PROTEIN POWER

How To Raise Chickens, Rabbits & Fish

IN THIS ISSUE

PART I: Raising Healthy Profitable Chickens

WHERE TO FIND YOUR CHICKENS?

Believe it or not, there are quite a few varieties of chicken. Before thinking about where to buy chickens, you must first familiarize yourself with the different species of chickens. Different species of chickens are bred for very different and unique purposes. If you happen to be a newcomer to buying and raising chickens, here are some tips to get you familiar.

Learn about the many different types of chickens before actually purchasing them. Chicken can be separated into 3 broad categories. They are:

1. Pure Breeds
2. Egg Laying Hybrids
3. Mixed Hybrids

The birds from each category have their own special qualities. For example, the egg laying hybrids are bred for the specific purpose of laying eggs. They have small bodies and not much meat mass so they cannot be slaughtered for their meat.

The first place to go to when buying chickens is a chicken breeder. Always buy from a reputable breeder and take all the time you need in verifying credibility. You can always get a reference for a local chicken breeder from those farmers that own chickens in your area. Check out several breeders and look at their livestock, before finally making a deal.

Always take note of their livestock and look at the living conditions of the chickens. If you notice

that the chickens are looking unhealthy, then you should never buy from the breeder, even if their livestock is cheaper than in the rest of the other breeders in the area. Quite often the price of the chicken will directly correlate to its living environment and treatment. Cheaper chickens will often live in lousy conditions and suffer from poorer health than their more expensive cousins.

Today, there are also a good many hatcheries selling chickens online. This doesn't change anything insofar as you would first need to know the breed of the chickens that you want. On online hatchery will also need to be verified for credibility, though likely more sternly than a hatchery you can simply go and visit. You can always ask local chicken owners for references.

Take a good long look at the hatchery's website before you buy anything. Make sure that you check out their stock before you buy the chicks off the internet. Hatcheries won't ship chicks in winter months due to the cold. This is why spring deliveries of chicks are booked well in advance. Many a novice chick-buyer has gotten stuck and been forced to wait a good while before receiving their little ones, as a result.

The chickens that you have selected should be very active, vocal and energetic. The chicks should have an entire coat of full feathers without any thinning or bald spots. If you see any signs of illness, contact the breeder or the hatchery immediately.

When you buy the chicks online, they will usually arrive in a day or two. Keep in mind that these are living creatures which will get thirsty and hungry en route. Since you can't ensure their nutrition in transit, make sure that you have water and feed ready for them on arrival.

Take the following steps well in advance of making your actual purchase:

1. Prepare Their Living Quarters

You will need to build a coop that can house your chickens properly. The ideal chicken housing should have enough space for them to roost comfortably. It should also provide protection from the outside predators. If you have a cat or a dog in your home, don't let them close. Cats, especially, can get pretty creative when it comes to getting close to birds of all shapes and sizes. The housing should also provide easy access for cleaning purposes.

2. Hay, Hay, Hay…

Line the area with plenty of hay and dried leaves and keep enough feed and water for the chicks to be well fed. They should never be hungry or thirsty and the importance of hay cannot be overstated.

3. Get the Right Feed

Make sure that you purchase the right kind of chicken feed for the breed that you have bought. You wouldn't serve your vegetarian friends a rare-cooked steak, so don't make the same mistake with your chicks. For instance, there are some feed types are fortified with extra calcium to ensure that your chicken lays healthy eggs, while others ensure that the chickens increase their body mass considerably as these chickens are meant for meat production. Ask around for the correct type of feed. Consult other breeders, as well as feed salespeople. Fresh water and the correct kind of feed are extremely important.

4. Throw a Chicken Party

Chickens and humans are both social animals. The main difference is that chickens really need to be surrounded by other chickens on an almost full time basis. Go ahead and buy at least a dozen or so chickens. This will make the chickens happy and help you to get used to caring for more of them at one time.

5. Play Doctor

Always check the chickens for any signs of illness as it can kill the entire lot quite quickly. Some basic research on chicken illnesses and symptoms will provide you with a checklist of what to watch for and how to handle issues if and when they arise.

WHAT TO FEED YOUR CHICKENS?

Food for baby chicks is vastly different form the food that is given to adult chickens. They should be fed the right amount and type of feed, if you want them to grow well and be healthy and prevent the spread of diseases as well. Many farm owners will give their chickens their own specially formulated chicken feed.

The problem with these home made chicken feed mixtures is that they often lack the nutritional content of chicken feed. If the homemade food is being given to the chickens, ensure that the ingredients are fresh and haven't been treated with chemicals or pesticides. These can interfere with the overall development of the tiny little chicks.

Use the best quality chicken starter feed that you can find for the little chicks. Again, the human comparison is valid. Would you prefer feeding a newborn nutrient-rich milk or a sugary grape soda?

Usually, the best kind of food for baby chicks is known as chicken starter feed and is available in most poultry shops. Keep in mind that all vegetarian poultry mixes are not natural for the little ones. In nature, they would consume little bugs and need animal protein to grow.

An all-vegetarian fare can make chicks malnourished. An ideal situation for the baby chickens would be one where they are allowed to roam free and eat as many bugs, plants and weeds as that they can get ahold of. This is the best way to optimize their nutrition.

For beginners, the pre-made commercial chicken starter feed will also eliminate the headache and unnecessary tension of figuring out what to give the chickens. The feeds have a healthy balance of protein, vitamins, minerals and other nutritional elements that are necessary for the chickens to become healthy and strong and lay eggs.

Don't give other mixes or food to the little chickens, as it will interfere with the nutritional balance of the commercial food given to them.

The feedbag label will tell you about the suitability of the feed for each stage of development. It will also mention the amount of nutrients per serving and the quantity that should be fed to chickens. The well-prepared diets are sufficient for the little tiny chickens and the additional use of vitamins isn't required.

Table scraps may be fed to the chickens occasionally, but not very liberally. Table scraps that consist of grains such as barley, wheat or corn can be given as additional treats when training the chickens. Don't give them these treats with daily food as it can interfere with the daily food that is being given to them. You may also feed them lettuce, tomatoes, and many other fruits and vegetables, if you'd like,

but the commercial feed is more economical and efficient.

Your chickens will usually feed until their bellies are full. In order to make sure this happens, you should top off the chicken feeder in the morning and then again in the late afternoon. Your chickens will usually help themselves to food when they are hungry and will leave the rest when they are full. Make sure to clean their feeder containers everyday and never feed them leftover feed. Chickens are not the cleanliest animals out there, so if you don't take care of their hygienic needs, the likelihood of them contracting illness greatly increases.

In case you can't get chicken starter feed, you can get by with breakfast cereal for the first few days or even really well-mashed hard-boiled eggs. In general though, the sooner you get them started on the feed, the better off they will be.

Make sure that you are providing clean and fresh drinking water to your chickens. Water is also an essential part of the small chicks' nutrition. If the little ones get dehydrated, they can die and unfortunately, they have no way of letting you know that they are thirsty.

This is why your chicks' water feeders should ideally be kept at an elevated level. This will prevent the bird droppings from falling in the water. Make sure that you change the water containers at least twice a day to ensure your chicks' optimal health.

If for some reason you are not able to change the water twice a day, then make sure you at least do so when the water is murky and dirty. Clean drinking water should be provided to chicks at all times. The temperature of the water should be closely monitored and kept around 90 degree F. This may seem high but will actually prevent the little chicks from becoming too cold and getting sick.

The next challenge lies in actually raising your chicks into full-grown birds. You may, for instance, raise a few chicks inside a box when young, but once they get older they'll need their own coop.

If the weather is warm a small crate surrounded with fine chicken mesh would work for a while. This will prevent the chicks from being attacked by nearby predators while providing them with enough fresh air to breathe while keeping them from running all over the place. The size of the chicken coop would be completely dependent upon the number of chickens that you have.

Tiny chicks have to be kept really warm. This cannot be overstated or repeated too often. The heat source should be good enough to keep them warm but not roast them alive. This is a thinner line than you might think, so be careful.

A heat lamp with a 100-watt bulb is usually good for approximately 25 small chicks. Usually, the temperature should be set at 90 degree F or 32-degree C. To ensure that the temperature is constantly maintained, you would also need to have a thermometer inside the chicken coop. This temperature should be gradually decreased over the coming weeks. Make sure to check your thermometer in the interim, as well, making sure that it reads properly.

More often than not, the chickens themselves will tell you whether the temperature is too hot or too cold for them. If they are really peeping loudly and are huddled in a group under the lamp, it means that they are cold. In this case, you'll want to decrease the distance between the lamp and the chickens. If they are trying to get as far away from the lamp as possible, then it means that they are feeling extremely hot. Move away the lamp further away and the chicks will feel better.

Now that the coop and lamp are in place, the coop also needs to be lined with sand and grit. Don't line the coop with newspapers, the chickens have a natural tendency to scratch and tear up all the newspapers. The grit in the coop will help them digest food more easily. If you aren't sure about the amount of grit you should use for the coop, ask the store from where you bought the grit and the chicken starter feed.

A waterer is an immensely important tool to have as the chicks are extremely thirsty after they are born. Place the waterer in such a way that it can't be knocked over when the chicks are running around in their coop. The temperature of the water should also be maintained at 90-degree F.

for aforementioned health reasons.

Feed for the day old chickens should be chicken starter or chicken crumbles. These foods will come in medicated as well as in un-medicated varieties. Which variety to buy is completely up to you and influenced by several factors.

If you have bought the chicks from a hatchery, then you could try a bag of medicated feed and then switch over to non-medicated feed.
If you have hatched the chickens in your own incubator, the option is completely up to you.
When the chicks are just a day old, use small feeders, but ensure that they aren't made from out of Styrofoam. Chicks have a tendency to peck at everything and can both swallow and digest the Styrofoam, which is bad for them.

When you first introduce the chicks to their coop or pen, keep an eye on them and allow them to get familiar with their surroundings. The day old chicks need to be taught how to drink water. Dip their beaks into the waterer gently, while making sure that the remainder of their body remains dry. When their bodies get wet, they can get the chills and die very easily.

Keep watch over them and ensure that any other pets you may have are coming nowhere near them. Also, make sure to alert any children that might be around how to handle the chicks properly.

WHAT YOUR BABIES NEED MOST

Caring for and handling the chicks correctly are one and the same. The little chicks will be extremely fragile at this stage and shouldn't be handled a whole lot. If they seem dirty, don't give them a bath, as this will kill them at this underdeveloped stage.

If you must handle them, then ensure that they are held firmly, but gently. In order to do this, you should slip your hand under the tummy of the chick and cover the chick with the other hand, almost as trying to hold a handful of water between your palms.

Just like other farm animals and pets, chicks need water. You would need to give them fresh clean water. It must be kept in their bowl at all times. Check it from time to time to make sure that the water is clean and there is enough of it for the chicks to drink. A low bowl can be found at any farm or pet shop and should be pretty heavy duty so that it doesn't topple over.

Chick starter feed is available at all pet shops and shops selling supplies for chicken and poultry. If you don't have chick starter feed, then you could feed them instant oatmeal, flaked infant cereal, whole grain cereals etc. All of these can be put in a blender and then churned. Don't grind the ingredients to a powder or paste. Let them remain grainy. This chicken feed for the baby chickens should have some grain part. Leave the food with them at all times so that they can get their little tummies full. They will stop eating once they are full.

Clean out their box at least once a day and make sure they are warm and rested at all times. Remember that the feeder and the feed should be in place before you get the little chicks. If you haven't prepared, then you will have to get things organized really fast.

For food, you can go to the nearest feed shop. Some pet shops will also have food for little chicks. Get the chick starter feed to begin with. The quantity will depend on the number of chicks that you have. A five-pound bag should be fine in the beginning. You will also need grit and separate bowls for the food and water.

A warming box is also a necessity for your baby chicks. You can buy these boxes online or in stores, but can also build them yourself. An old sturdy wooden box or a card box will do fine. Hang a bulb with a wire mesh around it to keep the chicks warm. Have some holes on the top of the sides of the box to allow them to breathe.

The warming box should also be lined with dry leaves, sawdust or shredded paper. This provides the chickens with coziness and also keeps them safe. The little chicks love to play around in this environment as well.

The feeder and the water container should be placed on a cement block and should stay on a firm surface. Otherwise they will get knocked over by the scurrying chicks. Special-made containers with tops can be bought from the pet store.

If you have lots of dry leaves, then you should keep adding them as they become compact. The dry leaves can absorb all of the chick poop and you won't have to empty out the box as often. Throw the grit in regularly and all of the chicks will be able to find it quite easily.

CARDBOARD BOX OR CHICKEN BROODER?

The cardboard box can be a relatively cost-effective home for newly hatched little chicks, but it can't be considered as a long-term solution. There are several types of chicken brooders available that make it easy to ensure the chicks are kept warm and dry. The essential purpose of the chick brooder is to keep the chickens warm and protected. It's essential to have the brooder until the chickens can be left outside in the chicken coop.

The brooder has to be cleaned everyday, so keep that in mind. The chickens should always have food and water available to them. Even if you are using a commercial chicken brooder, it needs to be disinfected and cleaned before the chicks can be put in it. If you decide to use a cardboard box make sure that it is at least 12 inches or more high. If it's any lower, the chicks will be able to jump out. If you decide on using a cover in order to prevent this from happening, make sure that it is made of mesh and lets air in.

Brooder size is also a crucial factor. With each passing week, the chicks are going to grow and get bigger, so get a brooder that will do them till they are ready to be sent out to a coop. Typically, 2 square feet per chick is more than enough This ensures that the chicks have enough room to grow and space themselves out. Make sure the brooder isn't in line with the air draft so as to not harm the chicks.

Chicks don't require precise temperature control. However, some rare and exotic species of birds may. This is why commercial brooders are better than the cardboard box. For newborn chicks and chicks that are less than a week old, the temperature must be maintained at 90 degree F. This can be decreased gradually as the weeks go by.

No matter whether you use a commercial brooder or a cardboard box, you must dry it well before you can line it. It should also be cleaned on a daily basis because the chicken droppings need to be cleaned out. Keep in mind that chickens aren't the cleanest animals, so doing these things will prevent the spread of diseases and maintain hygiene in the brooder.

You can make the lining out of paper towels for a small group of chicks, or hardware cloth, burlap, newspaper, decomposed non-toxic saw dust and wood shavings, peat moss or clean sand, if you've got more of them. The lining should be at least 2 inches thick. This helps the chicks to get a better foothold and also makes the surface less slippery.

If you decide to use a cardboard box, you'll have to have a heat lamp to keep the chicks warm. It is better to have a red light as the white light can be harmful to your little ones. You can also go with a 250-watt infrared light that will do the job. Make sure there's a healthy distance between the chicks and the lamp is maintained, so they are neither too hot nor too cold. If you find that the chicks are huddled together under the lamp, then you need to move the clamp closer. The lamp needs to be moved away from the chicks, if you see that the chicks are moving towards the edge of the box.

Pick up the lamps and reflectors at any of the hardware shops. The commercial chicken brooders come with a variety of temperature controls and thermostat. This removes the headache of checking the chickens often to ensure that they are warm enough.

BIGGER CHICKENS, BIGGER NEEDS

Chickens usually live for about a decade and can lay eggs throughout most of their lives. They do, however, suffer from various diseases, which is why keeping them clean and nourished is so important.

Water may be the chicken's most important nutrient. If a hen is laying eggs, clean drinking water is the most essential consumable. Play it safe and change the water on a daily basis or more often if it gets dirty. Keep the water elevated and use a waterer, if need be, to keep the water clean and the chickens out of it.

You can also look into adding some probiotic supplements to the water, as it is cheap and good for the chicken's health promotion and maintenance.

Since some chickens are bread for their eggs and others for their meat, it stands to reason that each variety needs a specific type of feed. You can easily get chicken feed at any poultry shop, just keep in mind that the different stages of a chicken's life require different types of feed.

You can also make your own custom feed blend, but this is not recommended for beginners. Never feed your chickens table scraps or add oil to their feed. Never feed your chickens chocolate, because it can be toxic and deadly for them. If you want to give them a treat, give them white bread for training purposes only.

As soon as you get your chicks, you should get them vaccinated. 'Marek's disease' is a common chicken killer and vaccination against the disease can keep your chicks alive. The vaccination also has a booster dose that should also be given to bigger chickens when they grow older. This is necessary since the virus that causes the disease moves through the air. Your entire flock of chickens can get sick and die, simply if another chicken in another coup somewhere down the road from you is infected with the disease.

Now that you have got the food, water and vaccination part covered, another important aspect is the shelter or the housing that needs to be provided for the bigger chickens. The chickens need to be in a coop and this building has to be fortified to ensure that the predators such as racoons and can't get near the chickens and harm them.

Building your own chicken coop is pretty cheap. Just build a box shaped chicken coop with a strong wire mesh all around to keep predators out. Also, your bigger chickens need ample space since the restricted confinement would lead to stress in the chickens as well as to cannibalism and low egg laying rates.

Usually, the chickens would require at least 2-3 square feet of space per chicken, but bigger breeds require more space and comfort. Just multiply this space by the number of chickens that you have and this number will tell you exactly how much space you will need.

Make sure that your chicken coop has good ventilation because chickens need air. That said, drafts kill chickens, so don't overdo it. It's also important to insulate the coop in the winter so the chickens don't freeze. If you decide to let your chickens wander in the day, make sure they're safely locked up over night, especially if you live in a rural environment.

THE WAY TO HOLD BABY CHICKS

Baby chicks are very delicate and fragile just make sure not to hold and handle them too much. This rule should apply to all of your family members, no matter how big or small. Children, especially, should be taught to handle the chicks extremely carefully. Also, check with your local government, if you are allowed to keep chickens in the backyard. Some cities will only allow hens, as they are less noisy than roosters and don't make much noise.

Once you are all prepped, go to a good hatchery and buy your chicks. Due to winter travel issues, you won't get your chicks until the spring. Most of the online hatcheries will only accept orders for 25-50 chickens at one time. But some of the hatcheries may ship as little as 3 chicks at a time. You have to do a proper research on the breed and the food requirements before you get the little chicks.

When the chicks arrive, they will be very stressed out. Try to touch them as little as possible in the first two days, they will be very physically vulnerable. Since they are extremely thirsty when they arrive, it's important that the waterer is easily accessible inside their coop. The water temperature has to be maintained. You may have to dip the chicks' beaks and teach them to drink water. Ensure that you don't drench their feathers since they can get chilled very easily. Also, elevating the waterer on a slab will prevent the chicks from getting wet.

After the initial days are over, you can handle the chicks and socialize with them. Allow them to hop over your hand and introduce all the family members to the new chickens. Talk to them and caress their feathers. In this way, they will get used to you.

The new chicks need to be indoors for the first few weeks before going outside. They need a warming box or a coop that will be big enough for them when they grow. The coop should have lots of space for them to move around and be able to protect them from predators. When the chicks are really small, don't allow house pets such as dogs to be near them as they can sometimes get too boisterous and injure or kill the chickens without meaning them harm.

The coop must be lined with paper towels, wood shavings, dry leaves or grass, but never use Styrofoam.

The heat lamp should be purchased with a red bulb, as the light it produces is less stressful. In the first week the temperature should be 90 degree F. During the second week, it should be 80 degree F and in the third week—70-75 degree F. this will give the little chicks a chance to self regulate their body temperature. Place a thermometer, so you can be sure that the chicks are getting adequate warmth. Don't let the chickens stay in an area where there is a direct draft, as this will harm them.

LIVING QUARTERS FOR LAYING CHICKENS

If you look online, you'll find an endless barrage of chicken coop layouts to choose from. Often, people just choose the first layout that they can find. This is a mistake. Try and spend some time to find a layout that best suits your situation.

First, choose a layout corresponding to the number of chickens you have or that you expect to raise in the near future. It is very important to choose a layout that you can build easily and efficiently. Try to stay away from those chicken coops that need to be built by highly skilled professionals because this will consume more time and effort.

Make sure you choose a layout that is appropriate for your residence. Some people think that they can fit a large chicken coop in a small yard, but they forget that they need a space for the hens to roam. The small yard could be very crowded with these hens.

After you settle down to a specific design, you need to collect all the parts before assembling them together. Measure them correctly to ensure that they fit. This is a very important step because sometimes, people miss-measure and this leads to problems in assembling. When you double-check your measures, you will be able to proceed with the assembly with no problems.

Assembling your chicken coop shouldn't be hard. It is a simple process that can get a bit tedious because of the many details. All you really need to know are these details and the assembly steps you need to take. At that point, you are good to go. Make sure that you have all the needed tools around you as this will help you concentrate on your work.

When you build your chicken coop, you should make sure that you are securing your chickens against outside hazards like predators and weather conditions. When it comes down to predators, chickens face many, but protecting them is very easy. First of all, try to use a more rugged construction with no loose ends and separation between different parts of the coop, so that the predators cannot get inside.

Small predators like weasels can get inside through very small spaces, so you need to make sure that your coop is tight enough to defend your chickens against such predators. Raccoons have a different route to attack your chickens and this is digging through the ground. You can insert wire mesh deep in the ground just to make sure that your chicken coop is fort-strong.

These three factors will most greatly influence good production of chicken meat and eggs. The hen needs light in order to start eating and needs constant amount of feed in a clear place in order to eat constantly. It needs a good amount of water in order to keep eating. Providing these three factors in adequate amounts will help the hen reach its maximum production soon.

Feeders should be located in clear places and they should be fixed. In this way the chickens cannot flip it easily and spoil all the feed. The same goes for the water, but the water needs to be in confined containers, so that the hens cannot stand inside the water and contaminate it.

Light should be supplied in adequate amounts for the hens depending on what you are raising the hens for. For example, if you are raising chickens for meat, then you will light up the coop as long as possible. This is usually 23 hours per day in certain ages, so you need to equip the chicken coop with sturdy light that can resist the harsh environment inside the coop.

KEEP THOSE NESTING BOXES SOFT

Most folks breed chickens for either, meat or egg production. No matter whether you are breeding chickens for pleasure or for business, you will need nesting boxes, if you are breeding them for egg production. Nesting boxes are the small boxes added to the chicken coop in order to provide a place for the hens to lay their eggs.

The first thing you should determine is the number of nesting boxes in line with the number of chickens. Every 2 to 4 chickens should get one nesting box. The ratio of the number of nesting boxes to the number of hens should be 1:3. This ratio guarantees that every hen gets its own laying place.

After determining how many nesting boxes you need, should choose a layout for these nests. Nests should be arranged in rows one above the other, making egg collection easier. Take one side of the coop and start building the nests for your hens above each other. Go for individual nests that can only be occupied by one chicken at a time as this will minimize the egg cracking and egg fouling.

Making a door at the back of the nests will make egg collection a lot easier. Collecting eggs through this door will decrease the time you need to spend on entering the coop. Collecting eggs from the outside is a much better solution, especially if you have large number of hens in one coop.

Make the opening of the nesting box smaller than the dimensions of the nesting box itself. Also, make the height of the nesting box very small. This will prevent the hen from moving inside the box and keep it from kicking the eggs and breaking them.

Each nest should have a lip to prevent the bedding of the nest from spilling out. The lip is very important to keep the coop very clean and keep all the bedding inside the nest all the time. It is also very important to fix a rooster line in front of the nests to give the hens a way to climb to the nest and to stand on before jumping to the ground.

When you're done building your nests, you have to to fill them with bedding. Keeping this bedding clean and changing it periodically is a must because the hen will lay eggs outside if the nesting box if it is not clean enough or the bedding is damp.

There are two choices of bedding—straw and wood shavings. Wood shavings are better than straw because they provide an extra dry surface for the hen to lay its eggs on. It also provides good support for the eggs and prevents them from cracking. Make sure that you change that bedding periodically and check it for dampness.

Changing the bedding and cleaning the nest from inside will help preserve the health of your hens. Hens always use their beaks to pick the wood or any object around them. This can lead to the splitting of wood chips that can hurt the chicken. Check your nesting houses on a monthly basis and see if there is any splintered wood lying around.

Breading hens in your back yard will provide you with eggs throughout the year, but you need to keep your hens healthy if you want them to keep laying. High quality nesting boxes will help keep your birds healthy, so don't hesitate to spend a few dollars on them.

WHAT HENS NEED

Before you start raising chickens, you should learn how to care for them. The process starts with determining the needed amount of space a chicken needs inside of the coop. You can figure this out once you decide which type of chickens you'll raise. Large hens need more space than bantams, which are the smallest chickens. Make sure that the chicken coop you build can be expanded in the future to save your having to build a new one from scratch.

After picking a strain or multiple strains, you can start building your chicken coop and begin filling it. Cover the floor with sawdust and straw before getting started as the two materials can help keep the chickens keep warm and protect the eggs if they fall out of the nesting boxes.

After placing the flooring material and ensuring there is food and water, the coop will be ready to receive your hens. You should give them an hour or two inside the coop and then check the whole coop again. It is very important to see that there are no holes that will let predators in or hens out.

It is very important to put the fence a little bit deeper into the ground as this is the only way to protect your hens from the predators that can dig under the fence. Try to choose fence materials that you can afford, but do not go for cheap ones because they will wear out very quickly and you will need to replace them soon. This means that you will end up paying double the cheapest price.

There are three important factors that you need to keep in mind when you are starting your hobby or project of hen raising. If you are breeding hens for egg production, then you will need nesting boxes or your hens will start laying their eggs on the ground and most of these will be cracked before you collect them.

You can use wood shavings instead of straw because they tend to last longer and provide better warmth in the winter months. Supply your chickens with enough wood shavings for bedding purposes in the nesting boxes and on the ground of the coop. Change this bedding periodically so that the hens will have dry and healthy bedding at all times.

Water is the third factor and a crucial one at that. Hens get thirsty all of the time and their water supply must be clean and consistent. The main rules for water are: cleanliness, abundance and that the water must be kept high enough so the chickens can't step in it.

You'll have to feed your chickens the right things on a daily basis. Some people feed their chickens only dry food, but chickens also need green feed to lay better meat and eggs. Green feed contains large amounts of water, helping with the chickens' dehydration problems. It is also very nutrient rich and helps the chickens stay healthy and avoid illness.

CHICKEN DISEASES

Chickens are prone to several diseases, the most common of which are described below:

1. Flock mite infestation

Mite infestation can kill a healthy chicken in three days or less. Examine the bottom of the hen, where the egg comes out. If you find the area to be dark in color and it seems to be moving, then your chicken probably has a mite infection. The most commonly found mites are the Red Mite and Northern Fowl mite.

The chicken can also show physical signs of a mite infection. Check the comb and wattles and you will be able to see if there is a mite infection. Also, if the chicken has turned pale or looks to be sulking in a corner, they've probably been infested. Check the vent area to see if that's where the infection is coming from. Also, check the ears, thighs and neck.

2. Coccidiosis

Commonly known as cocci, this disease can wipe out the entire flock. This is a deadly disease that only needs 96 hours to destroy an entire flock. If the chickens are smaller, then the time can even be shorter. This is a protozoa parasitic disease and every chicken raiser should be aware of it.

The disease has several physical symptoms. The feathers of the chickens will look as if they have been ruffled and the chickens will sulk in the corner. Diarrhea and a clear liquid, not unlike vomit in humans, will leak from their beeks.

The parasites that cause the disease are found naturally in soil. They can be brought to the farm quite easily through soil carried on shoes and boots. For this reason, you must not only keep your coop clean, but also yourself whenever you plan on going near it.

3. Marek's disease

This airborne virus is extremely deadly and your flock can easily get the disease if a bird farm down the road is infected by it. There's not a whole lot you can do about Marek's. The virus is very common type of herpes and enters the chicken's body through its respiratory tract. The virus is microscopic and is carried through the dander of the chicken's feathers.

This is a contagious disease that can't be stopped, but doesn't spread to the egg. The disease will usually hit the chickens when they are aged between 5 –25 weeks. Beyond that age your chickens will develop a natural

immunity to the diseases.

Depending on the type of the disease, the chicken can also get paralyzed wings, with the legs and neck becoming immobile. Death is usually soon to follow, since the chicken can't access food or water on its own.

4. Upper respiratory fungal infections.

Chickens often die right after the cold weather wanes and the weather gets warmer. This is most often the result of upper respiratory fungal infection. When conditions are damp, mold begins to form in the chicken coops and when the mold dries, the bacteria develop spores and find a place where they can survive.

Sadly, often times the spores are inhaled by the chickens, landing in the lungs and the trachea of the bird. This area of the body provides the spores with a warm and moist environment in which they can grow. The upper respiratory fungal infection is thus created and quick to kill.

This infection is something most grown stronger chickens can handle, but not the young, the weak and the old. This disease can stay in latent form and erupt when the chicken is under stress. When infected, they often make gurgling sounds, sneeze, and stretch out their necks, while coughing and wheezing. There is a medication called "Oxine" that can help your chickens fully recover.

Disease prevention in chickens is important and can often be accomplished through timely vaccinations.

RECOMMENDED VACCINATION

All of your day old chickens should be vaccinated against a number of diseases such as Marek's disease. The antibodies that are produced as a result can help the chickens fight the disease if and when they become exposed to it.

Passive immunity can be passed on from the hen to the egg. If the hen had a higher level of antibodies they can be easily passed to the egg yolk and the fluids in the egg. This helps the chick to become resistant towards many diseases for a few weeks. If the little chickens have high levels of antibodies following their birth, then giving them a vaccination may, in fact, result in a reduced state of response.

BIO SCURRILITY PROGRAM IMPLEMENTATION

Many poultry veterinarians talk about the bio security that can reduce the exposure of chickens to diseases. This can be done when the poultry farm owners and workers understand the mechanism in which the diseases can be transferred. They can combine the knowledge and implement it as a disease prevention program. The program can't stop the diseases, but it can reduce the probability of it spreading. The effect of the program is usually felt after it has been implemented with a series of flocks. It isn't visible in the true sense in the first flock after the program is initiated.

There is lack of support for these programs. This is because many farm managers see these as expensive programs that are time consuming and don't yield the results instantly. They prefer to use other products such as vaccinations and medications.

DISINFECTIONS OF THE COOP AND OTHER MATERIALS THAT COME IN CONTACT WITH THE CHICKENS

Disinfecting tires and shoes before entering the coop is very a crucial factor in stopping the spread of disease and infection. Today's commercial poultry farms will actually spray disinfectant on the trucks, tires and protective clothing worn by humans who go anywhere near chickens. This helps prevent the spread of diseases from one farm to another.

Oxine is an effective disease preventer, but it does have a bleaching effect on the clothes and the feathers, so handle with care. Fogging with Oxine should be done at least once a week, as it can kill all the airborne viruses and bacteria.

Make sure you fog especially well in damp areas, as they are more likely to help germs incubate and spread.

If you find small rodents anywhere, set out traps immediately to avoid predator problems. The mice or rodents presence can be seen through their droppings in the water and the food bowl and they look a lot like pepper pellets.

MAKE SURE TO CLEAN FOOD AND WATER BOWLS DAILY

Cleaning out water and food bowls regularly will help control the spread of parasitic organisms that spread through the bird droppings and feces in the water. Bacteria grows very quickly in dirty bowls and can greatly harm chickens. Water and food bowls that are used for them should never be used for other avian population or other animals on the farm.

KEEP YOUR YOUNG AND OLD CHICKENS SEPARATED

The younger chickens have not yet developed their immunity and can get extremely sick when exposed to older chickens. Older chickens easily pass off their infections on their younger friends. Also, be weary of wild chickens or fowl, as they will bring and spread infectious diseases quickly and with terrible consequences.

SUPPLEMENTS FOR CHICKENS

Just like humans require supplements, chickens also require certain supplements that would include minerals and vitamins to make them strong and keep them in good health. The intake for chickens is essentially dependent on the farm that manages their dietary requirements and on the breed of chickens. Usually the supplements that are necessary for the chickens include calcium, phosphorus, grit, some amount of salt and some vitamins.

CALCIUM

Calcium requirement for chickens changes as they age. They are also affected by local weather conditions and whether the chickens are laying eggs or not. Hens laying eggs need more calcium in comparison to those chickens that are bred for their meat. If the hens don't get enough calcium, they might wind up laying eggs with very thin shells or even without shells. Their shells will also be prone to breaking extremely fast.

Older hens need more calcium than the younger hens and the requirement increases in hot weather, due to older chickens not eating enough food. Ground oyster shells and ground limestone are good sources of calcium, just make sure you don't feed the harmful dolomite limestone to your chickens.

SALT

Some salt is included in the commercial feed given to chickens, even though they don't require it as part of their diets. Occasional treats can contain some salt but shouldn't be overdone as too much salt intake can cause health problems for the chicken. When it gets hot, make sure your chickens have plenty of water if or when salt supplements are given. In the winter, make sure the water doesn't freeze over, as it can be fatal.

PHOSPHORUS

Chickens need Phosphorous to metabolize the calcium in their bodies and can't live without it.

GRIT

Chickens need grit because they have no teeth and it helps them digest. Usually grit is stocked and sold by the poultry feed stores. It is found as loose grain sand or small pebbles. When the chickens eat the grit, it is stuck in their gizzard.

When the food passes through the gizzard, it is broken up or crushed into small pieces. This aids for the digestion of the food. Grit acts like teeth in the body of the chicken. Grit is essential part of the meal, even if you are

feeding them chicken feed. Free roaming chickens don't require grit, however, since they get their daily share from the grass and the pebbles on the farm.

Chickens also have vitamin intake requirements. Here are the most crucial vitamins chickens should consume in order to ensure maximum health.

VITAMIN D

Vitamin D is very important for chickens. Luckily, chickens can absorb plenty of Vitamin D from the sun, but if this isn't possible due to weather or other reasons, then Vitamin D should be added manually to their diet.

Vitamin D is found cod liver oil, as well and is necessary for helping chickens metabolize calcium and phosphorus. A Vitamin D deficiency can lead to easily-breaking eggshells or laid eggs to have very thing shells overall.

VITAMIN A

Vitamin A is especially healthy for breeding chickens. Many seasoned farmers feel that a chicken can never get too much Vitamin A. Though this statement isn't entirely true, it does shed the light on the importance of Vitamin A to breeding chicken diets. Vitamin A can also come from yellow corn and cod liver oil as substitutes.

RIBOFLAVIN

Riboflavin is one of the B vitamins. It helps the embryo in the egg reach its full stage of development and hatch as a small chicken. Usually, commercial feeds are lacking in it and chicken breeding farmers need to use supplements to ensure the chickens consume Vitamin B in the right amounts. This vitamin can typically be found in dairy products, yeast, and cod liver oil and in lots of green leafy vegetables.

VITAMIN E

This vitamin is essential for the chickens as it helps them to get protection against diseases. It raises their immunity levels as well. This vitamin is found in fresh greens and wheat germ oil.

Ensure that the chicken gets enough of the minerals and the vitamins so that they can lead a healthy and disease-free life.

GREENER IS BETTER

Chicken feed comes in one of two types—dry feed and green feed. Green feed is very important because it improves the taste of the meat and eggs. One of the major mistakes in breeding chickens is not feeding them with the right kind of greens. There are several types of green feed you can give your chicken. The different types of green feed can affect the health of the chickens and can also add a distinctive odor or taste to the eggs.

All the green fodder types contain high amount of water, but only some of them have high amounts of nutrients. Wheat grass is one green feed that hens seem to like. The plant is full of nutrients as well as of water. Chickens love it so much that they will eat it all the time if allowed.

In addition to the wheat grass, chickens can eat any weed clippings that you can get from your garden. It is very important to make sure that they are eating safe plants and safe food. Generally, however, chickens will not consume foods that are harmful to them.

There are two methods to feed your chickens with green food - you either get them out of the coop and let them feed on their own in your garden or you can cut the grass and the green weeds and put it in their coop.

If you go with the first approach, then you need to make sure that the perimeter is safe and there are no predators that can harm your chickens while they're out and eating. You'll need to monitor the weather, as well. If it is going to be windy or rainy, then you need to get the hens inside as soon as possible. If you are leaving for work, then do not leave your chickens outside unless you are sure that they are safe or predators will have them for lunch. Another consideration to keep in mind is if you have plants in your garden that you want to keep for yourself. Chickens can become predators themselves when it comes to plant life.

If you go for the second method, then you need to make sure that you supply your chickens with enough amounts of green food. In the meantime you can easily keep them protected from predators with a fenced-in coop. Also, make sure the available coop space in the free-run is capable of accommodating the number of chickens you have.

Feeding your chicken with green food can save you a lot of money compared to feeding them dry ration. Greens can be a free source of food for your chickens, if you decided to grow some useful greens in your garden or your backyard. If you are able to plant different sections of your back-yard with green stuff sprouting during different times of year, then you won't need to worry about running out of food for your chickens.

All recent research has proven that green feed will enhance the amounts of Vitamin A, Beta Carotene and Omega-3 fatty acids in the eggs and will also help to eliminate a big chunk of cholesterol from the egg content.

EGG UTILIZATION

The main reason most people raise hens is to get eggs, but often the supply will exceed the demand. Once a breeder builds his first chicken coop and the hens start to lay eggs there may be heaps of leftover eggs lying around. So what do you do with them?

The best solution for such situation is to sell these eggs through Farm Gate Selling. Farm Gate Selling is a legal way to get rid of the excess quantities of farm products that you do not need. There are no taxes levied. You will be able to get back a portion of what you are paying to keep the hens, but there are some points that you should keep in consideration when you opt for Farm Gate Selling.

1. **Advertise and promote your eggs.**

   The best thing to do is to hang up a sign announcing that there are eggs for sale. AS people get to know you sell eggs and buy them regularly, you may need another sign for when the egg supply runs out.

   After you advertise your eggs, you need to make sure that you legalize everything in order to start selling these eggs and make some profit. When you start your own farm selling point, you need to do a couple of things in order to ensure people that the eggs you are selling are safe.

2. **Write down the production date of the eggs you are selling.**

   Usually, the egg can withstand three weeks in storage before it goes bad. When you add such a sign, you spare yourself lot of problems and money spent. The presence of the production date on a stand beside the products solves lots of problems and spares you a lot of hassle. It is mandatory to put the production date and the “best before” date. This will assure people that you are selling fresh eggs.

3. **Ask your regular customers to place their buying orders upfront**

   This way, you can set aside the eggs they want. This is a very effective way to sell your eggs and any other farm products too. When you display your eggs, make sure that you are displaying moderate sized eggs that are not so small or so big. When someone needs smaller or larger eggs, he or she should give you a note upfront. This will help you pick the required size and number of eggs.

4. **Choose the cleanest eggs.**

   Buyers may accept a little spot on the shell, but you should do your best to choose the clean eggs to display for your customers and save the others for household usage. Eggs can be cleaned by rubbing them lightly with steel wool—with no soap.

PART II: Protein Power From Rabbits

Rabbits are a great source of low-fat protein. A 3 oz. serving of rabbit meat contains 28 grams of protein, 4 mg of iron, 204 mg of phosphorous, and 292 mg of potassium. Rabbit meat is higher in protein than beef or chicken, and lower in fat.

The younger rabbits or "fryers", weigh anywhere from 1.5 lbs to 3.5 lbs and are approximately 3 months old. This meat is often prepared much like chicken in recipes and is virtually indistinguishable from chicken in most casseroles. The latter being a great way to serve it at family functions and "sneak it by" those relatives who are apprehensive to trying new types of foods.

Mature rabbits weigh more than 4 lbs., often reaching 10 or 11 lbs., at the age of 8 months or more. The meat from older rabbits is usually tougher than that of the fryers and can take longer to cook. It is sometimes used in recipes in place of beef, though it's more comparable to duck meat. The meat from older rabbits is often stronger in flavor as well. For some, the "wilder" taste of mature rabbit meat can be unpleasant.

For that reason, this meat is better to put into recipes with other strong flavors such as chili and other spices. Rabbits are quick to harvest, as well; you can harvest them in as little as 3 months. A Doe rabbit's gestational period is roughly 32 days and a 10 lb. Doe can produce 320 pounds of meat per year. Rabbits eat very little and require much less space than almost any other meat animal.

Zoning laws will allow you to raise rabbits in most backyards even when other meat animals have been banned, such as chicken, goats, and cows. For that reason, you're not required to buy farmland to raise your own rabbit meat.

Before proceeding, you should be aware of "Fluffy Bunny" syndrome. Many people do not have the stomach to handle killing rabbits, and it can be easy to become attached to the rabbits that you're raising. Children are the most susceptible to this and it can become a major issue for them. While rabbits are usually quiet, you'll want to be wary of neighbors, as they and PETA can make life difficult for you.

AMERICAN RABBIT BREEDS

There are 47 different rabbit breeds, many of which are show rabbits or very small rabbits not worth breeding for meat.

1. American
2. American Chinchilla
3. American Fuzzylop
4. American Sable
5. Belgian Hare
6. Beveren
7. Blanc de Hotot
8. Britannia Petite
9. Californian
10. Champagne d'Argent
11. Checkered Giant
12. Cinnamon
13. Crème d'Argent
14. Dutch
15. Dwarf Hotot
16. English Angora
17. English Lop
18. English Spot
19. Flemish Giant
20. Florida White
21. French Angora
22. French Lop
23. Giant Angora
24. Giant Chinchilla
25. Harlequin
26. Havana
27. Himalayan
28. Holland Lop
29. Jersey Wooly
30. Lilac
31. Mini Lop
32. Mini Rex
33. Mini Satin
34. Netherland Dwarf
35. New Zealand
36. Palomino
37. Polish
38. Rex
39. Rhinelander
40. Satin
41. Satin Angora
42. Silver
43. Silver Fox
44. Silver Marten
45. Standard Chinchilla
46. Tan
47. Thrianta

Small or Mini Rabbits (Max weight under 7lbs):

- American Fuzzy Lop 4lbs.
- Britannia Petite 2.5 lbs.
- Dutch 5.5 lbs.
- Dwarf Hotot 3 lbs.
- Florida White 6 lbs.
- Havana 6.5 lbs.
- Himalayan 4.5 lbs.
- Holland Lop 4 lbs.
- Jersey Wooley 3.5 lbs.
- Mini Lop 6.5 lbs.
- Mini Rex 4.5 lbs.
- Mini Satin 4.7 lbs
- Netherland Dwarf 2.5 lbs.
- Polish 3.5 lbs.
- Tan 6 lbs.
- Thrianta 6 lbs.

Standard Size Rabbits (Max weight 7-12 lbs):

- American 12 lbs.
- American Chinchilla 12lbs.
- American Sable 10 lbs.
- Belgian Hare 9.5 lbs.
- Beveren 12 lbs.
- Blanc de Hotot 11lbs.
- Californian 10.5 lbs.
- Champagne d'Argent 10.5 lbs.

Standard Size Rabbits (Max weight 7-12 lbs):

- American 12 lbs.
- American Chinchilla 12lbs.
- American Sable 10 lbs.
- Belgian Hare 9.5 lbs.
- Beveren 12 lbs.
- Blanc de Hotot 11lbs.
- Californian 10.5 lbs.
- Champagne d'Argent 10.5
- Cinnamon 11 lbs.
- Crème d'Argent 11 lbs.
- English Angora 7.5 lbs.
- English Spot 8 lbs.
- French Angora 10.5 lbs.
- Harlequin 9.5 lbs
- Lilac 8 lbs.
- New Zealand 12 lbs.
- Palomino 11 lbs.
- Rex 10.5 lbs.
- Rhinelander 10 lbs.
- Satin 11 lbs.
- Satin Angora 9.5 lbs.
- Silver 7 lbs.
- Silver Fox 12 lbs.
- Silver Marten 9.5 lbs.
- Standard Chinchilla 7.5 lbs.

Small or Mini Rabbits (Max weight under 7lbs):

- American Fuzzy Lop 4lbs.
- Britannia Petite 2.5 lbs.
- Dutch 5.5 lbs.
- Dwarf Hotot 3 lbs.
- Florida White 6 lbs.
- Havana 6.5 lbs.
- Himalayan 4.5 lbs.
- Holland Lop 4 lbs.
- Jersey Wooley 3.5 pounds
- Mini Lop 6.5 lbs.
- Mini Rex 4.5 lbs.
- Mini Satin 4.7 lbs
- Netherland Dwarf 2.5 lbs.
- Polish 3.5 lbs.
- Tan 6 lbs.
- Thrianta 6 lbs.

Giants: (Max weight over 12 lbs.)

- Checkered Giant (no max weight listed)
- English Lop (10.5 lbs. and up)
- Flemish Giant (no max listed)
- French Lop (no max listed)
- Giant Angora (no max listed)
- Giant Chinchilla (16 lbs.)

CHOOSING YOUR BREED

When choosing a breed to raise, you'll want to take into consideration what type of farming you'll be setting up and how much space you'll need to do it.

The larger the animal, the more space you'll need, and some breeds do better in certain climates than others. You'll also want to decide if you'll be housing them indoors or if you're looking to do an outdoor setup.

Unless you know the breeder well and you're willing to take the chance on their word, you should really buy only pedigreed rabbits. While Pedigrees won't ensure the health of the animals, they do have documentation of what type of rabbit it is and its lineage back 3 or sometimes 4 generations.

If you're planning on selling the fur, selling offspring, or showing any offspring in the future, you'll want to have a pedigree on your animals.

Pedigrees not only show the breed of the animal, but who sired it, who bred it, and who the Doe was. This goes back 3 generations, so you can trace back your animals to previous breeders, if needed. If you live in a small area with only one or two breeders, this pedigree can also help to prevent too much inbreeding. The more inbred the animal, the more health problems and deformities you may have in your offspring.

The standard practice for the rabbits name is for it to start with the rabbitry or breeder's name. This helps trace the lineage and prove the breeding. It doesn't show ownership, but merely who paired the sire and Doe. Offspring of a pairing usually bear the breeder's name on the pedigree unless agreed to otherwise. It can cause a mess if this is changed, and is highly offensive to the breeder who created the rabbit.

Registered rabbits are generally for show only, and demand higher prices. In order to register a rabbit, it first must have a pedigree of 3 generations. American Rabbit Breeders Association (ARBA) will need to check out and grade the rabbit by its breed. It must meet specific criteria for that breed in order to qualify. This includes ornamental coloring aspects as well as health.

Who To Buy From

As with any business, there are those that are high quality and those that aren't. Make sure that you start your breeding with the best quality (health) of rabbits as possible. You'll want to check out the breeder's facilities and check

the animals over for any signs of illness. You'll want to hold your prospective rabbit, thoroughly examine it for illness or damaged feet and ask for its health record.

Rabbits catch each other's illnesses rather quickly, so if there is any signs of illness among the rabbits at that breeder, you'll do best to wait or find a different breeder.

Sick rabbits should be removed from other rabbits as soon as possible and either culled or placed far away until it's healed. Most rabbits, once sick, do not recover.

You'll also want to make sure you trust the seller for other reasons. A forged pedigree, even falsifying a rabbits age by just a few months, can sometimes mean the difference between having a viable rabbit for breeding or simply just buying lunch. So check around your area and ask other farmers for their opinions on where to get the best stock. You may also want to check with your local Humane Society or Animal Rescue as they may know of places that breed inhumanely, which may have lower quality or diseased stock.

It is also not recommended to purchase stock around Easter as some breeders may have over-taxed the Does or their resources in order to have supply for the demand.

MEAT RABBITS

Meat rabbits are labeled as such because they have high litter counts and are bred to improve reproductive abilities. Unlike show breeds, the coloring on these is not generally as important as their ability to reproduce at great rates, which is what you'll want for raising meat.

Some of these are also show breeds, so do make sure to ask how the rabbit was bred. If it was bred for show, it may have a lower litter count than is normal for its breed. The New Zealand and Californian breeds are the most popular breeds raised for meat in the USA.

Meat Rabbit Breeds

New Zealand (New Zealand White):
Despite its name, this is a purely American breed of rabbit. The most popular of this breed is the New Zealand White, but it is also recognized in red and black. Crossbreeding of these colors can result in more diverse coloring. This is one of the larger breeds of rabbit and can weight anywhere from 9-12 lbs. New Zealand rabbits are primarily bred for meat, but also for their pelts, show, and for laboratory use. Adults can be more aggressive than other breeds, so routine handling is often recommended to help curb this trait. Does bred for meat can average 8-10 kittens (babies) per litter. Breeding experiments with this breed showed that it improved the kits per litter of other breeds when crossbred, and often had a higher number of kits per litter within its own breed than other breeds.

Californian: This is another American breed of rabbit developed in the early 1900's in Southern California. It is a cross of Himalayan and Chinchilla rabbits with New Zealand Whites. It was bred to produce a great pelt while supplying good meat. Today, this is the second most popular breed for meat producing in the world, the first being the New Zealand rabbit.

The Californian is classified as a "fancy breed". It is most noted for its big ears and is considered moderate in size averaging 8-10 lbs. Coloration of the rabbit is similar to the Himalayan rabbit. It should have a predominantly white body and dark brown to black fur on the feet, ears, nose, and tail. They have pink eyes. Does bred for meat can average 8-10 kittens per litter.

Palomino: This breed is more docile than some of the other meat breeds, and can make great pets if you're so inclined. It comes in two varieties: Golden and Lynx with fly-back fur. Palomino's can weigh from 8-11 lbs, and usually average about 9 lbs. Does bred for meat can average 6-10 kits per litter.

Satin: Satin rabbits were initially made by mistake. Walter Huey of Indiana was attempting to develop a color of his Havanas when he inbred his animals accidentally creating rabbits with a satin-textured fur. When tested, it was discovered that the rabbits carried a recessive gene. Originally shown as Havanas, there was an initial uproar when they were put into their own individual breed category.

Satin rabbits have a generally pleasant and calm personality. Adult weight ranges from 8-11 lbs. It is accepted in many colors such as golden red, orange, grey, black, and white. The colored varieties may or may not have a lighter circle of fur around the eyes. Litters are comparable to the Palomino, and average around 8 per litter for those that are bred for meat. These rabbits are bred for their fur and for meat, as well as for pets.

American Chinchilla: These used to be called "Heavyweight Chinchilla" and are larger than the standard Chinchilla, but otherwise identical. This breed was brought about by breeding the standard Chinchilla to produce a larger size. They were introduced to the US in 1919.

The American Chinchillas are bred for meat and fur, but some are shown and can be a hearty pet. Unlike the other breeds, American Chinchillas do not require regular grooming. These are stocky rabbits with a curved back starting at the nape of the neck to their rump. Their weight ranges from 9-12 lbs, and like other rabbit breeds, the Does will weigh at the top of scale and males at the bottom. The average litter size for a Doe is 7-10 kittens per litter.

Blanc de Hotot: These are very distinct white rabbits with a black or dark circle around a dark eye. They were initially created in France, rumored to be a blend of Flemish Giant, Geant Papillion Francais, and White Vienna. These are rather rare to find and are listed as "threatened" but not yet endangered.

The standard of perfection with this breed is to have no other color than a band around the eye. The band should be 1/16 to 1/8 inch wide with both eyelids and eyelashes in black. Banding with any break in it is a disqualification when showing the animals, as is too wide of a band. The meat still tastes the same, so you may be able to get members of this breed cheaper if they are slightly flawed in this manner.

The Blanc de Hotot weighs from 8-11 lbs. They are good breeders and generally have large litters averaging around 9 kittens per litter.

Champagne d'Argent: Once known as the French Silver, these are one of the oldest of the French show rabbits, and are great sources of meat as well. Slightly arched backs and shorter rounder ears characterize them. Kittens are born solid black, but start to show variation at around 4 months. Their coloring is a slate blue shade with darker blue underbelly and around the ears and mouth. Some varieties also have a touch of color around the eyes with a trail from the eyes to the mouth.

These are great natured rabbits and are often used as pets. They are small boned rabbits, but range in weight from 8-12 lbs. Litters average 8 kittens.

Cinnamon: The Cinnamon rabbit is a relatively new breed created on accident by children of a rabbit breeder. It is a combination of Chinchilla, New Zealand, Checkered Giant, and Californian. Created in 1964, it became an established breed in 1972.

The Cinnamon rabbit is most widely recognized by its unique coloring. It is a cinnamon color with dark brown around the ears. Its body has a

uniform grey ticking along its back, and its feet and mouth appear to be a darker color than the rest of the body. It also has erect ears. They range in weight from 8-11 pounds, and have average litters of 9 kittens.

They are well suited to being pets as well as being raised for their coats and meat. Since these are not the most common meat rabbits, the fur of these may catch a higher price.

Crème d'Argent: This rabbit is similar to the Champagne d'Argent in size and nature. The coloring is the main difference, as these have creamy fur with orange under-color and dark brown eyes. They weigh between 8-11 lbs. and have an average of 5-8 kits per litter.

Silver Fox: This breed was first recognized in 1925 under the name "American Heavy-weight Silver", then later became "American Silver Fox". It is now shortened to "Silver Fox", though it is not the same rabbit as "Silver Fox" in other countries. "Silver Fox" in other countries is actually the rabbit breed Silver Marten. This particular breed is not recognized in other countries.

The Silver Fox are known for their docile nature, and the kits are born solid black or blue. Kits start to show silvering at 4 weeks, but can take up to 4 months for their coloring to complete. Adults weigh from 9-12 lbs. They average 9 kittens per litter.

The breed is valued as much for its fur as it is for its meat producing. The fur is extremely dense and will stand up when stroked in the wrong direction. This is one of the few rabbits that have this trait, and is a telltale sign of this breed.

American Sable: This breed is the result of Chinchilla rabbit cross-breeding. They're nearly identical to Chinchilla rabbits in body structure, but their coats are colored differently. They look eerily like a Siamese cat with head, ears, feet, back and the tail in a dark brown/black while the body is a lighter tan color. The eyes of this breed are usually dark and may have a red hue.

These are one of the smaller rabbits, reaching 7-10 lbs., and are a social animal. They enjoy the company of other rabbits and their owner, despite spending most of the day sleeping. They average 8-10 kittens per litter.

Harlequin: This is an older breed and known mostly for its coloration. It comes in many colors but is most known for its Black Magpie variation, part black and part orange. Ideally, Harlequins should have a half and half color on the head, often looking like a dividing line down the front of the face. The body also has color blocking, which often looks like large stripes across the back.

Recognized color patterns are Black, Blue, Brown, Lilac. The rabbits are playful, docile and often intelligent. These usually respond to their name, and can be litter box trained. They are often sold as pets, however since the proper color variations are difficult to produce, many of this breed are culled until the proper look for sale is achieved.

Harlequin adult rabbits can get up to 6-9 lbs. and should start breeding at 6 months. The first litter needs to be borne before they reach one

year old, to prohibit their pelvic bones from fusing incorrectly. Their litters average between 3-5 kittens, but can be as large as 9.

Rex: The Rex rabbit is best known for its plush fur. It was developed in France in 1919 and is recognized by having guard hairs that are as long as its coat. Other breed's guard hairs are longer than their coats. This gives the fur of a Rex rabbit a thicker, more velvety feel, and this rabbit is often raised for its fur alone.

The Rex is available in many different colors: Amber, Black, Blue, Broken varieties, Californian, Castor, Chinchilla, Chocolate, Cinnamon, Dalmatian (broken black), Ermine or pure white, Fawn, Harlequin, Havana, Lilac, Lynx, Marten Sable, Marten Seal, Opal, Orange, Otter, Red, Sable, Seal, Satin fur varieties, Siamese Sable, Siamese Seal, Silver Seal, Smoke pearl-Marten, Smoke pearl-Siamese and Tortoiseshell. Though only a few of these colors are recognized for show. It also has straight-standing ears.

The Rex adult rabbit weighs between 7.5 and 10 lbs., and may have 6-8 kittens per litter.

Silver Marten: This breed was first established in 1927 for its chocolate and black varieties; sable and blue were added in a few years later. Its most noted by its coloring. The rabbits are almost entirely one solid color with a lighter shade under the chin, underbelly, and inside the ears. They have fly-back fur and standing ears.

Adults reach 6-9 lbs. Litter sizes average 6-8 kittens. They're supposed to make great pets, but can be more timid than other varieties.

Meat Rabbits By Size

- Meat Rabbits By Size
- New Zealand: Buck 9-11 lbs., Doe 10-12 lbs.
- Silver Fox: Buck 9-11 lbs., Doe 10-12 lbs.
- American Chinchilla: Buck 9-11 lbs., Doe 10-12 lbs.
- Palomino: Buck 8-10 lbs., Doe 9-11 lbs.
- Champagne d'Argent: Buck 8-10 lbs., Doe 10-12 lbs.
- Satin: Buck 8-10 lbs., Doe 9-11 lbs.
- Blanc de Hotot: Buck 8-10 lbs., Doe 9-11 lbs.
- Cinnamon: Buck 8-10 lbs., Doe 9-11 lbs.
- Crème d'Argent: Buck 8-10 lbs., Doe 8.5-11 lbs.
- Californian: Buck 8-10 lbs., Doe 8.5-10 lbs.
- American Sable: Buck 7-9 lbs., Doe 8-10 lbs.
- Rex: Buck 7.5-9.5 lbs., Doe 8-10 lbs.
- Harlequin: Buck 6-9 lbs., 7-9.5 lbs.
- Silver Marten: Buck 6-8lbs., Doe 7-9lbs.

THE GIANTS

The Giants category is just what it implies. These are huge rabbits, and not recommended for the first time rabbit breeder or for a rabbit novice. Due to their sheer size, it can be difficult to handle these animals without causing damage to their spines. So, breeding these should be left to those with a few years' worth of experience under their belt or with commercial farm facilities.

They eat quite a lot and produce a vast amount of waste compared to smaller varieties. They also require a quite a bit more room due to their size and are prone to sore or damaged hocks if left to stand on cage wire for long periods.

Of the Giants, the Flemish Giant is one of the most popular and is often bred with other rabbits to produce larger varieties and new breeds. The second most popular is likely the French Lop. As with all Giants, these rabbits take longer to mature on average than their smaller counterparts.

Checkered Giant (no max listed): The Checkered Giant is considered a show rabbit rather than a meat rabbit. As such, it won't have the muscle mass that meat giants of the same size would have. The Checkered Giant is black and white spotted. Its ears, nose and around the eyes will be solid black or blue. Body type markings differ between the European and American Checkered Giants, although they are considered the same breed.

Checkered Giants bucks should weigh at least 11 lbs., with mature Does averaging 12 lbs. It is outweighed by the Flemish Giant and Giant Chinchilla. These are not known to be child- friendly, and are rather active rabbits.

English Lop (10.5 lbs and up): This is a fancy breed of rabbit and one of the oldest breeds. It was developed in the 19th century through selective breeding, and is the original Lop breed. It is most noted as a household pet though originally intended as a meat rabbit.

The English Lop averages 11 lbs., and is known for its extra long lop ears. Its ears can average 22 inches which is the largest of any rabbit breed. English Lops are short-haired in solid or broken colors (color/white). They can come in many different colors including: black, fawn, white, golden and sooty fawn.

Flemish Giant (no max listed): This is one of the oldest breeds of domestic rabbit and has been bred since the 16th century, originating in Belgium. The Flemish Giant has seven recognized colors: black, blue, fawn, light gray, sandy, steel gray, and white. They have a semi-arched back with the arch starting at the back of the shoulders and ending at the base of tail. This gives it a "Mandolin" type shape.

It is a very strong and powerful rabbit and is

often raised for meat. They can be docile, but frequent handling and interaction is necessary to ensure this personality trait. Like all rabbits, Flemish Giants can become fearful and violet if handled incorrectly. This is much more serious due to its size and power. It is not unusual for this breed to reach 20 lbs.

French Lop (no max listed): This breed is a combination of the English Lop and Flemish Giant. It was established in France in the early 1900's. Lops have ears that droop from the head, and the French Lop is no different. It has a wide range of varieties of colors, and can be found in solid or broken coloring.

The French Lop should be bred at 9 months of age, and should have its first litter by the time it is one year old. At one year, the pelvic bones fuse together making natural birth extremely difficult for this rabbit; having a litter prior to this helps shape the pelvic bones to fuse correctly to allow natural birth. At 3 years of age, Does should be retired from breeding.

Adults have a minimum weight of 10 lbs., and are often heavier. They're known for their large litters of 9 or more kittens on average.

Giant Angora (no max listed): This breed is bred almost solely for its fur. The rabbits are rather comical as they are a huge fur ball with a face peeking out. This is the largest of the angora breeds recognized. They are only accepted in pure white with ruby eyes (albino coloring) and are generally docile rabbits.

Giant Angora's require quite a bit of maintenance to keep their fur from matting, and to keep them from dying of fur balls. Each time they try to clean themselves, they swallow a little bit of fur. With fur that grows an inch per month, it can add up quickly. It is recommended to sheer these rabbits about every 90-180 days. It is considered a must for the health of the animal to sheer it at minimum every 180 days. Each sheering can produce 12 ounces of wool.

Giant Chinchilla (max weight of 16 lbs.): Sometimes called the "Million Dollar Rabbit", this chinchilla was first produced in 1921 by selectively breeding overweight Chinchillas with the Flemish Giant and American Blue. It is blue/grey-flecked with a lighter colored under chin and belly.

Initially produced for its fur, it's also a great meat producer. It grows to a good size rather quickly, reaching 6 pounds at 8 weeks and 9 pounds at 12 weeks. It is also known for having large litters.

Feeding your Rabbit

There are quite a few food choices for rabbits, but commercial pellet feed is the most popular and easiest to manage. The pellets are high in fat and protein. It is recommended that you feed your rabbit ½ cup of pellets per 5 pounds of body weight every day. Depending on how much you supplement with other foods, you may be able to reduce this to 1/8 cup per 5 pounds. Pregnant rabbits or rabbits under 8 months of age should be fed unlimited amounts of feed.

Selecting a good pellet feed can be a little tricky. Do not be deceived by pellets that look whole fiber or appear to have crunchy bits. Pellets that contain dried fruit, seeds, nuts, or colored bits can be harmful to a rabbit's digestion. Bad choices in food can lead to fecal matter caked onto the rabbits behind, and can be a sign of cecal dysbiosis, in which the bad intestinal bacteria outnumbers the good bacteria, which can lead to a very sick bunny.

Rabbits also need a fresh supply of water or they may not eat properly. Use a ceramic (inedible and heavy) bowl to supply the feed and water, or you may use a water bottle attached to the cage. Water bottles for rabbits have a metal tube with rolling ball that settles and stops the water from dripping out, but when moved by the slightest touch releases a little water. With either method, you'll want to monitor your rabbits to make sure there is a sufficient supply of clean, fresh water and that the bottle is operating properly. Bottles should be cleaned regularly to prevent bacteria buildup and to keep the ball function operating properly.

In addition to pellet feed, your rabbits will need an endless supply of roughage. Place bits of grass hay between the cages for the rabbits to nibble on as needed. You can also supply them with fresh vegetables and fruits, but these should be introduced slowly. Any significant changes in a rabbit's diet can cause serious effects in their fertility and health. Any changes in diet should be gradual. If you're getting a rabbit from another breeder, be sure to ask what the rabbit's diet regimen is so you can better ease them into your own system. The less traumatic you can make a transition, the better off the rabbit will be.

The rabbit diet should be mostly grass/hay. You'll want to avoid alfalfa hay, as it is high in calories and calcium and can cause health problems if fed too often. They should also have fresh food during the day for added nutrients/vitamins. You can give them about 1 cup of leafy greens per 2-3 pounds of body weight per day. Most leafy greens are acceptable and should be rotated for variety.

Other vegetables can be supplemented in addition, such as broccoli, cauliflower and root vegetables. You can give these other vegetables to rabbits in a dose of 1 tbsp. per 2 lbs., of body weight per day. Do not give your rabbit vegetables from the onion family (onions, garlic, leeks, asparagus, chives), as these can cause problems in their blood.

With adding vegetables, watch your rabbit for any signs of distress or diarrhea. Introduce new foods slowly. If your rabbit shows signs of diarrhea, discontinue that vegetable and try something else.

Acceptable leafy greens: (1 cup per 2 lbs.)

- Arugula
- Carrot tops
- Cucumber leaves
- Endive
- Escarole
- Frisee Lettuce
- Kale
- Mache
- Red or Green Lettuce
- Romaine Lettuce
- Turnip Greens
- Dandelion Greens
- Mint
- Basil
- Watercress
- Wheatgrass
- Chicory
- Raspberry leaves
- Cilantro
- Radicchio
- Bok Choy
- Fennel (entire plant)
- Borage leaves
- Dill leaves
- Yu Choy

Non-leafy vegetables: (no more than 15% of their diet. 1 Tbsp. per 2 lbs.)

- Edible flowers (roses, nasturtiums, pansies, hibiscus)
- Bell pepper
- Broccoli
- Broccolini
- Brussel sprouts
- Cabbage
- Carrots
- Celery
- Chinese pea pods (without large peas)
- Mushrooms (human-edible varieties)
- Summer or Zucchini squash

Fruits: (not more than 10% of the diet. 1 tsp per 2 lbs.)

- Apple
- Apricot
- Banana (remove peel—no more than 2 slices 1/8 in. thick per day for a 5 lb. rabbit)
- Berries (cooked or uncooked)
- Cherry
- Currants
- Papaya
- Pear
- Peach
- Pineapple (remove skin)
- Plum
- Kiwi
- Mango
- Melons (peel and seeds are fine)
- Nectarine
- Star Fruit

CAGE AND ENVIRONMENT

Unfortunately, there isn't one style of cage to suit every need. The following are a few guidelines you'll want to keep in mind when making your rabbit shelter.

- **COMFORTABLE** It should be comfortable for the rabbits. They'll be spending a lot of time in it.
- **CONFINEMENT** It should confine the rabbits to keep them from escaping.
- **PREDATORS** It needs to protect the rabbits from predators.
- **WEATHER** The housing should protect the rabbits from bad weather. Rain, shine, hail, sleet, or snow.
- **ACCESS** You'll need to be able to comfortably access the rabbit in the cage.
- **CLEANING** The cage should be as self-cleaning as possible and easy to clean.
- **COST** It should be reasonable priced and easy to maintain.
- **DURABILITY** It should be able to withstand a few years of wear and tear.

To allow for the comfort of the rabbits, the size of cage you need is going to vary depending on the size of rabbit, and so is the structure of it.

Most rabbits will survive in a sheltered outdoor situation in moderate climates, but do not do well with getting wet. If it gets too hot or too cold, rabbits can freeze or overheat rather easily. As such, it is recommended that rabbits have "houses" of their own or are raised inside a home or shelter.

Most ready-made cages will work fine for standard breeds, but the larger breeds will need more support. The Giants will require a wood or solid- bottomed cage or their feet will become injured due to their weight on the wire mesh. Giants also require approximately 5 sq. ft. of "run" space. It's recommended that you allow ¾ sq. ft. of space per pound of mature body weight. So it's best to pick your breed before you buy your cages.

Cages will also need to have built in waste disposal and regular cleaning to ensure that the rabbits remain healthy. For standard breeds, a wire mesh bottom is used and waste falls down into a pit where it can be scooped out as needed. The giant breeds will require more hands-on cage cleaning, as most of their cage will need to be solid footing.

The pit below the cages should be made with wood chips or dirt to help soak up the urine. Rabbit urine is high in urea, which mixes with

moisture to form ammonia and can become unbearable rather quickly. Having some kind of absorbent material below the cages helps to alleviate this issue. You'll also want to have a good ventilation system.

The cages should have the option of direct sunlight during part of the day. Sunlight is good for the animals and is a natural germ killer. However, your rabbits shouldn't be forced to endure long periods of direct sun, as they may overheat or suffer sunburn. So make sure there is a spot of shade in their cages as well.

An Optimal environment for rabbits is about 55 degrees F., as high temperatures will reduce food intake and growth. Too low of temperatures will result in higher feed costs, as it will take more dietary energy for the rabbits to keep warm. Humidity should be about 35-50%, as this will help keep the floors and manure dry. Lower humidity can cause the rabbits to have respiratory issues, and high humidity may increase the ammonia levels.

PREDATORS AND DISEASES

Most literature will warn you about having cats or dogs around your rabbits. This is generally not an issue if the dog or cat is well fed and well trained. Certain breeds may be more hazardous than others, and it's best that these pets be introduced early to the rabbits and taught proper behaviors.

Once they understand that the rabbits are not foreign but part of the "family", most pets will accept it. Cats are a bit harder to train in this, so problematic cats may need to be removed from the home. Certain hunter breeds of dogs may also be problematic. However, most working, shepherding dogs adjust fine to the new additions and have been known to herd the rabbits if they escape.

Other predators such as foreign dogs, cats, rat, raccoons, or coyotes can be problematic depending on where you live. Even if you live in a town, you should plan for a possible rat/raccoon problem and for stray cats/dogs. Durable welded mesh in 1/2 "x 1" is the best choice as it is strong and won't break easily, and has small enough holes for the rabbits not to fall through. It is also spaced wide enough apart to allow feces to fall through unencumbered.

Be sure your cages are sturdy and high enough to prevent these animals from breaking in. A guard dog and possibly an extra fence may help with this issue as well.

Sadly, there aren't a whole lot of cures for rabbit diseases, and since rabbits tend to spread their germs rather easily, you should removed any sick rabbit from the area where your other rabbits are. If you want to try to cure them, you may, but it is advised instead to kill them.

Different experts disagree on how to go from there though. Some say that the carcass should be immediately buried or burned to prevent the spread of the disease. Others say that in most cases it's fine to eat the animal as rabbit-to-human disease transmission is rare.

Other Diseases To Watch For

Snuffles Sneezing or long sessions of sneezing. Thick white snot in your rabbit's nose? This is what is called "the Snuffles" or pasteurella multocida. It is incurable and very contagious. Do not breed this animal. It should be culled immediately.

Diarrhea Watery or mucus-covered stools. Some can be fatal in 12-48 hours.

- **ENTEROTOXEMIA** Sudden acute diarrhea often in 4-8 week old rabbits, resulting in death within 12-24 hours.
- **TYZZER'S DISEASE** Just like Enterotoxemia,

but caused by a different bacteria.

- **COCCIDIOSIS** This disease attacks the liver, causing severe diarrhea.
- **MUCOID ENTERITIS** Caused by bowel blockage.
- **EPIZOOTIC RABBIT ENTEROPATHY** Highly contagious diarrhea for rabbits.
- **"MILD" DIARRHEA** If you are alert, it should stay mild.

Rabbit Hemorrhagic Disease RHD is a viral disease that can wipe out your entire herd in a matter of days. It is most noted by these three types:

- Sudden and violent death, and then more dead rabbits. It is exceedingly contagious.
- Rabbit goes off its feed and shows lethargy and trouble breathing. Body temp soars to 105-106 degrees, then cools off just as the rabbit dies.
- Bloody nasal discharge, tightness and arching of the back, noisy respiration as the rabbit struggles to breathe. With this variety, the rabbit may be dead in a matter of hours. In some younger rabbits, it may recover and show immunity. These survivors tend instead to be dormant carriers of the disease, spreading it throughout the herd in feces and urine for at least a month, maybe longer.

Myxomatosis Nasty virus carried by wild rabbits and transferred by mosquitos. It is fatal. It's most common in Europe, but is also present in California and Oregon. It comes in two forms:

- **RAPID DEATH** You won't see it coming.
- **DELAYED DEATH** Slight redness of the eyelids, loss of appetite, elevated temperatures. It'll soon be a dead rabbit, and should be culled from the herd.

Whenever a rabbit goes off its feed or appears abnormal and if their rectal temperature is elevated above 103.5 degrees F, kill the rabbit and bury the carcass. In many cases, this is the only way to protect the rest of the herd from a deadly disease spread.

REPRODUCTION AND THE YOUNG

Most Doe rabbits will be ready to breed at 8 months. Smaller varieties may be ready a month earlier and larger varieties may be a month later. It is essential if you're going to breed a Doe that she bear a litter before she is one year old. This ensures that her pelvic bones do not set too narrow for birth. Bucks, or male rabbits, tend to need more time to mature before breeding. Often, this is just a couple more months, but for some giant breeds, it can be over a year. It's best to ask the breeder who supplied your rabbit for the proper breeding timeline.

Rabbits do not ovulate on a regular cycle. The mating of a rabbit will cause the Doe to produce eggs necessary for fertilization. Although she has no real heat cycle, she will only accept a Buck in about 12 out of every 14 days. When she is ready to breed her vent area will be a dark pink, red, or purple.

Always place a female into a male's cage. Males placed in new surroundings tend to get distracted with investigating the new surroundings that they forget about the Doe. Once she's in the cage, observe until mating is completed. It is not uncommon for errors in mating to occur. If the Doe refuses the buck, try it again in a few days.

In order to tell if she is pregnant, you should palpitate her belly in a few weeks. She may already show signs of building a nest, and a nesting box should be placed in her cage so she can prepare. Does have two uterine sacs and it's possible to have a Doe pregnant with two litters. This is not recommended, as it can be problematic for the Doe, and the kits usually have health problems if born alive. For that reason, you shouldn't breed a Doe unless you're certain she is not already pregnant.

Pregnancies for Does last roughly 30 days. Smaller breeds may be a day or two less and larger breeds may be a day or two longer. You'll want to be prepared for this occasion. Most Does won't be nice and have their litters in their nesting boxes. You'll often have to move the kittens inside the nesting box for their own safety as the wire mesh on the bottom of the cages is often dirty and the holes too big for the small offspring. When touching the kittens, make sure you also touch the Doe and, if possible, rub your finger on her nose to pass your smell onto her. This will help prevent her from rejecting her kittens.

You should try weaning the kittens from the Doe at around 4 weeks. First removing the largest kitten, then the next and so on. If a kitten doesn't seem to be doing well on it's own, it can be placed back with the mother for a while longer. By 5 weeks, all kittens should be fully weaned.

BUTCHERING AND PREPARATION

This is where most rabbit breeding ideas come to die. Even some of the most well motivated have trouble with this last step, butchering. Killing rabbits can be tricky and if done wrong you, and possibly your neighbors, won't quickly forget it. Rabbits will scream if given the proper reason (such as a near- death experience).

Rabbit screams are as loud as any screaming baby you've ever heard, only with a higher pitch and sound like a child screaming bloody murder. With close neighborhoods, it is common for them to come see what is going on.

As such, killing a rabbit is an all or nothing job. If you "chicken out" half way through, you'll pay for it with a loud scream for all to hear. Some butchers use a small pellet gun to the back of the head; others break the neck; and others chop the head off in one fell swoop. You'll need to figure out which method you're most comfortable with. If you're selling the fur, you'll want to make the butchering process as bloodless as possible. Once the rabbit is dead, simply hang it, slit the neck, and let it bleed out.

To remove the fur, simply make an incision at the back of the hind legs, and place a finger inside to loosen the skin from the body. Keep pulling on the skin until you remove it all the way up to the head, then chop off the head. Once the skin is removed, make a light cut to the stomach and between the legs. Remove the innards. You may save the heart and liver if you desire.

Rinse the carcass thoroughly to make sure no contaminants got on the meat, and cook or store as desired.

The meat may be stored as you would whole chicken, or you can cut it up into pieces. You can also debone the meat and store it that way.

Cutting up the rabbit into pieces is rather simple. The entire back legs are one piece each and can be cut from the body where they attach. These make great "drumsticks". The arms of the rabbit can be removed making "wings". The chest cavity can be cut under the ribs separating the rump from the chest, and if desired, the chest can be split down the center to make two "breast" pieces.

PART III: Fish Farming and Aquaculture

Fish farming is the principal form of aquaculture, while other methods of raising fish may fall under mariculture. Fish farming involves raising fish commercially in tanks or enclosures, usually for food and sometimes for profit.

A facility that releases juvenile fish into the wild for recreational fishing or to supplement a species' natural numbers is generally referred to as a fish hatchery. Worldwide, the most important fish species used in fish farming are carp, salmon, tilapia and catfish.

There is an increasing demand for fish and fish protein, which has resulted in widespread overfishing in wild fisheries. Fish farming offers fish marketers another source. However, farming carnivorous fish, such as salmon, does not always reduce pressure on wild fisheries, since carnivorous farmed fish are usually fed fishmeal and fish oil extracted from wild forage fish.

Top 10 Freshwater, brackish water & marine cultured fish in 2010

Freshwater culture	Tonnage	Mariculture	Tonnage	Brackishwater culture	Tonnage
Grass carp	4,337,114	Atlantic salmon	1,421,647	Greasy grouper	3,677,691
Silver carp	4,116,835	Large yellow croaker	378,622	Flathead grey mullet	333,322
Catla (Indian carp)	3,869,984	Salmonids nei†	270,436	Marine fishes nei†	112,539
Common carp	3,444,203	Greasy grouper	215,028	Nile tilapia	107,489
Bighead carp	2,585,962	Sea trout	143,751	Cyprinids nei†	100,000
Crucian carp	2,217,798	Japanese amberjack	139,077	Barramundi	49,234
Nile tilapia	1,990,275	Gilthead seabream	118,212	Marble goby	34,123
Pangas catfishes nei†	1,305,277	Japanese seabass	107,903	Tilapias nei†	23,562
Roho labeo	1,167,315	European seabass	102,538	European seabass	23,313
Freshwater fishes nei†	1,080,241	Silver seabream	73,924	Mozambique tilapia	17,103

EXTENSIVE AQUACULTURE

Limiting for growth here is the available food supply by natural soursources, zooplankton feeding on pelagic algae or benthic animals, such as crustaceans and mollusks. Tilapia species filter feed directly on phytoplankton, which makes higher production possible. The photosynthetic production can be increased by fertilizing the pond water with artificial fertilizer mixtures, such as potash, phosphorus, nitrogen and other microelements.

Being that most fish are carnivorous, they occupy a higher place in the trophic chain and therefore only a tiny fraction of primary photosynthetic production (typically 1%) will be converted into harvest-able fish.

Another issue is the risk of algal blooms. When temperatures, nutrient supply and available sunlight are optimal for algal growth, algae multiply their biomass at an exponential rate, eventually leading to an exhaustion of available nutrients and a subsequent die-off.

The decaying algal biomass will deplete the oxygen in the pond water because it blocks out the sun and pollutes it with organic and inorganic solutes (such as ammonium ions), which can (and frequently do) lead to massive loss of fish. An alternate option is to use a wetland system such as that of Veta La Palma.

Acidity	pH 6-9
Arsenic	<440 µg/L
Alkalinity	>20 mg/L (as $CaCO_3$)
Aluminum	<0.075 mg/L
Ammonia (non-ionized)	<O.O2mg/L
Cadmium	<0.0005 mg/L in soft water; <0.005 mg/L in hard water
Calcium	>5 mg/L
Carbon dioxide	<5–10 mg/L
Chloride	>4.0 mg/L
Chlorine	<0.003 mg/L
Copper	<0.0006 mg/L in soft water; <0.03 mg/L in hard water
Gas supersaturation	<100% total gas pressure (103% for salmonid eggs/fry) (102% for lake trout)
Hydrogen sulfide	<0.003 mg/L
Iron	<0.1 mg/L
Lead	<0.02 mg/L
Mercury	<0.0002 mg/L
Nitrate	<1.0 mg/L
Nitrite	<0.1 mg/L
Oxygen	6 mg/L for coldwater fish 4 mg/L for warmwater fish
Selenium	<0.01 mg/L
Total dissolved solids	<200 mg/L
Total suspended solids	<80 NTU over ambient levels
Zinc	<0.005 mg/L

In order to tap all available food sources in the pond, choose fish species which occupy different places in the pond ecosystem, e.g., a filter algae feeder such astilapia, a benthic feeder such as carp or catfish and a zooplankton feeder (various carps) or submerged weeds feeder such as grass carp.

Despite these limitations significant fish farming industries use these methods. In the Czech Republic thousands of natural and semi-natural ponds are harvested each year for trout and carp. The large ponds around Trebon were built from around 1650 and are still in use.

INTENSIVE AQUACULTURE

In these kinds of systems fish production per unit of surface can be increased at will, as long as sufficient oxygen, fresh water and food are provided. Because of the requirement of sufficient fresh water, a massive water purification system must be integrated in the fish farm.

A clever way to do this is by combining hydroponic horticulture and water treatment. The exception to this rule are cages which are placed in a river or sea, which supplements the fish crop with sufficient oxygenated water.

The cost of inputs per unit of fish weight is higher than in extensive farming, especially because of the high cost of fish feed, which must contain a much higher level of protein (up to 60%) than cattle food and a balanced amino acid composition, as well.

However, these higher protein level requirements are a consequence of the higher food conversion efficiency (FCR—kg of feed per kg of animal produced) of aquatic animals. Fish like salmon have FCR's in the range of 1.1 kg of feed per kg of salmon whereas chickens are in the 2.5 kg of feed per kg of chicken range. Fish don't have to stand up or keep warm and this eliminates a lot of carbohydrates and fats in the diet, required to provide this energy. This frequently is offset by the lower land costs and the higher production costs which result from the high level of input control.

Essential here is aeration of the water, as fish need a sufficient oxygen level for growth. This is achieved by bubbling, cascade flow or aqueous oxygen. Catfish, for instance can breathe atmospheric air and can tolerate much higher levels of pollutants than trout or salmon, which makes aeration and water purification less necessary and makes them a species especially suited for intensive fish production. On some Catfish farms about 10% of the water volume can consist of fish biomass.

The risk of infections by parasites like fish lice, fungi, intestinal worms (such as nematodes or trematodes), bacteria (e.g., Yersinia spp., Pseudomonas spp.), and protozoa (such as Dinoflagellates) is similar to animal husbandry, especially at high population densities. Intensive aquaculture does have to provide adequate water quality (oxygen, ammonia, nitrite, etc.) levels to minimize stress, which makes the pathogen problem more difficult. This means, intensive aquaculture requires tight monitoring and a high

level of expertise of the fish farmer.

Very high intensity recycle aquaculture systems (RAS), where there is control over all the production parameters, are being used for high value species. By recycling the water, very little water is used per unit of production. However, the process does have high capital and operating costs. The higher cost structures mean that RAS is only economical for high value products like brood stock for egg production, fingerlings for net pen aquaculture operations, sturgeon production, research animals and some special niche markets like live fish.

Raising ornamental cold water fish (goldfish or koi), although theoretically much more profitable due to the higher income per weight of fish produced, has never been successfully carried out until very recently. The increased incidences of dangerous viral diseases of koi Carp, together with the high value of the fish has led to initiatives in closed system koi breeding and growing in a number of countries. Today there are a few commercially successful intensive koi growing facilities in the UK, Germany and Israel, but they have definitely dropped off in popularity.

Some producers have adapted their intensive systems in an effort to provide consumers with fish that do not carry dormant forms of viruses and diseases.

Within intensive and extensive aquaculture methods, there are numerous specific types of fish farms; each has benefits and applications unique to its design.

CAGE SYSTEM

Fish cages are placed in lakes, bayous, ponds, rivers or oceans to contain and protect fish until they can be harvested. The method is also called "off-shore cultivation" when the cages are placed in the sea. They can be constructed of a wide variety of components. Fish are stocked in cages, artificially fed, and harvested when they reach market size. A few advantages of fish farming with cages are that many types of waters can be used (rivers, lakes, filled quarries, etc.), many types of fish can be raised, and fish farming can co-exist with sport fishing and other water uses. Cage farming of fishes in open seas is also gaining popularity. Concerns of disease, poaching, poor water quality, etc., lead some to believe that in general, pond systems are easier to manage and simpler to start. Also, past occurrences of cage-failures leading to escapes, have raised concern regarding the culture of non-native fish species in open-water cages. Even though the cage-industry has made numerous technological advances in cage construction in recent years, the concern for escapes remains valid.

Recently, copper alloys have become important netting materials in aquaculture. Copper alloys are antimicrobial, that is, they destroy bacteria, viruses, fungi, algae, and other microbes. In the marine environment, the antimicrobial/algaecidal properties of copper alloys prevent biofouling, which can briefly be described as the undesirable accumulation, adhesion, and growth of microorganisms, plants, algae, tube worms, barnacles, mollusks, and other organisms.

The resistance of organism growth on copper alloy nets also provides a cleaner and healthier environment for farmed fish to grow and thrive. In addition to its antifouling benefits, copper netting has strong structural and corrosion-resistant properties in marine environments.

As of 2011, copper-zinc brass alloys were being deployed in commercial-scale aquaculture operations in Asia, South America and the USA (Hawaii). Extensive research, including demonstrations and trials, are currently being implemented on two other copper alloys: copper-nickel and copper-silicon. Each of these alloy types has an inherent ability to reduce biofouling, cage waste, disease, and the need for antibiotics while simultaneously maintaining water circulation and oxygen requirements. Other types of copper alloys are also being considered for research and development in aquaculture operations.

IRRIGATION DITCH OR POND SYSTEMS

These use irrigation ditches or farm ponds to raise fish. The basic requirement is to have a ditch or pond that retains water, possibly with an above-ground irrigation system (many irrigation systems

use buried pipes with headers.) Using this method, one can store one's water allotment in ponds or ditches, usually lined with bentonite clay. In small systems the fish are often fed commercial fish food, and their waste products can help fertilize the fields. In larger ponds, the pond grows water plants and algae as fish food. Some of the most successful ponds grow introduced strains of plants, as well as introduced strains of fish.

Control of water quality is crucial. Fertilizing, clarifying and pH control of the water can increase yields substantially, as long as eutrophication is prevented and oxygen levels stay high. Yields can be low if the fish grow ill from electrolyte stress.

COMPOSITE FISH CULTURE

The Composite fish culture system is a technology developed in India by the Indian Council of Agricultural Research in the 1970s. In this system both local and imported fish species, a combination of five or six fish species is used in a single fish pond. These species are selected so that they do not compete for food among them having different types of food habitats. As a result the food available in all the parts of the pond is used. Fish will also feed on the excreta of the common carp and this helps contribute to the efficiency of the system which in optimal conditions will produce 3000–6000 kg of fish per hectare per year.

INTEGRATED RECYCLING SYSTEMS

One of the largest problems with freshwater pisciculture is that it can use a million gallons of water per acre (about 1 m^3 of water per m^2) each year. Extended water purification systems allow for the reuse (recycling) of local water.

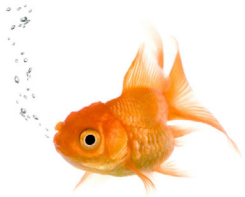
The largest-scale pure fish farms use a system derived (admittedly much refined) from the New Alchemy Institute in the 1970s. Basically, large plastic fish tanks are placed in a greenhouse. A hydroponic bed is placed near, above or between them. When tilapia are raised in the tanks, they are able to eat algae, which naturally grows in the tanks when the tanks are properly fertilized.

The tank water is slowly circulated to the hydroponic beds where the tilapia waste feeds commercial plant crops. Carefully cultured microorganisms in the hydroponic bed convert ammonia to nitrates, and the plants are fertilized by the nitrates and phosphates.

This system, properly tuned, produces more edible protein per unit area than any other. A wide variety of plants can grow well in the hydroponic beds. Most growers concentrate on herbs (e.g. parsley and basil), which command premium prices in small quantities all year long. The most common customers are restaurant wholesalers.

Since the system lives in a greenhouse, it adapts to almost all temperate climates, and may also adapt to tropical climates. The main environmental impact is discharge of water that must be salted to maintain the fishes' electrolyte balance. Current growers use a variety of proprietary tricks to keep fish healthy, reducing their expenses for salt and waste water discharge permits. Some veterinary authorities speculate that ultraviolet ozone disinfectant systems (widely used for ornamental fish) may play a prominent part in keeping the Tilapia healthy with re-circulated water.

CLASSIC FRY FARMING



This is also called a "Flow through system." Trout and other sport fish are often raised from eggs to fry or fingerlings and then trucked to streams and released. Normally, the fry are raised in long, shallow concrete tanks, fed with fresh stream water. The fry receive commercial fish food in pellets.

The issue of feeds in fish farming has been a controversial one. Many cultured fishes (tilapia, carp, catfish, many others) require no meat or fish products in their diets. Top-level carnivores (most salmon species) depend on fish feed of which a portion is usually derived from wild caught (anchovies, menhaden, etc.). Vegetable-derived proteins have successfully replaced fishmeal in feeds for carnivorous fish, but vegetable-derived oils have not successfully been incorporated into the diets of carnivores.

Another issue is that farmed fish are kept in concentrations never seen in the wild [e.g. 50,000 fish in a 2-acre (8,100 m2) area] with each fish occupying less room than the average bathtub. This can cause several forms of pollution. Packed tightly, fish rub against each other and the sides of their cages, damaging their fins and tails and becoming sickened with various diseases and infections, not-to-mention stress.

However, fish tend also to be animals that aggregate into large schools at high density. Most successful aquaculture species are schooling species, which do not have social problems at high density. Aquaculturists tend to feel that operating a rearing system above its design capacity or above the social density limit of the fish will result in decreased growth rate and increased FCR (food conversion ratio—kg dry feed/kg of fish produced), which will result in increased cost and risk of health problems along with a decrease in profits.

SEA LICE AND OTHER DISEASES

Sea lice, particularly *Lepeophtheirus salmonis* and various *Caligus* species, including Caligus clemensi and Caligus rogercresseyi, can cause deadly infestations of both farm-grown and wild salmon. Sea lice are ectoparasites which feed on mucus, blood, and skin, and migrate and latch onto the skin of wild salmon during free-swimming, planktonic *nauplii* and *copepodid* larval stages, which can persist for several days. Large numbers of highly populated, open-net salmon farms can create exceptionally large concentrations of sea lice; when exposed in river estuaries containing large numbers of open-net farms, many young wild salmon are infected, and do not survive as a result. Adult salmon may survive otherwise critical numbers of sea lice, but small, thin-skinned juvenile salmon migrating to sea are highly vulnerable. On the Pacific coast of Canada, the louse-induced mortality of pink salmon in some regions is commonly over 80%.

Diseases and parasites are the most commonly cited reasons for such decreases. Some species of sea lice have been noted to target farmed coho and Atlantic salmon. Such parasites have been shown to have an effect on nearby wild fish. One place that has garnered international media attention is British Columbia's Broughton Archipelago. There, juvenile wild salmon must "run a gauntlet" of large fish farms located off-shore near river outlets before making their way to sea.

Because of parasite problems, some aquaculture operators frequently use strong antibiotic drugs to keep the fish alive (but many fish still die prematurely at rates of up to 30 percent). In some cases, these drugs have entered the environment.

Additionally, the residual presence of these drugs in human food products has become controversial. Use of antibiotics in food production is thought to increase the prevalence of antibiotic resistance in human diseases. At some facilities, the use of antibiotic drugs in aquaculture has decreased considerably due to vaccinations and other techniques. However, most fish farming operations still use antibiotics, many of which escape into the surrounding environment.

The very large number of fish kept long-term in a single location contributes to habitat destruction of the nearby areas. The high concentrations of fish produce a significant amount of condensed feces, often contaminated with drugs, which again affect local waterways. However, these effects are very local to the actual fish farm site and are minimal to non-measurable in high current sites.

Concern remains that resultant bacterial growth strips the water of oxygen, reducing or killing off the local marine life. Once an area has been so contaminated, the fish farms are moved to new, uncontaminated areas. This practice has angered nearby fishermen.

Other potential problems faced by aquaculturists are the obtaining of various permits and water-use rights, profitability, concerns about invasive species and genetic engineering depending on what species are involved, and interaction with the United Nations Convention on the Law of the Sea.

Tanks saturated with carbon dioxide have been used to make fish unconscious. Then their gills are cut with a knife so that the fish bleed out before they are further processed. This is no longer considered a humane method of slaughter. Methods that induce much less physiological stress are electrical or percussive stunning and this has led to the phasing out of the carbon dioxide slaughter method in Europe.

How To Harvest Humanely

There are multiple ways of killing your fish once the time comes. Some of these methods are considered inhumane, while others are more acceptable. Since there are no clear rules on legality with regards to the "inhumane" methods, the choice is left to the individual. Here are both, the frowned-upon and the accepted methods:

Inhumane Methods

- **AIR ASPHYXIATION.** This amounts to suffocation in the open air. The process can take upwards of 15 minutes to induce death, although unconsciousness typically sets in sooner.
- **ICE BATHS / CHILLING.** Farmed fish are sometimes chilled on ice or submerged in near-freezing water. The purpose is to dampen muscle movements by the fish and to delay the onset of post-death decay. However, it does not necessarily reduce sensibility to pain; indeed, the chilling process has been shown to elevate cortisol. In addition, reduced body temperature extends the time before fish lose consciousness.
- **CO_2 NARCOSIS.**
- **EXSANGUINATION WITHOUT STUNNING.** This is a process in which fish are taken up from water, held still, and cut so as to cause bleeding. According to references in Yue, this can leave fish writhing for an average of four minutes, and some catfish still responded to noxious stimuli after more than 15 minutes.

Humane Methods

- **PERCUSSIVE STUNNING.**
- **ELECTRIC STUNNING.** This can be humane when a proper current, duration, conductivity, and temperature are present. One advantage is that in-water stunning allows fish to be rendered unconscious without stressful handling or displacement. However, improper stunning may not induce insensibility long enough to prevent the fish from enduring exsanguination while conscious. It's unknown whether the optimal stunning parameters that researchers have determined in studies are used by the industry in practice.

Published by:

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