected. The source of infection can be either dirty incubator equipment and/or dirty eggs. Dirty eggs can contaminate both the setter and hatcher. In addition, it is possible for Aspergillus to penetrate the egg which is how embryos can become infected. Young growing goslings are also susceptible to Aspergillosis but usually not as severely although they can be infected from contaminated litter. Symptoms.**

**The symptoms are difficult and accelerated breathing (gaspings) with rattling or gurgling noises. The birds might be very depressed and mortality can be high. Nervous symptoms may appear in a small percentage of the birds and can be accompanied by increased thirst and diarrhoea.**

**Prevention/Treatment.**

**The first step is to clean the hatching facilities, organize a good sanitation programme and ensure that all hatching eggs are cleaned and fumigated as soon as possible after laying. Mouldy feed and litter must be removed and destroyed and the building cleaned and disinfected with 1:2000 copper sulphate. The treatment of Aspergillosis is not always effective. Nystatin and Amphotericin-B have proven to be the most effective medications for geese. If these are not available, a recommended low cost treatment consists of 5 percent potassium iodine in the drinking water for three days, followed by two days of no treatment and then a second treatment for three days.**

## **CHLAMYDIOSIS**

**Chlamydiosis is a general term which refers to infections caused by a bacterium of the genus Chlamydothila. In birds, the disease is caused by Chlamydothila psittaci and, although reported in geese, is very rare. It is however a disease of public health significance in that it is transmissible to other animals as well as to humans.**

### **Symptoms.**

**The disease has been reported to affect a wide range of organs with symptoms including mild respiratory difficulties, conjunctivitis, inflammation of the sinuses, rhinitis, diarrhoea and atrophy of the breast muscle.**

### **Prevention/Treatment.**

**The antibiotics of choice to treat this disease are the tetracyclines. In some cases salmonellosis may be a complicating factor and it may be necessary to use a combination of antibiotics.**

## **COCCIDIOSIS**

**Geese can get two distinct types of coccidiosis. The most prevalent form is renal coccidiosis caused by *Eimeria truncata*. While intestinal coccidiosis is less prevalent, it is caused primarily by *Eimeria anseris*. At least five additional species of Eimeria have been isolated from the intestine of the goose. The level of infection and degree of economic loss associated with coccidiosis in the goose is generally low and it is not regarded as a major problem.**

### **Symptoms.**

**Renal coccidiosis can affect geese from 3-12 weeks of age, although the younger birds are much more susceptible. In an exceptional acute form, renal coccidiosis can result in mortality as high as 80 percent. Other indicators of the disease include depression, weakness, diarrhoea, whiteish faeces, anorexia, dull, sunken eyes and drooped wings. Diagnosis of renal coccidiosis can be confirmed by locating the distinctive oocysts in the kidneys and in the cloaca near the**

**urethras. Birds quickly develop immunity to re-infection by *Eimeria truncata*. Intestinal coccidiosis also mostly affects young birds but does not always result in mortality. Rather, the infection produces anorexia, a tottering gait, debility, diarrhoea and morbidity. The small intestine becomes enlarged and filled with reddish brown fluid. Lesions are primarily in the middle and lower portion of the small intestine.**

#### **Prevention/Treatment.**

**Various sulphonamide drugs and coccidiostats have been used in the treatment of renal and intestinal coccidiosis of geese. If the geese are to be fed rations which were formulated for other types of poultry, it should be noted that in spite of popular belief to the contrary, waterfowl can be fed rations containing most of the coccidiostats used for chickens.**

### **CRYPTOSPORIDIOSIS**

**This is a protozoan disease caused by parasites of the genus *Cryptosporidium* which infects both the lungs and intestine of geese. It is found worldwide wherever commercial poultry are raised and, as poultry health specialists develop appropriate tools to identify it, it is expected that more cases will be reported. This probably explains why reports from the goose industry are that its incidence seems to be on the increase.**

#### **Symptoms.**

**One form of *Cryptosporidiosis* infects the respiratory tract and the symptoms include depression, sneezing and respiratory distress with moderate mortality. The other form infects the digestive tract and the symptoms include diarrhoea and, if the geese are young, can result in a relatively high mortality rate. Because a number of diseases can produce the same symptoms, fluids obtained from respiratory tract and the faeces should be examined for cysts.**

#### **Prevention/Treatment.**

**There are no effective drugs for the prevention or treatment of *Cryptosporidium*. There is evidence that once infected birds recover, they are immune, but to date no vaccine has been developed. Good sanitation is recommended as a preventative measure, together with steam**

**cleaning of infected premises. The oocysts of *Cryptosporidium* are extremely hardy.**

### **DERZY'S DISEASE**

**Derzy's disease is a viral disease also known as Parvovirus disease because of the causative agent. Other names include Goose Plague, Goose Hepatitis, Goose Enteritis, Goose Influenza, Infectious Myocarditis and Ascetic Hepatonephritis. It is a highly contagious disease that affects young geese. The disease has been reported to exist in any part of the world where geese or Muscovy ducks are raised since they are also susceptible to it and can transmit the disease to geese. In its acute form, the disease can result in up to 100 percent mortality rate or it can occur in a more chronic form. If birds are infected during the first week of age, very high losses can occur but if the goslings are 4-5 weeks old or older the mortality rate will be negligible.**

#### **Symptoms.**

**For goslings under one week of age the clinical signs are morbidity (anorexia and prostration) and mortality, with deaths occurring in 2-5 days. Older birds, depending on their level of maternal immunity, will exhibit anorexia, polydipsia, weakness with a reluctance to move, nasal and ocular discharge, swollen and red uropygial glands and eyelids and a profuse white diarrhoea.**

#### **Prevention/Treatment.**

**There is no treatment for Derzy's infection. Adult breeding geese that have been naturally infected with the parvovirus become immune and transfer this passive immunity to their progeny. This passive immunity will persist in the newly hatched goslings for 2-3 weeks. It is the phenomena of passive immunity being transmitted to the offspring that has led to the development of a recommended vaccination programme. In its simplest form, all goslings should be vaccinated at about two weeks of age. This assumes that the goslings' parent flock had been vaccinated which would mean that the goslings' natural passive immunity would protect them until 2-3 weeks of age.**

**For birds not designated to be breeders, this single vaccination is sufficient. Birds designated**

to be breeders should be vaccinated again three weeks before the beginning of lay and three weeks before the beginning of each subsequent lay. In addition, some practitioners recommend a booster vaccination at peak egg production. If the parent flock had not been vaccinated which would mean that no passive immunity was passed on to the goslings, the recommendation would be to give serum to the goslings on day one and on day ten to give them passive immunity and to then vaccinate them on day 21.

### **DUCK VIRUS ENTERITIS**

Duck Virus Enteritis (DVE) is an acute, contagious disease caused by a herpes virus that can infect ducks, geese and swans although the incidence of the disease in geese is very low. DVE can be transmitted directly, by contact between infected and susceptible birds, or indirectly, by contact with a contaminated environment. Birds that have recovered from DVE are immune to re-infection by the DVE herpes virus. It should be noted that in Australia a herpes virus has been isolated from a flock of infected geese (with a mortality rate of 97 percent) which was antigenically distinct from the duck viral enteritis herpes virus.

#### **Symptoms.**

The symptoms depend on the age and sex of the geese, the stage of infection and the virulence and intensity of the virus exposure. Lesions of DVE are associated with vascular damage (tissue haemorrhages and free blood in the body cavities), vascular eruptions at various locations on the mucosa surface of the gastrointestinal tract, as well as lesions of lymphoid and other tissues.

#### **Prevention/Treatment.**

There is no treatment for DVE but vaccines that are effective have been developed.

### **ERYSIPELAS**

Erysipelas is generally an acute, sudden infection of individual geese within the flock. In both young and adult birds it is caused by the bacterium *Erysipelothrix rhusiopathiae*. Outbreaks of

this disease which are economically significant are uncommon in avian species, with the exception of turkeys, but some cases have been reported for geese.

*Erysipelothrix rhusiopathiae* is somewhat unique in that it can infect over 50 animal species and can also infect humans. In the latter case, the infection usually enters through scratches or uncture wounds and is considered a safety issue for people working with infected animals. Human infections can be treated with antibiotics.

#### Symptoms.

Infected geese will appear depressed, have diarrhoea and die suddenly. Lesions are suggestive of generalised septicaemia.

#### Treatment.

The antibiotics of choice are rapid-acting forms of penicillin that can be administrated together with an erysipelas bacterin. Since the presence of the disease in geese is sporadic, routine immunisation is not generally recommended. However, in areas where the disease is prevalent, and particularly for breeder flocks, vaccination is recommended. Birds that have recovered from acute infections have a high degree of resistance to re-infection.

## FLUKES

Flukes (trematodes) are flat, leaf-like parasitic organisms. Over 500 species belonging to 125 genera and 27 families are known to occur in birds. Generally, flukes are not a problem for geese, however, geese with access to natural lake or pond water may become infected. This is because most flukes have an aquatic snail (genus *Limnaea*) as an intermediate host. The dragon fly (genus *Odonata*) is the second intermediate host in many cases.

#### Symptoms.

Flukes may invade almost every cavity and all tissue of birds and can show up unexpectedly at a post-mortem. One species of fluke known as the oviduct fluke (*Prosthogonimus ovatus*), can infect the oviduct which results in flukes appearing in the geese's eggs.

#### Prevention/Treatment.



**The only practical solution is to remove the birds from the source of infection. This can be done if the intermediate host(s) is/are known.**

**A sample life cycle of flukes (Source: Guy, 1996)**

- (1) Infected geese excrete fluke eggs in their dropping.**
- (2) When the conditions are favourable, the eggs hatch, producing a primary larvae.**
- (3) The larvae mature in an intermediate host (a snail of genus Limnaea).**
- (4) The intermediate host lays the mature larvae on grass.**
- (5) After ingesting the larvae by grassing, the geese become re-infected.**

### **FOWL CHOLERA**

**Fowl Cholera, also known as Pasteurellosis, is a contagious disease affecting all domestic and wild birds. Pasteurella multocida is the causative agent, to which geese are highly susceptible and mortality can be high.**

#### **Symptoms.**

**Fowl Cholera usually appears as a septicaemic disease, associated with high morbidity and mortality. Perhaps the most characteristic aspect of the acute form is the sudden death of birds with the symptoms appearing only a few hours before death. The chronic form, which can follow the acute form, normally shows as localised infections. The lesions associated with this disease can take several forms, but in most cases the heart, pericardium and air sacs are damaged.**

#### **Prevention/Treatment.**

**Fowl Cholera is not a disease of the hatchery nor is it one transmitted through the egg. Rather, infection occurs when the geese are on the farm. The first step in the control of Fowl Cholera is therefore good sanitary management practices and keeping the geese separate from other birds. In areas where Fowl Cholera is present either in geese or other species of birds, vaccination of all birds is recommended. In the case of an outbreak, it is possible to treat the birds to stop the spread of the disease, but this must be done quickly.**

## **LEUCOCYTOZOONOSIS**

**This is a parasitic disease of birds which affects the blood cells (especially the white blood cells) and the tissues of various internal organs (parasite multiplication occurs in the macrophages of brain, liver, heart, lungs, and spleen). It is a very uncommon disease in geese but outbreaks of economic significance have been reported. Leucocytozoon simondi is the causative agent in waterfowl and has been reported in 27 species of ducks and geese in North America, Europe and Vietnam.**

### **Symptoms.**

**Leucocytozoon infections are diagnosed by direct microscopic observation and by identification of either the gametocytes (sexual stage of the parasite) in stained blood samples or of the schizonts (stage of massive multiplication) in tissue sections.**

### **Prevention/Treatment**

**Treatment of leucocytozoonosis with drugs has, in general, limited success and no effective treatment has been found for Leucocytozoon simondi. Control methods require the elimination of the insect carriers that include various species of diptera (simuliid flies and culicoid midges) that live near streams.**

## **LISTERIOSIS**

**Listeriosis is not a common disease of geese but some instances have been reported in temperate areas of the world. This is probably due to the fact that, in temperate climates, Listeria monocytogenus (the causative agent) is found in both faeces and soil. Also, it is in these areas that many geese are kept on pasture and therefore are exposed to the organism.**

### **Symptoms.**

**The symptoms are septicaemia with necrotic areas in the liver and heart. Encephalitis has been reported in young geese. Infected birds appear emaciated with diarrhoea.**

### **Prevention/Treatment.**

**Prevention depends on eliminating the source of infection. As the organism is resistant to most commonly used antibiotics, high levels of tetracyclines are usually recommended for treatment.**

### **MYCOPLASMA INFECTIONS**

**Mycoplasma infections, also known as Pleuro-Pneumonia. Like Organisms or PPLO, can cause relatively serious problems in geese. These organisms have an intermediary structure between that of bacteria and viruses. At least three species of Mycoplasma (Mycoplasma anseris, Mycoplasma claucaale and Strain 1220) have been isolated in geese. In recent years the prevalence of Mycoplasma infections in geese in a number of areas appears to have increased. This is most notable when birds are managed under intensive conditions.**

#### **Symptoms.**

**The main problem of Mycoplasma infections is that in breeder flocks it results in reduced egg production and lower fertility. There is necrosis of the phallus (Venereal Disease) which can cause a severe drop in fertility. In young goslings Mycoplasma infection results in reduced growth, and respiratory and air sac infections. For young geese the common source of Mycoplasma infection is from the hatching egg.**

#### **Prevention/Treatment.**

**The most important aspect of a Mycoplasma control programme is to ensure that the grandparent and parent stocks are Mycoplasma-free so that goslings from these flocks are not infected. Treatment of eggs from an infected flock is achieved by dipping the eggs in a tylosin solution before the eggs are incubated. Infected goslings can be treated by adding either tetracycline or tylosin to their drinking water.**

### **MYCOSIS OF THE DIGESTIVE TRACT**

**Mycosis of the digestive tract, caused by Candida albicans, can occur frequently in some classes of poultry but not in geese. An exception is force-fed birds, where inflammation of the oesophagus may be caused by the insertion of the corn dispenser. This inflammation can then**

provide a port of entry for *Candida albicans*.

#### Symptoms.

The symptoms are not particularly characteristic but infected birds show unsatisfactory growth, are stunted, listless and have ruffled feathers. Lesions occur most frequently in the crop and are characterised by a whitish deposit.

#### Prevention/Treatment.

Since unhygienic and overcrowded conditions are conducive to *Candida albicans* infections, the first step is to eliminate these. The addition of copper sulphate to the drinking water has had variable results in treating chickens and geese. Sodium bicarbonate in the drinking water increases the pH in the crop and creates an unfavourable condition for the organism as it likes an acid environment. Addition of either Nystatin or Amphotericin to the feed has been reported to be effective.

### MYCOTOXICOSES

Mycotoxicoses is a disease caused by exposure to mycotoxins, and the most prevalent source of mycotoxin contamination for geese is mouldy feedstuffs. Diagnosis of Mycotoxicoses can be very complex since hundreds of mycotoxins have been identified. However, knowing what the geese are being fed, the source, the symptoms the geese are exhibiting and whether or not other livestock or poultry being fed the same feedstuffs are showing similar symptoms, will allow diagnosis of the problem and identification of the source(s) of the mycotoxin. In tropical countries where aflatoxins are very common, their origin is connected with the development of genus *Aspergillus flavus* and *Aspergillus parasiticus* growing mainly on peanuts but also on soybeans, copra, rice bran and corn. According to the literature, aflatoxins may cause slow growth, a drop in egg production and feather loss for all species of waterfowl, although geese are among the less sensitive. The genus *Fusarium* produces numerous toxins injurious to geese, and these have been found in corn, sorghum, barley, sunflower seed, oats, mixed feed and brewers' grains. *Fusarium* mycotoxin production thrives in conditions of high humidity and

a temperature of 6-24°C. In temperate climates it is therefore essential that grains be harvested early before the cool-humid conditions of fall arrive as these are conducive to mycotoxin production.

#### **Symptoms.**

T-2 toxin is one of the most common *Fusarium* toxins and, depending on the level of contamination, will cause feed refusal, reduced activity, increased water consumption, reduced egg production and reduced hatch. There are reports that exposure of young geese to T-2 toxin has resulted in the geese dying within two days. Another *Fusarium* toxin to which geese are very sensitive is zearalenone which can not only result in an immediate drop in fertility but can also permanently damage the testes of the gander.

#### **Prevention/Treatment.**

Treatment is to remove the contaminated feedstuff immediately and provide the geese with fresh, uncontaminated feed. The best prevention is to ensure that all purchased feedstuffs are mycotoxinfree.

### **NECROTIC ENTERITIS**

Necrotic enteritis is caused by *Clostridium perfringens* and has been reported to occur in geese although the incidence of the disease does not appear to be high. *Clostridium perfringens* can be found in soil, faeces, dust, litter and contaminated feed.

#### **Symptoms.**

The clinical signs of Necrotic enteritis are severe depression, decreased appetite, reluctance to move, diarrhoea and ruffled feathers. Sick birds may die quickly due to enterotoxemia and necrosis of the small intestine.

#### **Prevention/Treatment.**

Prevention is the rule. Many birds have natural populations of *Clostridium perfringens* in their caeca, but rarely in the small intestine. Stress or any irritant to the digestive tract can provide the stimulus for this genus to appear and multiply in the small intestine and should be avoided.

If the disease appears, a number of antibiotics have been found to be effective which include lincomycin, bacitracin, oxytetracycline, penicillin, tylosin, virginiamycin, avoparcin and nitrovin.

### **NEPHRITIC HEMORRHAGIC ENTERITIS**

Nephritic hemorrhagic enteritis is a disease that is currently quite prevalent in the south western region of France and is often referred to simply as NEHO. It can infect geese from 4-20 weeks of age and causes mortality rates from 30-100 percent. The causes of this disease are not well understood but it seems to be primarily poor management. An excess of protein in the feed or any sudden change in the diet of the birds can also bring it on, as can poor quality drinking water and parasite infections.

#### **Symptoms.**

When suffering from this disease, geese are often unsteady on their feet, have difficulty getting up and have erratic movements. These symptoms are accompanied by diarrhoea and trembling and death usually follows shortly afterwards. The characteristic lesions are urates and haemorrhaging in the kidneys, an exaggerated sub-cutaneous swelling and the presence of intestinal parasites.

#### **Prevention/Treatment.**

The first measures to take are good management prevention practices such as controlling parasites and ensuring that the geese have a balanced ration. For outbreaks of the disease, good results can be obtained by injecting homologous serum. Also available are renal tonics and liver detoxicants, both of which can help relieve the symptoms. Due to a lack of knowledge of the disease, no vaccine has yet been developed.

### **NEWCASTLE DISEASE**

The Newcastle Disease Virus is of the genus Paramyxoviruses which has been isolated from geese. Clinical signs are the exception rather than the rule, but when present, consist of

**greenish diarrhoea and, occasionally, disorders of the central nervous system. In many cases, geese may be infected without showing any clinical symptoms, yet they can be carriers for a prolonged period. Usually geese are not vaccinated since Newcastle disease is not generally a problem for them.**

## **PARATYPHOID**

**Paratyphoid, or salmonellosis, is an important disease in geese with young birds, generally under six weeks of age, being the most susceptible. In addition, the concern regarding salmonella infection in humans and the demand for salmonella-free poultry products has increased the awareness of this disease and resulted in various monitoring programmes being undertaken in many countries. Over 2 000 types of salmonella organisms have been isolated from various species of fowl worldwide. Generally, the salmonella serotypes isolated from poultry are more characteristic of the region than the species of poultry. Paratyphoid is easily spread through contact with either infected birds, their faeces or through infected equipment, particularly that used for hatching and brooding. It now appears that salmonella is spread by salmonella entering the egg both in vivo before it is laid and by penetrating the egg after it is laid. In both cases it can multiply in the egg. For this reason, the importance of collecting eggs frequently before they get dirty, and cleaning and fumigating them as soon as possible, cannot be over emphasised.**

### **Symptoms.**

**Geese with Paratyphoid will usually be less than six weeks of age, tend to stand in one position, with their heads lowered, eyes closed, wings drooping and feathers ruffled. Sick birds will also exhibit marked anorexia, increased water consumption, watery diarrhoea, pasty vent and a tendency to huddle close to the heat.**

### **Prevention/Treatment.**

**The first step in the control of Paratyphoid is to remove all the possible sources of salmonella. This requires excellent management and sanitation of the breeders, the hatching process and**

the rearing of the goslings. The cleanliness of the hatching eggs is perhaps the most important single aspect in the control of Paratyphoid, especially the fumigation of eggs immediately after laying. Rodent control is also very important. A number of sulphonamides, antibiotics and nitrofurans have been recommended in the treatment of paratyphoid. In addition, furazolidone and injectable gentamicin and spectinomycin can be used. The final diagnosis of Paratyphoid depends on isolation and identification of the causative organism. This will help determine which drugs are best suited to treat a particular outbreak.

### **RIEMERELLA ANATIPESTIFER INFECTION**

**Riemerella anatipestifer** infection is a contagious disease affecting domestic geese, ducks and various other birds which means that infections in geese can originate from other species.

#### **Symptoms.**

The common symptoms are ocular and nasal discharges, mild coughing and sneezing, greenish diarrhoea, uncoordinated movement, tremor of the neck and head and coma. Geese that recover from the disease are resistant to subsequent infection.

#### **Prevention /Treatment.**

The sulphonamides and antibiotics as listed under Fowl Cholera for the control of *Pasteurella multocida* are usually effective against *Riemerella anatipestifer*. Vaccines have been developed but they have been used primarily with ducks although they can be expected to prevent the disease in geese as well.

### **PSEUDOTUBERCULOSIS**

**Pseudotuberculosis** caused by *Yersinia pseudotuberculosis* has been reported in a large number of avian species, including geese. It is not, however, a common disease in geese.

#### **Symptoms.**

The disease is characterised by an acute septicaemia and infected birds have difficulty



**breathing and are weak, with dull and ruffled feathers and diarrhoea. A definite diagnosis requires isolation and identification of the causative agent.**

**Prevention/Treatment.**

**Due to the low incidence of the disease, there is very little information available but chloramphenicol, streptomycin and tetracycline have been effectively used in some species.**

## **RETICULOENDOTHELIOSIS**

**Reticuloendotheliosis refers to a group of syndromes caused by the retroviruses of the REV group. The disease occurs in a wide variety of domestic poultry but is rare in geese. It is sometime called the Runting Disease because it is characterised by poor growth and abnormal feathering. In geese, viruses have been isolated from tumours of the spleen, liver, pancreas and intestines. No vaccine has been developed for this disease because the incidence and economic importance of the disease is very low.**

## **SPIROCHETOSIS**

**Spirochetosis in avian species is caused by *Borrelia anserina* and is tick-borne. Spirochetosis was first described in 1891 as a severe septicaemic disease of geese in Russia but it is now found worldwide, especially in the tropical and subtropical areas where fowl ticks (genus *Argas*) are common. However, even in these areas the incidence of the disease is low.**

**Symptoms**

**. Morbidity and mortality are highly variable, ranging from 1-2 percent up to 100 percent. Lowest rates occur when the birds have previously been exposed to *Borrelia anserina* and have developed immunity. Larval ticks or puncture haemorrhages from tick bites on the birds, or ticks in the birds' environment are indicative of the disease.**

**Prevention/Treatment.**

**In areas where Spirochetosis is prevalent, vaccination is the control method of choice. Female**

geese that have acquired immunity, either through natural exposure or through vaccination, are capable of passing on passive immunity to their offspring which will protect them for 5-6 weeks post hatching. When an outbreak occurs, the treatment of choice is usually antibiotics. *Borrelia anserina* is sensitive to most antibiotics including penicillin, chloramphenicol, kanamycin, streptomycin, tylosin and tetracyclines.

## **STAPHYLOCOCCOSIS**

All avian species are susceptible to staphylococcal infections though geese do not appear to be affected to any great degree. If and when they are infected, it is generally as a secondary infection but even this is rare. *Staphylococcus aureus* is the most common infection in birds. One of the major concerns is that staphylococcus infections can be transmitted from birds to humans. This has been observed among both slaughterhouse workers and people performing autopsies.

The most frequent sites of infection in poultry are bones, tendon sheaths and leg joints but infections may occur elsewhere.

**Prevention/Treatment.**

**Staphylococcus infections can be treated with antibiotics. Penicillin, streptomycin, tetracycline, erythromycin, novobiocin, sulphonamides, linomycin and spectinomycin have been used successfully.**

## **STREPTOCOCCOSIS**

There are a number of species of streptococcus that infect birds. However, to date, streptococcus infections in geese are very rare although *Streptococcus mutans*, a common bacterium of the human oral cavity, has been identified as a cause of septicaemia and mortality in geese.

**Symptoms.**

In its acute form, the clinical signs of Streptococcosis are related to septicaemia, depression, lethargy, diarrhoea and head tremors, although often the birds are just found dead. In the chronic form, depression, loss of weight, lameness and head tremors may be observed.

**Prevention/Treatment.**

Prevention and control require reducing stress and following proper sanitation practices. Treatment includes the use of either antibiotics such as penicillin, erythromycin, tetracycline or nitrofurans.

**NEMATODES (worms)**

The main problem with geese in EA is that they are susceptible to gizzard worms which kill them if left untreated. Gizzard worms are a very common parasite and geese should be wormed at least twice a year with 1ml Levamisole 7.5% (consult your pharmacist who will advise you of similar products available. Never use more than the recommended dose as it is easy to overdose and this may prove fatal. This treatment is not suitable for goslings 10 weeks and younger.

Alternatively, use Flubenvet which is a multipurpose wormer and covers gizzard worm. It is a powder which sticks readily to feed. The correct dose (on the pack) should be administered for 7 days. It is suitable for goslings and it is advisable to treat a hen when she starts sitting, as well as the gander.

It has been said that nematodes, or roundworms as they are commonly called, constitute the most important group of helminth parasites of poultry. With geese, *Ascaridia* are generally not a problem but various species of *Capillaria* and *Heterakis* can cause problems. The most common nematode in geese is *Amidostomum anseris*.

**Symptoms.**

The usual symptom of worm infection in geese is lethargy. The presence of eggs or worms in either the faeces or in any organ, as revealed upon autopsy, will confirm a worm infection.

**Amidostomum anseris** infects the horny lining of the gizzard and sometimes the proventriculus. It causes dark discoloration of the gizzard and a sloughing off of the lining.

#### **Prevention/Treatment.**

The first principle in controlling nematode infections is to practice good management. For geese on range, it is essential to rotate pastures 3-4 times a year and to change the pastures every year so as to break the cycle of nematode re-infection. For geese in confinement, the litter should be changed regularly and the uilding washed and disinfected with insecticide after each flock of geese. It is important not to mix young and old geese together, nor to follow old geese with young geese who are much more susceptible to nematode infections. A number of anthelmintic drugs are available to treat nematode infections. For the control of *Amidostomum anseris* in geese cambendazole, pyrantel, mebendazole and fenbendazole have each been shown to be effective.

The following nematodes have been isolated from the small intestine of the goose: *Echinura uncinata*, *Epomidiostomum uncinatum*, *Ascaridia galli*, *Capillaria anatis*, *Capillaria bursata*, *Capillaria annulata*, *Capillaria anseris*, *Capillaria caundinflata*, *Capillaria obsignata*, *Heterakis dispar*, *Heterakis gallinarum*, *Strongyloides avium* and *Trichostrongylus tenuis*. The nematode *Syngamus trachea* has been isolated from the respiratory tract of the goose.

#### **TAPEWORMS**

Over 1 400 species of cestodes or tapeworms have been noted in wild and domestic birds and for many an intermediate host has been identified. Control of the intermediate host has proven to be the best way of controlling the tapeworm. Even though geese have been reported infected with numerous species of tapeworms introduced by wild waterfowl, tapeworms are generally not a problem in goose production. This is particularly so if geese are denied access to natural waterways where they can ingest an intermediate host (most of the time a fresh water crustacean). At least four tapeworms have, however, been isolated from the intestinal lumen of geese: *Fimbriara fasciolaris*, *Hymenolepis megalops*, *Hymenolepis compressa*, *Hymenolepis*

**lanceolata.**

**Symptoms.**

**Normally geese infested with tapeworms will not perform well, but isolation and identification of the worm is required for an accurate diagnosis.**

**Prevention/Treatment.**

**As with many other poultry species, it is not easy for geese to contract a tapeworm infection because of the trend towards confinement poultry production systems. This trend has resulted in a marked decline in tapeworm infections simply because poultry species are now more separated from the intermediate host. For this reason the first step to control tapeworm infestations in geese is to separate the geese from the intermediate host by confining them or by developing an effective pasture rotation system. The geese must also be isolated from natural waterways. Using only drugs to expel the worm will have a very short-term effect if the intermediate host is not controlled. Drugs that have been effective in controlling tapeworms in chickens are butynorate, either on its own or in conjunction with piperazine and phenothiazine under the trade name Wormal. Experimentally, hexachlorophene and niclosamine have also been shown to be effective.**

### **TRICHOMONIASIS**

**This is a protozoan disease that infects mostly mature geese in breeder flocks. The causative agent in geese is *Trichomonas anseris* while for other classes of poultry it is *Trichomonas gallinae*. These organisms are transmitted from bird to bird through the water and, to a lesser degree, through the feed.**

**Symptoms.**

**The infection in geese is mainly in the lower digestive tract and the first symptoms are reduced reproductive performance and weight loss. The droppings can be monitored for the protozoan although an autopsy (with heavy infections mortality can be high) will generally not yield the protozoa as they disappear quickly.**

**Prevention/Treatment.**

If the disease has not spread throughout the flock, any sick birds that can be identified should be isolated. Nitrofurazon, metronidazole and dimetridazole are effective in treating the disease.

**VENEREAL DISEASES**

Bacteria, especially Neisseria, Mycoplasma, and Candida albicans have been associated with a venereal disease in ganders although it now seems that Mycoplasma are the primary infective agents.

**Symptoms.**

Initially, the base of the phallus becomes swollen and inflamed with the infection extending to the cloaca. Later, there is necrosis, ulceration and eventually considerable scarring, making reproduction impossible. The disease spreads throughout the flock very rapidly.

**Prevention/Treatment.**

The onset of the disease has, in some cases, been associated with a high density of ganders that has led to fighting, resulting in the phallus of some ganders being injured and becoming infected. The infection then spreads through the flock via the females. When infected, the females exhibit symptoms such as airsacculitis, peritonitis, and salpingitis. The first control measure to take is good management of the breeder flock. Because of the principle involvement of Mycoplasma, some veterinarians view the disease as a component of Mycoplasma infections rather than as a separate disease. Treatment is therefore with antibiotics effective against mycoplasma such as tylosin, tetracycline, chlortetracycline, linomycin, oxytetracycline, spectinomycin, spinomycin and tiamulin. Sensitivity tests should be conducted to select the appropriate antibiotic.

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**Information Source Links**

- **Buckland, R. and Guy, G. (2002). Goose Production. FAO Animal Production and Health Paper 154. FAO, Rome. <ftp.fao.org/docrep/fao/005/Y4359E/Y4359E00.pdf>**

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## Cattle Breeds and Breeding

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## Introduction

A breed is a race or variety related by descent and similarity in certain distinguishable characteristics. More than 250 breeds of cattle are recognized throughout the World.

*In Africa there are two main races of Cattle: **Bos indicus** (cattle with humps) including the **Boran, Sahiwal and Zebu cows** (indigenous) and the **Bos taurus** (exotic or imported breeds). The two races can cross breed, and the crosses can be very productive both in terms of growth rates for beef, improved milk production as well as disease resistance.*

Kenya is a home to a wide range of cattle genotypes. Within the East and Central Africa region, Kenya has the highest number of exotic dairy cattle. As for indigenous breeds, Kenya also ranks high with Ethiopia and Sudan topping the list of African countries with the highest population of indigenous cattle breeds.

## Crossbreeding

Some agroecological zones (AEZ's) are not suitable for pure breed high yielding milk cows, but can benefit from crossbreeding the local breeds of cattle with exotic breeds. However, this will only be useful if management practices such as improved feeding, plenty of fresh water available, and a reliable source of veterinary drugs are available. Without these conditions the survival rate of cross breeds is likely to be low.

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## The Friesian breed

The exact origins of the breed are difficult to determine but it is known that in the 18th century, herds of small black-and-white cattle were brought into northern Holland and Friesland from





**northern Jutland to replace animals that had fallen victim to disease and flooding. These animals were crossed with the existing Dutch cattle and formed the basis of the Friesian. Before the establishment of the Netherlands herd book in 1873 and the Friesland herd book in 1879, both black-pied and red-pied animals were maintained separately. The preference for black-pied cattle, particularly in the United States, led to the further segregation of red-pied animals and presently this colour variation only exists in small number in the Netherlands.**

**Production levels of this breed declined during the 1950's when excessive emphasis was placed on correct colour pattern. During the 1970's Holsteins were imported from the United States and used to improve the milk production. This resulted in larger animals with a more pronounced dairy characteristics. The mixing of these two breeds is such that now many Friesians are 25% to 75% Holstein.**

**The modern Friesian is pre-eminently a grazing animal, well able to sustain itself over much lactation, on both low lying and upland grassland, being developed by selective breeding over the last 100 years. Some outstanding examples of the breed have 12 to 15 lactations to their credit, emphasizing their inherent natural fecundity. In response to demand, protein percentages have been raised across the breed and herd protein levels of 3.4% to 3.5% are not uncommon.**

**Typical characteristics include:**

**Purpose: Milk production**

**Potential yield: 40-50 Litres milk/day**

**Average body size: Large (500-550kg)**

**Description: Black and white short haired coat, short horns**



**Advantages:**

- High milk production potential with low butter fat content of about 3.2%

**Note: Milk production will depend on level of feeding and other management**

- Suitable for zero grazing and high level management
- Frequent calving in their lifetime
- Need less replacements
- Provide valuable male calves
- Have lower cell counts
- Have higher fat and protein percent
- They are known for their versatility: they provide high quality milk and high quality lean meat

**Friesian cow with calf**

© AIC Documentation Unit,  
Kenya

**Disadvantages:**

- Heavy feeder
- Susceptible to diseases, susceptible to milk fever
- Susceptible to high temperatures
- Feed requirements high (90-110Kg fresh forage/day i.e. 3 gunny bags)
- Adequate clean water (min 60 Lts/day, more for heavy yielders)

**Friesians and their crossbreeds are predominant in Kenya particularly in Central Kenya and**

**Central Rift Valley. The farms where they can be found include:**

- 1. Manera (Delamere Estates), Naivasha**
- 2. KARI Naivasha, PO Box 25 Naivasha**
- 3. KAR Lanet, PO Box 1275, Nakuru**
- 4. Agricultural Development Corporation (ADC) Katuke Complex, PO Box 1392-30200 Kitale**
- 5. Makongi Farm, PO Box 1320-30100 Eldoret**
- 6. Kisima Farm, PO Box 19- 20107 Njoro**
- 7. Gogar Farm PO Box 6-201080 Rongai**
- 8. University of Nairobi Farm PO Box 29053-10202 Kabete**
- 9. Sanctuary Farm PO Box 244-20177 Naivasha**
- 10. Marimba Farm PO Box 32 Meru**
- 11. ADC Olngatongo PO Box 680-30200 Kitale**
- 12. Gicheha Farm, PO Box 236 Ruiru**

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### **The Ayrshire breed**

**The Ayrshire breed originated from in the county of Ayr in Scotland, prior to 1800. The breed was introduced to Kenya in 1908 from South Africa. It has been developed over the last century through inputs of bloodlines from Britain, South Africa, Sweden, New-Zealand, Canada and USA. Kenya Ayrshire cattle breeders emphasize on medium cow balanced for type, production, longer life and fertility. Ayrshire population in Kenya is estimated to be over 1.2 million of which nearly 30'000 are registered (see the list of breeding farms below).**

**Typical characteristics include:**



Airshire cow

© AIC Documentation Unit,  
Kenya

**Purpose:** Milk production. Ayrshire milk is referred as "the ideal drinking milk"; it is not excessively rich, not lacking adequate fat, and it possesses desirable quantities of proteins.

**Potential yield:** 30 Litres/day

**Average body size:** Large (average live-weight 450kg)

**Description:**

- **Body colour:** Brown and white patches in almost equal amounts with some cows tending to dark mahogany colour
- **Prominent strongly attached and balanced udders**
- **Strong loins, long stooping from hip to pin bones**
- **Good spring of ribs and deep body capacity**

#### **Advantages:**

- **High milk production potential (30 Litre/day).** The average milk yield from this breed in Kenya is roughly 3'000 Litres in 305 days with butter fat of 4.7%.
- **The cow's milk has moderate butter fat content 4.0%**
- **Fairly hardy and adaptable to varied agro-ecological zones (AEZs)**
- **They are easy calving**
- **They are relatively resistant to diseases and free of genetic diseases**
- **Better suited to range management than the Fresian breed**

#### **Disadvantages:**

- **Feed requirements high (90-110 kg fresh forage/day i.e. 3 gunny bags)**
- **Need plenty of clean water (60 Litres/day)**

#### **Farms keeping Ayrshire in Kenya (officially registered):**

1. Agricultural Development Corporation (ADC) Katuke Complex, PO Box 1392-30200 Kitale
2. Makongi Farm, PO Box 1320-30100 Eldoret
3. Kisima Farm, PO Box 19- 20107 Njoro
4. Gogar Farm PO Box 6-201080 Rongai
5. ADC Lanet Farm PO B0x 1124-20100 Nakuru
6. University of Nairobi Farm PO Box 29053-10202 Kabete
7. Moi University Farm PO Box 30900-30100 Eldoret
8. Loruk Farm PO Box 104-10400 Nanyuki
9. Waunyomu Ngeke Ranch PO Box 236-00232 Ruiru
10. Sanctuary Farm PO Box 244-20177 Naivasha
11. Marimba Farm PO Box 32 Meru
12. KARI OI Joro Orok Private Bag 20302 OI Joro Orok
13. ADC Oingatongo PO Box 680-30200 Kitale
14. Sunset Farm PO Box 13366-20100 Nakuru
15. Limuru Agricultural Youth Centre PO Box 30496 Nairobi
16. Chemusian Farm PO Box 86-20107 Menengai

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### **The Guernsey breed**

The Guernsey originated on the small Isle of Guernsey, situated in the English Channel just off the coast of France. There is no concrete evidence as to the development of the Guernsey before the 19th Century but there may be some truth in the theory that the Isigny cattle of Normandy and the Froment du Léon breed from Brittany were ancestral relatives of the modern Guernsey.

**Purpose: Milk production. Heifers generally come into milk at about two years of age.**



Guernsey cow exhibited at 2009 Kenya Livestock Breeders Show

© J.O.Ouda, KARI, Kenya

the visual impression of a plain animal bred for utility rather than good looks.

4. They have an attractive carriage with a graceful walk, a strong back, broad loin, wide rump and deep barrel, strong, attached udder extending well forward, with the quarters evenly balanced and symmetrical.

5. The Guernsey bull has an attractive individuality, revealing ample vigour and masculinity. It has smooth-blending shoulders showing good refinement, strength and even contour.



**Advantages:** 1. High milk production potential (25 Lt/day).

2. Milk has moderate butter fat content 4.3%.

3. Feed requirements: Moderate (65-85Kg fresh forage/day i.e. 2 gunny bags)

4. Guernsey are efficient converters of feed to product, being of intermediate size, Guernsey produce their high quality milk while consuming 20 to 30 percent less feed per pound of milk produced than larger dairy breeds.

5. Guernsey reach reproductive maturity at an early age and can calve at 22 months of age. This provides an early return on investment.

### Guernsey cow

© J.O.Ouda, KARI, Kenya

production levels anywhere.

10. They are docile and have an ideal Dairy Temperament.

6. Guernsey produce calves big at birth, which are easy to rear.
7. Guernsey are well known for having the minimum of calving complications.
8. Guernsey are adaptable to all climates and management systems and lack any known undesirable genetic recessives.
9. Her fawn and white coat enhances her heat tolerance and reduces heat stress, which adds to her ability to maintain

### Disadvantages:

1. Need plenty of clean water (40 Lts/day)

### Farms keeping Guernsey in Kenya (options):

1. Egerton University, PO Box 356, Njoro
2. ADC Lanet Farm PO B0x 1124-20100 Nakuru
3. ADC Olngatongo PO Box 680-30200 Kitale
4. Gicheha Farm, PO Box 236 Ruiru

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### The Jersey breed

Despite considerable research, nothing definite is known as to the actual origin of the cattle first brought to Jersey Island. Most research agrees that the Jersey probably originated from the adjacent coast of France, where in Normandy and Brittany cattle resembling Jerseys are found.

**Purpose: Milk production.**

**Average yield: 22 litres/day and 6.3% butter fat.**

**Average body size: Small - medium (350 Kg)**



**Description:**

**1. Jerseys in Kenya are typically light brown in colour, though this can range from being almost grey to dull black. They can also have white patches which may cover much of the animal. A true Jersey will however always have a black nose bordered by an almost white muzzle.**

**2. They have protruding eyes.**

**3. This breed is well known for milk with high quality - it is particularly richer in protein, minerals and trace elements than those from the larger dairy breeds. The milk is also rich in colour which is naturally produced from carotene.**

**4. Milk production potential is moderate (20 Lt/day), depending on feeding and management regime.**

**5. The highest milk production record of 12,138 litres in 305 days from this breed has been reported Canada with 6.4% butter fat (782 kg) and 3.5% protein (428 kg).**

**Jersey cow**

**© AIC Documentation Unit,  
Kenya**

**Advantages:**

**1. Feed requirements is relatively low (65-85 Kg fresh forage/day i.e. 2 gunny bags).**



2. Milk has high butter fat content 5.2%.
3. It is hardy and adaptable to varied AEZs.
4. The Jersey's hard black feet are much less prone to lameness.
5. They perform well under a wide range of systems and are well-known for their high feed conversion efficiency.
6. Jerseys generally produce milk components at a lower cost compared to the other major breeds.
7. They stay in the herd longer than any other dairy breed. Her milk has greater nutritional value, plus the highest yield and greater efficiency when processed into cheese and other value-added products.
8. The breed has little or no calving problems, greater fertility, a shorter calving interval, and earlier maturity.
9. Also suitable for cross breeding/ improving local breeds.

**Disadvantages:**

1. Susceptible to milk fever and tick borne diseases

**A few contacts/farms where Jersey can be found in Kenya are:**

1. OIEndeti (Grammaticas) Nairobi, Tel-2067686
2. Ololua Farm (Carol Rees) PO Box 21007 Nairobi, Tel-891015
3. Ontulele (Bidly Davis) Nairobi Tel-891518)
4. OI Donyo (Tara Llewelyn) PO Box 111 Nanyuki
5. Rawhide (Janet Mills) Nakuru 051-343005
6. ADC Sabwani Complex, PO Box 680 Kitale

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**The Boran breed**

**By careful selection and application of the strict standards of excellence of the Boran Cattle breeders Society, the Boran breed has been developed into an ideal beef animal suitable for the arid range areas to be found in many parts of the world.**

**The original strains of the breed came from Ethiopia and were adopted early in the 20th Century by commercial cattlemen in Laikipia, Machakos and the Rift Valley Districts of Kenya. The Boran society was formed in 1951 and its panel of inspectors continues to ensure that the breed progresses and keeps up to date with the demands of modern beef production. The society promotes exports of embryos world wide and semen is exported throughout the East African region.**

**Purpose: Meat and milk production**

**Average body size: Medium (Average live-weight is 350-400 kg)**



**Boran cow dehorned**

**© AIC Documentation Unit,  
Kenya**

**Description:**

**The Boran is typically white in colour with dark points and pigmented generally black skin. Steel-grey with black points is not uncommon. Fawn and red also occur, but black is rare and is not considered a true Boran colour. The Breed standard permits all colours except brindle.**

**The head is carried well, of medium length and slightly convex. Ears are small in comparison with the Indian breeds and not pendulous. Horns are generally short, round in cross-section and upright, but there is some variation in size and length. They can be 46 cm in circumference at the base and up to 84cm or more in length, measured on the outside curve, but this is exceptional. Polled animals are not uncommon and some**

**animals have been selected for this condition.**

**The hump is well defined and thoracic; it is larger in the male than in the female. The Boran shows a surprisingly straight top line for a Zebu animal. The well developed hindquarters have frequently been remarked upon. The rump is long., wide and muscular in the male and the buttocks are well fleshed. Among Zebu breeds the Boran is outstanding in this character.**

**Skin is generally thin, with loose folds and pliable. Both the dewlap and umbilical folds are well developed.**

**The Boran is generally vigorous and alert. Being accustomed to desert condition, it covers vast distances in search of grazing and water and in some areas is only watered on alternate days or on the third day.**

### **Fertility**

**In the view of the cattlemen, the first job of a cow is to produce a calf a year. Boran can meet this objective. It is acknowledged that the greatest attribute of the Boran is its fertility. Even under harsh conditions the Boran cow will continue to breed and rear calves and do this without punishing herself. One explanation for this high fertility is that the cow has relatively low body weight loss over the suckling period, thereby maintaining a good condition, thus able to conceive again.**

### **Longevity**

**Boran cattle live a long time. It is quite normal for 15 years old breeding cows to be sound mouthed and it is also on record that a 16 year old Boran bull is still producing high quality semen for artificial insemination.**

### **Temperament**

**Boran cattle are recognized as being generally quite, docile and easy to handle. This trait has developed over many generations of cattle living close to man.**

**The Boran cattle Breeders society makes docility a strait selection criterion and this feature has**

been recognised by Australian cattlemen who import Borans.

### **Beef production and Carcass Quality**

**Average weight gains per day on grass & feedlot: Grass = 0.7 - 1.0 kg per day depending on grass quality. Feedlot = 1.3 kg per day depending on type of cross used (this was found at a recent trial at Marania Farm - Timau where using Boran cross Angus steers & heifers) . Trials in Nebraska, USA, show that the Boran and its crosses score consistently better than other Zebu breeds for meat tenderness, carcass marbling and rib eye area. Butchers in Kenya prefer Borans and their crosses for this reason.**

### **Disease resistance**

**True resistance to disease is a complicated matter. Recent studies of immunity to diseases in Zebu breeds are now becoming more widely known. For practical purpose the Boran has a useful degree of host resistance to ticks and from Australia it is reported that the breed is 'completely resistant to buffalo fly'. Borans are generally less affected by foot and mouth diseases than exotics and recover faster. It is also clear that the morbidity and mortality rates of East Cost Fever are lower in Boran than in *Boss taurus* breeds; the Boran being naturally more resistant.**

### **Survival Characteristics**

**Being an animals which in obliged to walk long distances, selection for perfect feet and leg conformation is necessary for registered cattle. Inspectors will not compromise on this point. Dark pigmentation and black points have become more sought after to satisfy pedigree criteria and export demands.**

**The herd instinct of the Boran makes it very easy to manage in bush country. They are noted for being able to 'graze on the trot' and they will always stay together. The Boran male and female share breed points, the sexes, however, show marked dimorphism - the female being notably small, whilst the male grows to a large size.**

**The cow has a well-carried udder with strong attachments and neat, small teats, in contrast to some Asian Zebu breeds. Boran heifers reach puberty at an average age of 385 days. She is an**

**excellent mother, not only will she feed her calf so well that high weaning weights are attainable, but she guards against predators, and will never allow her calf to get lost in the bush. Calving problems hardly exist. Calves at birth weigh an average of 28 kg for males and females, 25 kg.**

**Boran cattle have developed adaptive traits of crucial importance for their survival. Some of these characters are - the ability to withstand periodic shortage of water and feed, ability to walk long distances in search of water and feed and ability to digest low quality feeds. The herd instinct of the Boran makes it easy to manage and survive in bush country. They will always stay together and can 'graze on the trot'.**

**The well-developed beef conformation shows up in carcass appraisals. The depth of eye muscle, marbling, even fat cover and ratio of hind to forequarter make the Boran difficult to beat, hence the preference of Kenya butchers for young, well-finished Boran steers.**

**Advantages:**

- 1. Docile**
- 2. Milk has high butter-fat of 4.8%**
- 3. Good breeds for marginal areas**

**Disadvantages:**

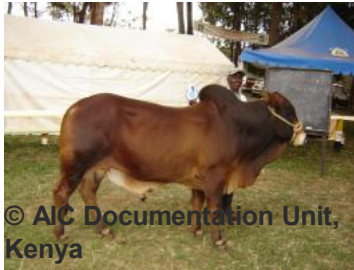
- 1. Milk production potential is low (10 Kg/day)**
- 2. Difficult breeders, most mating at night**

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**The Sahiwal breed**

**Sahiwal bull**

**This Zebu breed originates from India and Pakistan. National study was established in 1963 in Naivasha with the purpose of improving**



the breed for milk and beef i.e. as dual purpose breed. For a long time the breed was confined to government farms where the focus was conservation, characterization, improvement and utilization in smallholder systems. This breed is adapted to utilization of of poor quality pasture and rough terrain.

**Purpose: Meat and milk production**

The milk yield is highly variable because of variation of management regimes. Yields may range from 5-10 litres/day

**Average body size: Large (average live-weight 350-400 kg)**

**Description: Body colour is solid brown**

**Advantages:**

1. Docile.
2. Good breeds for marginal areas.
3. Milk has high butter-fat of 4.8%

**Disadvantages:**

1. Milk production potential is low (10 Kg/day)
2. Difficult breeders, most mating at night

**Farms where they can be found include:**

**The largest herds in Kenya are kept by KARI, Naivasha and El-Karama Nanyuki.**

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**The East African Zebu**

## **East African Zebu**



**Purpose:** Milk and meat production

**Average body size:** small (average live-weight 250-300 kg)

**Description:** Body colour is variable, the breed has a prominent hump

**Advantages:**

1. Very hardy and disease resistant animal

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**Disadvantages:**

1. Milk production potential is low (5 Lt/day)
2. Late maturing (3 years)
  - Mainly in southern rangelands

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**Other breeds:** Hereford, Simmental, Charolais

## **HEREFORD**

**Purpose:** Meat production

**Average body size:** Large (average live-weight 550 kg)

**Description:** Body color reddish brown body with white head and feet

**Advantages:**

1. Good beef conformation for the discerning consumer.

**Disadvantages:**

- 1. High forage requirement**
- 2. As all exotic breeds Hereford is susceptible to tick borne diseases.**
- 3. Only suitable for cool areas with year round quality fodder availability.**

## **SIMMENTAL**

**Purpose: Meat and milk production**

**Average body size: Large (average live-weight 750 kg)**

**Description: Body color brown**

### **Advantages:**

- 1. High production potential with good management and good feeding**

### **Disadvantages:**

- 1. Susceptible to tick borne diseases.**
- 2. Only suitable for cool areas with year round quality fodder availability.**
- 3. Potential milk yield: low to moderate (10-15 Liters/day)**
- 4. High forage requirement**

## **CHAROLAIS**

**Purpose: Meat production**

**Average body size: Large (average live-weight 800 kg)**

**Description: Body color white**

### **Advantages:**

- 1. High production potential with good management and good feeding.**
- 2. Good beef conformation for the discerning consumer.**



**Disadvantages:**

- 1. Susceptible to tick borne diseases.**
- 2. Only suitable for cool areas with year round quality fodder availability.**

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Integrating animals into the farm

Animals integrated into the farm, showing the flow of fodder, dung and products

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**Sheep on Biofarm, Ethiopia**

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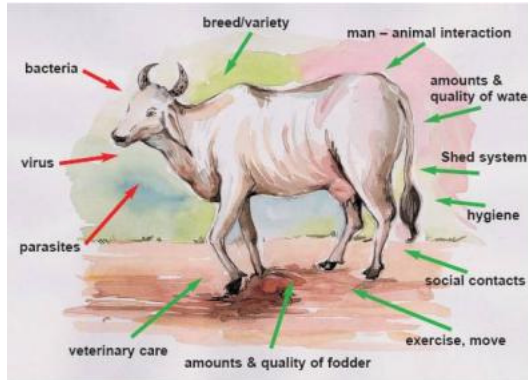
### Pig



Pig on Biofarm, Ethiopia

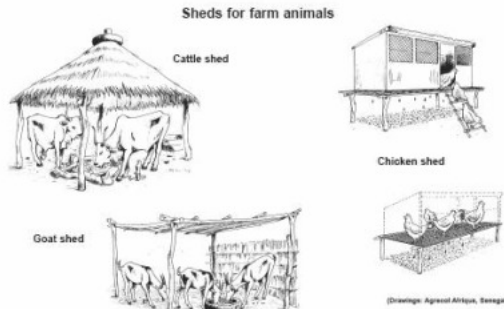
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### Factors influencing animal health



**Bacteria, viruses and parasites attacking the farm animal which fights back with its immune system. The farmer can influence both sides of this balance**

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Sheds for farm animals



Traditional simple sheds in Senegal: cattle shed, goat shed, chicken shed

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Friesian cow with calf

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Saanen goat

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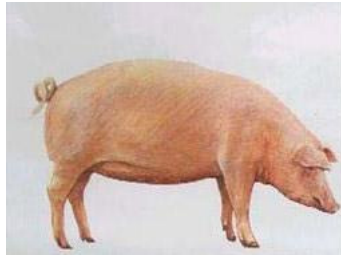
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Landrace sow

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Introduction to Animal

A hen with Fowl Pox pimples on the comb.

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top left: Protective housing shields chicks from predators and harsh weather; top right: Simple houses built with sticks, mud and polythene paper are easy and cheaper to construct.

**Give clean and fresh waer in a specific place**



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Synchronised ducks sitting on eggs

© Henry Ondwasy, KARI

A foster hen with chicks of different ages



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Multiple infestations by 4 species of worms

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This hen did not show signs of sickness when it was put in the basket with chicks but died of acute Newcastle disease 4 h later.



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Death caused by Infectious bursa disease.

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Automatic drinker



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Green grams for protein

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**Mange**





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Laying nest on a slatted poultry house

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Chick drinker



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**Broilers on cemented deep litter floor**



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Brooding hen

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Chicken Indigenous



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Dwarf hen

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**Feathered shank hen**

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**free range cockerels**

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**Frizzled feathered chicken**



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**Kuchi game bird**



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**Naked neck cock**



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**Naked neck hen**





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Hybrid layers

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**Hybrid Cockerels**

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**Normal feathered indigneous chicken**



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