

The Organic Farmer

The magazine for sustainable agriculture in Kenya



Nr. 64 September 2010

A fungus that fights aflatoxin

There is a successful and natural method to contain aflatoxin in maize; but it requires government action.

TOF - To eliminate a fungus with another fungus: This is a new method to fight aflatoxins. Developed in the US, this technique has been tested with good results in US and Nigeria. This safe and natural method would be very helpful for Kenya. According to scientists, aflatoxin poisoning affects Kenya more than any other country in Africa, as you can read on *page 2*.

Storage problems

One of the main causes of aflatoxin poisoning is the lack of storage; when

maize is not dried and stored properly, aflatoxins develop in the grains. According to the UN agriculture organisation FAO, in Africa 40 percent of grain harvest is spoiled due to unsafe storage, diminishing farmers' income as well as the benefit that come with a good harvest.

This is exactly the Kenyan farmers experience this year. The country has been blessed with a good harvest; but most of the farmers have been unable to sell it up to now. Apart from an immediate drop in prices, many farmers are likely to lose a sizeable portion of their maize harvest due to lack of storage. *Page 3*

Dairy goat farmers are angry

TOF - The article on the dairy goat scandal (TOF No 63, August 2010) has elicited a strong feedback from farmers across the country. The overwhelming response in form of phone calls and letters is a clear indication that TOF stirred a hornet's nest. Many farmers are being cheated by being sold to poor quality dairy goats. This is sad, especially taking into consideration the big demand for dairy goats from farmers with small parcels of land who cannot keep dairy cows. *Page 8*



Buying or selling? Use our new marketplace

TOF - *The Organic Farmer* magazine is putting together a database that can help us reply to farmers' requests with more appropriate information. This database will contain information of farmers, companies, organizations that deal with farming and the products they stock. TOF will use the information for referral purposes. For instance

to your location. This will allow those seeking products or those selling them to sell or buy directly at a given location and time.

Please send us an SMS with the following information:

1. Your full name
 2. Name of product (e.g. tree seedlings, dairy cows, cassava cutting, seed potatoes. e.t.c)
 3. Name of farm, group or company
 4. Your location
- The service is free. All you need is to send us an SMS. Use the following phone numbers: 0715 916 136 or 0738 390 715.



when you ask us a question like, where can I buy Prunus African seedlings? Then we will give you the contacts of a certified tree nursery near you. If you want to buy a dairy cow, then we refer you to a breeder close

in this issue

Cattle vaccination 4



Growing pawpaws 5

Dear farmers,

More than 3 million bags of maize harvested between April and June this year in parts of Eastern province were contaminated by aflatoxins due to poor drying and storage. This scenario should be a cause for worry to any government. Remember that between 2004 and 2006 more than 200 people died of aflatoxin poisoning in parts of Ukambani.

Although the government has forestalled the problem by early warning in the affected areas, very little is being done to address the underlying causes of aflatoxin poisoning: Late harvesting and poor storage by farmers. To avoid the danger of people consuming or selling the contaminated maize, the government had promised to buy and destroy it. But upto now very little of the contaminated maize has been bought from farmers. This is endangering the lives of many unsuspecting consumers if the maize is released into the market.

But instead of spending money on buying rotten maize, the government should take measures and educate farmers on proper drying and storage of maize. Better still, it can research and adopt a new aflatoxin control technology: Scientists in Nigeria have made a major breakthrough in the control of aflatoxins in maize. They have discovered a strain of a beneficial fungus that colonises the poisonous strains of aflatoxins rendering them harmless (see page 2). Kenya has one of the highest levels of aflatoxin contamination of maize in Africa. We strongly appeal to the government to introduce these technologies and protect the consumers.

The other measure the government can take to prevent this calamity is by buying maize in time from the affected areas. The NCPB has good storage facilities in every part of the country. Farmers can also prevent aflatoxin poisoning by taking simple steps like harvesting, drying and storing their maize in the right way (page 3). This prolongs the storage period allowing farmers to sell their maize when prices are favourable

A new method to fight aflatoxins

Kenya could save millions of shillings if it can make use of a fungus which reduces aflatoxins in cereal crops.

The Organic Farmer

Aflatoxin is a highly poisonous substance produced by a mould fungus (*Aspergillus flavus*). The poison itself is invisible, tasteless, odourless, and its presence can only be confirmed in a laboratory. It can develop on many cereals and oilseeds, but maize and groundnuts are affected most frequently. Therefore: Never consume or feed grains that have moulds on them!

Infectious particles of this fungus are microscopic (very small). They develop in moist soils, are carried by wind like dust and infect young maize ears in the field. Drought stress during pollination increases infection. Once the cobs are infected, the mould will grow best and produce most aflatoxins under warm and humid conditions: On mature corn that remains in the field and on grain that is stored without proper drying. Maize must be kept dry during the whole storage period, because mould growth and aflatoxin production will start again under humid conditions. Avoiding damaged grains, keeping storage and feeding facilities clean also reduces contamination risks.

Immune systems attacked

If contaminated grains are consumed, people and animals are in danger: Aflatoxin attacks the immune system, retards growth and development and causes liver cancer. In high concentrations, it causes liver failure and rapid death. Unfortunately, many farmers are completely uninformed about the issue and sometimes believe it is caused by witchcraft if their animals or people are affected. People, poultry, pigs, horses (including donkeys) and young animals in general are very prone to aflatoxin poisoning. Cattle are more resistant, but the poison can pass into the milk of lactating cows, making it unfit for consumption by people or calves.

A serious problem in Kenya

Sadly, Kenya has one of the highest levels of aflatoxin contamination in the world. There is a very high occurrence of one of the most toxic strains (types) of *A. flavus*, and deaths are



Aflatoxin can be found in maize that appears healthy as well as in rotten maize. It cannot be seen with the naked eye. (Photo TOF)

frequent. From 2004 to 2006, nearly 200 Kenyans died after consuming contaminated maize. This year, over two millions bags of maize should have been bought and destroyed by the government because of aflatoxin contamination. However, weeks after the Agriculture Ministry had promised to do so, stocks were still in the stores in the affected Eastern and Coast provinces. While the government is not in a hurry to remove the poisonous maize, farmers will be tempted to eat it or sell it to others.

A new method to fight aflatoxins

Farmers cannot avoid aflatoxin contamination completely. They cannot influence temperatures and humidity, and they may lack the means to establish proper drying and storage facilities. In spite of this difficult situation, there is very good news that give hope: A new affordable, safe and natural method has been developed to prevent aflatoxin formation in maize.

In the US, it has already successfully reduced contamination of cotton seed and maize. In Nigeria, maize farmers were able to reduce aflatoxin contamination by 80% last year.

Beneficial fungus native to Kenya

The technology is based on the fact that there are hundreds of naturally

occurring types of the *A. flavus* fungus. Scientists have found strains that do not produce the toxin and can outcompete and reduce the toxic strains. These strains are bred, attached to sorghum grain and broadcast into the maize field 2-3 weeks before maize flowering.

They are then carried by the wind to the maize ears where they are able to reduce the population of the toxin-producing strains. And they can do even more: They attach themselves to the maize grains and can prevent aflatoxin contamination even during the entire storage period. The treatment may not even need to be applied every year, as the beneficial fungus may stay in the soil for several seasons.

IITA (International Institute of Tropical Agriculture), the Agriculture Research Service of the United States Department of Agriculture (USDA-ARS) and the African Agricultural Technology Foundation (AATF) have developed the technology for Nigeria and have obtained provisional registration under the name Aflasafe™. The researchers have also identified efficient strains of the fungus native to Kenya and are calling upon the government and the private sector in Kenya to partner with them and make this biocontrol option available to farmers in maize growing areas.

The Organic Farmer is an independent magazine for the Kenyan farming community. It promotes organic farming and supports discussions on all aspects of sustainable development.

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Harvest early and save your maize

Farmers keep their maize for too long in the fields before harvesting. This causes weevil damage and rotting.

The Organic Farmer

Farmers invest a lot of money and labour in maize production. However, their efforts are wasted during and after the time of harvesting. Most of them harvest too late, just a few of them own proper storage facilities. They are likely to lose a sizeable portion of their maize harvest due to contamination. Very often, they do not take seriously the labour-intensive work of drying their high value crop.

Harvest early

Farmers often wait for too long to start harvesting; when they delay, the maize will start rotting. Apart from this, maize that has been left to stay too long in the shamba tends to 'open its ears'. According to scientific studies, this makes it easy for pests to get into the maize cob and start infestation even before staking and harvesting has started. Prolonged stay often allows fungal pathogens such as aflatoxins to spread.

Maize is ready for harvesting when the grain hardens. Another sign for the farmer is to check the silky flowering at the top of the maize cob; immediately the silky flowering turns black, this is a sign that the maize has matured and it requires harvesting immediately.

Drying and shelling

The first step towards avoiding losses through contamination is by drying. Ensure the maize that is still on the cob is properly dried in the sun before being stored.

- The cobs should be properly dried 48 hours after harvest; always use a tent on a completely dry ground (clean



Maize thrown to the ground during harvesting can be easily contaminated.

concrete or tarmacked surface).

- Remove any rotten maize cobs and the ones with signs of weevil damage.
- After drying, farmers should shell the maize as soon as possible to reduce weevil damage.

Reduce the moisture level

Maize with a high moisture level develops moulds; they grow and release toxins, generally referred to as mycotoxins (aflatoxins are just one of them). A lot of maize from farmers in Eastern province has been condemned this year because of aflatoxin.

Most of the maize that is harvested early or during the rains has a moisture content as high as 37 per cent. The farmer has to reduce the moisture level by drying to about 12 per cent before storage.

An easy test-method

Take a handful of grains and a 1/2 handful salt in a dry soda bottle. Shake for 2-3 minutes and allow the grains to settle. If the salt sticks on the walls of the bottle, this shows the grains have moisture. Dry again and repeat the test until no salt sticks on the bottle, you can then store the grains.

Diatomite, cheap and efficient

Even if the maize is dry and well-stored in sacks, the dangers are not over: Weevils will attack this highly valuable cereal. There is a very powerful pesticide assisting farmers: Diatomite. It preserves maize and other cereal crops such as beans rice and even wheat. Unlike most of the chemical pesticides in the market, insect pests cannot develop resistance to diatomite. Diatomite is crushed into powder form that contains small particles with sharp corners that work by piercing all body parts of the insect pests; this dehydrates their body fluids, thus killing the pests. With diatomite, properly dried grains can be stored for up to 3 or 4 years without pest damage or deterioration in taste and quality. Diatomite is not poisonous and will not harm animals or human beings. Of course, grain that has been treated with diatomite should be washed before cooking. Unfortunately diatomite has not been discovered by many farmers.

Farmers are advised to apply 500g of diatomite for every bag of cereals. A 20kg bag costs about Ksh 400 and can preserve up to 40 bags of maize. The main problem for farmers is that diatomite is not available in most agrovet shops in the country. However, farmers can organize themselves and buy it in large quantities from the African Diatomite Industries in Gilgil, then they can share it. Interested farmers or dealers can contact the company on Mobile telephone number 0722 277 120.

Metal silo for storage

For farmers who want to preserve maize for consumption purposes, the Catholic Relief Services (CRS) has designed a special silo for grain storage. It can protect well-dried maize, beans, and other cereals from moisture, rats and even pests.

The metal silo is an airtight storage tank.

They are available in various sizes, ranging from 2 to 20 bag storage tanks. A 10-bag silo costs Ksh10,050, while a 20 bag silo goes for Ksh 16,890. Interested farmers can enquire about the silos from the Ministry of Agriculture offices near them or CRS (mobile 0733 262 543).



Important storage tips

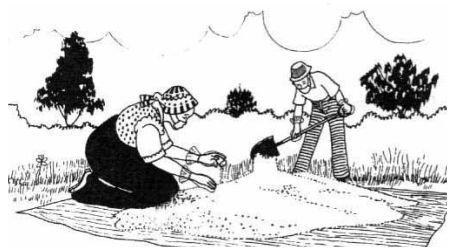
Maize stores should be well-ventilated to allow for air circulation. By the way, you should not use synthetic bags; they trap the moisture inside the bags causing contamination. Use sisal bags.

The stores should be properly cleaned to remove undesired grains,

cobwebs, and other residues which harbour pests. Turn the maize regularly during the drying process, and afterwards, check it regularly for any signs of pests.

Maize stores should be built on raised platforms to allow for air circulation from below and on the store sides. This facilitates further drying of the stored grains. The stores should have rat traps which keep away rats that cause great damage to maize during storage.

(Sketches: KARI)



Managing cattle diseases effectively

An experienced farmer from Eldoret talks about his successful disease prevention strategy.

The Organic Farmer

Cattle diseases are a big threat to livestock production in Kenya. For a long time, farmers have approached disease control from a treatment point of view where clinical cases are isolated and treated. This is a very risky affair as the success of treatment depends on early detection of disease. It is trickier in a farm with many animals. There is no dispute that prevention is better than cure. However, the extent to which prevention programs are effective remain a big challenge to farmers especially tick borne diseases as ticks develop resistance to acaricides.

John Cheburet, producer of *The Organic Farmer* Radio program, talked with Josef Creemers, owner of the Baraka Farm in Eldoret. The farm has 65 dairy cows and provides nutritional support for children cared for by Lewa Childrens' home and Kipkeino School. The farm sets an example for local small scale farmers through innovative farming techniques.

What are the major diseases that you encounter?

The major diseases that we use prevention against are foot-and-mouth, black quarter and anthrax. I must say in the last 17 years I have never had a case of foot-and-mouth disease. Two years ago I had a case of black quarter even though I had vaccinated the animals. But you get black quarter under very rainy conditions; in 2007 many areas were waterlogged. The difficulty with black quarter is that it is your best animal that you lose, never the weak one. We kept vaccinating because vaccination does not always mean that you can completely rule out black quarter, but to reduce the number of cases if you get the disease in your farm. That is our aim.

Vaccination program

For the vaccination program, we vac-



Josef Creemers, Eldoret

(Photos: JC)

inate against Lumpy skin disease every 6 months, Black quarter every 6 months and Brucellosis between 6-8 months. With brucellosis, you can get up to 75% protection. There is a possibility now but it is not yet available in the Kenyan market, that you do a booster of 3 vaccinations and get between 95% and 99% protection.

Against Rift Valley Fever, we vaccinate at least once every year. But this is a difficult vaccination because you can only vaccinate if the animal is less than 1 month pregnant. That's why we have to do it very regularly.

How successful is your program?

Vaccination is all about getting more than 80% of animals covered. 100% is not possible because at any given time in a large scale farm, there are always animals that are pregnant and I cannot vaccinate them otherwise that could induce an abortion.

You have to be very strict on those programs and repeat them every 6 months. If you skip once, you are lost!

Did you ever use the East Coast Fever vaccine?

No, because I do not have cases of ECF. Our prevention program is very good. The two ways of preventing ECF and tick borne diseases are:

1. Use a proper spraying and management program, and
2. Make sure your animals don't move out to the pasture.

Both of them work perfectly on this farm giving us 100% cover. I have animals that are grazing outside; I spray them every 7 days. That's once a week. I have used Amitraz for 17 years on this farm and there is no tick resistance; make sure you use the right amount of water and the right concentration. Once in a month I use Delete™, a pyrethrum-based compound. We don't see any ticks.

The animals that are kept 100% indoors have no ticks and I never spray them. 2 years ago, there were 1 or 2 cases of Anaplasmosis which we couldn't even confirm.

10 litres of water per animal

So, use a spraying program and stick to that very consistently. You need to use at least 10 litres of water to cover the animal properly. It is all about the skin, not the fur, that you spray. That's where the tick attaches. A lot of people who spray make that mistake. Sometimes, the person who sprays does it



too quickly and the *dawa* (agent used) does not penetrate up to the skin. It is just suspended in the air and that is not enough!

Deworming

Which methods do you use for deworming?

We chose two ways, the same as with tick borne diseases:

1) Every 3 months you deworm. Use the right concentration which means you have to weigh your animal to know how heavy she is and by how much *dawa* you can give her.

2) Make sure that the animal doesn't move and you don't have to deworm. But, don't feed them on any roadside grass. You cannot go and buy hay from the shop. If you use those kinds of feed-stuffs, you have to deworm because you don't know the source of the grass which animal has been grazing on. That pasture probably has been used by animals before and so the eggs of the worms are there.

How about the grasses on your own farm?

The grasses on my own farm are infected because my animals graze there. I can only do away with the infection if I cut the grass with a mower, remove that grass and make hay or silage out of it and then I leave the grass to re-grow. And, I don't allow animals into the grass anymore. Do the cutting of the grass and making of hay repeatedly. Never allow animals into your pasture anymore. That's the only way to keep the grass free of worms.

Animals getting used to worms!

At home – where I come from - we use this as a management tool to get our young stock used to worms. We cut the grass and when the first grass that starts growing, we place the young animals there. They will get a little infection by worms and then build up a bit of resistance. But, they don't get too much that they get sick or that you have to deworm them. So that's what we use as a management tool. Otherwise, here in Kenya, it is very tricky because the climate is much more favourable for those worms to grow than in the temperate areas.

What you need to grow pawpaws

Pawpaws can help you to get an additional income and to diversify the crops on your shamba.

Theresa Székely

It is important to know some general characteristics and requirements of pawpaws. In natural forestry systems, the pawpaw grows in open spaces where giant trees have been felled. It is capable of dominating the new growth during a few years. It has high light demands and disappears when the place becomes overgrown and shady as new trees grow higher.

Fertile, light soils rich in organic matter are important. Pawpaws have a flat root system; they do not require a very deep soil. But because pawpaws are not tolerant of stagnant water, the soil must be well drained. Drenching that lasts longer than 48 hours may cause the death of the plants. On the other hand, if dry periods are longer than 2 months, irrigation is necessary. But a drier period at the time of ripening is beneficial for fruit quality.

Pawpaw does not like strong wind. It should be grown in sheltered places, but in full sunshine. It may need staking and windbreaks for proper growth and fruit production. Wind breaks should be spaced at distances of about 10 to 20 times their height. For example, a tree strip that is 4 metres high can protect a strip of land that is 40 to 80 metres wide. Grow wind breaks such as silver oak (*Grevillea robusta*), leucaena, gliricidia, but also mango or avocado.

Continuous cropping in the same field

Tips for the maintenance

- Diseased and dead plants need to be removed and composted.
- Remove the side shoots of the stem.
- Cut back all bushes and young trees that loom over the pawpaw after 6-8 months.
- Remove fruits which are poorly pollinated, malformed or pest-infected.
- Support the plant with stakes when bearing heavy fruits and during stormy seasons.

Pawpaw may live as long as 15 to 20 years, but it is profitable only for about 3 years. As the tree grows taller and older, the fruits become sparser, and they are borne at greater height on the trunk. The growth slows down after 3 years, and fruits and leaves diminish in size. Remove the plant at this stage, as it will be uneconomical to maintain it any longer. A good strategy is to plant other trees on papaya plots and to plant new papayas where free plots appear on the farm, or where old trees (other than pawpaw) were removed. *tsz*

may result in poor growth and cause disease problem to pawpaw trees. After a 3-5 year period of use, the area cultivated with pawpaw should be used otherwise for some years. A second cycle with pawpaw can then be initiated. Large areas of sole pawpaw are not recommended. Pawpaw can be combined very well with cocoa and bananas for example, or be planted together with slower growing trees like mango and citrus. Short term crops such as corn or vegetables may also be considered.

The pawpaw plant has male, female, hermaphrodite (bisexual flower) and some other complex forms. Typically, the fruits from female plants have a short shape, while fruits from hermaphroditic plants are longer.

Seeds

You will need 20 to 30g of seeds per acre, if two thirds of the seeds germinate and most of the seedlings are planted successfully. Seeds are collected from the ripened fruit and spread out on mats or wooden planks to dry in the shade. They should be sown within one week.

Own seeds: In order to harvest own seeds of a certain variety, it is essential to remove any unidentified male plants in the proximity of the plantation. Otherwise they will fertilize the flowers of your female plants, and the seeds of these fruits will bring forth cross-variety trees (and fruits) with unknown properties.

Purchased seeds: If you want to be sure to have trees of the desired variety, it is best to buy seeds. They must be from a dependable source and of good quality. They should be sown as soon as possible

Sowing and germination

The seeds are sown 1-2 cm deep. The optimum temperature for germination is 21-27° C. It takes 1 to 4 weeks from sowing to germination depending on the temperature.

Pawpaw can be sown directly or at tree nurseries. Prepare the nursery about 2 months before the actual planting time. This is the period the seedlings require to be ready for transplanting.

Direct seeding: Before you sow them directly, work a mixture of ash, composted poultry dung or compost into the soil. This helps the trees to establish quickly and to dominate the system within a few weeks. Sow 3 to 5 seeds per hole to compensate for poor germination, virus infection, insect damage and removal of male plants at the time of flowering.

Pot or bag sowing: The substrate consisting of tilled clay and sand soil mixed with compost should be placed into the pots or Polyethylene bags around 2 weeks before sowing. Sow 2-3 seeds per pot.



Pawpaw tree and fruit, from Koehler's Medicinal plants

Nursery beds: Sow the seeds in raised beds. The soil should be fine and mixed with generous amounts of decayed farmyard manure or compost. Sow the seeds 1-2 cm deep and 2-3 cm apart. Rows are spaced at 15 cm. Sprinkle the seed beds daily with a watering can except on rainy days. Avoid water logging as this may lead to fungal diseases and "damping off" of the seedlings.

When the seedlings are 2 to 3 weeks old, they may be sprayed with a fungicide solution. Dissolve 1g of copper oxychloride in 1 litre of water.

Transplanting

Transplant the seedlings when they are about 20 cm tall, or up to 40 cm if they are grown in larger containers.

Continued on page 6

A flowering pawpaw plant (inset), pawpaw seedlings in a nursery (below)



They can be planted year round if irrigation is available. If the soil is not well drained, a 40-60 cm high bed is required.

Drill planting holes about 45cm in diameter and 30cm in depth. Mix the soil with plenty of well rotted compost for planting. The plants and rows should have a distance between 2m and 3m in the end, but this should be co-ordinated with the requirements of any additional crops. Usually, you will want to uproot virus-infected plants and excess male and female plants later, so the distance between plants at transplanting may be about 1m.

The seedlings should be well watered one day before transplanting. Transplant them on a cloudy day or in the late afternoon to minimize transplanting shock. The roots of pawpaws consist of a tap root and hair roots in the upper parts. Make sure not to damage the hair roots during replanting. Take care not to plant too deep; otherwise collar-rot disease may affect the buried part of the stem. Then water immediately after planting.

Thinning out

When the first flower buds appear after about 3 to 5 months, the seedling's sex can be determined and plants should be thinned out. For pollination of female plants, 10-20% hermaphrodite plants or 1 male per 25 females are required. If hermaphrodite varieties are planted, only virus-infected plants and excess plants are eliminated.

Nutrition

Pawpaws prefer very fertile soils with high organic matter content. This

Feed your indigenous chickens well

The common practice of indigenous chickens farmers is to leave indigenous chickens to look for their own feed. Free range chicken rearing is encouraged in organic farming. Lack of adequate feed and water will reduce their resistance to diseases and parasites- inadequate feed can lead to low production and even death.

Giving extra feed to chickens improves their general health, growth and production. Like other livestock, chickens require energy, proteins, vitamins, minerals and even adequate water. Supplementary feeding should be offered in the morning and afternoon. The following feed rations are recommended for different stages of growth:

Proteins: Chick mash is high in protein and should be given to chicks from one day to 8 weeks. For farmers who cannot be able to buy ready made feeds, they can prepare their own feed using fishmeal or milled soya for proteins. Proteins should not be more than 20 per cent of the diet. Protein sources



should already be considered when choosing a site. Pawpaw is a heavy feeder and has a continuous demand for nutrients. Increased nutrient uptake is observed after flowering. For fertilization, use mature and composted animal manure at a rate of 2 to 5 kg per plant and per year, plant teas and compost. A sufficiently thick layer of mulch is very beneficial and especially important in dry seasons.

Weed control

Mulch the bed with rice or sugarcane straws or any other organic material like hedge cuttings within a few days after transplanting. This controls weeds, soil erosion and water loss, and adds organic matter and nutrients. Weeds should be frequently and lightly removed at a young stage. Be careful when weeding as the plant has shallow roots. Cut down mature weeds to use for mulching, and remove grasses with their roots intact.

are maggots, termite eggs, insects, worms, fish scraps, ground nuts or coconuts.

Energy: About 75 per cent of chicken feed should be made up of energy feeds. Energy feed provide the chickens with body maintenance (temperature, vital functions, exercise. Cereals grains such as maize, sorghum, wheat and rice by-products, roots or tubers. Roots and tubers should be soaked in for 60 minutes.

Minerals: Chickens require minerals for bone and egg formation and also for good health. The most important minerals are calcium and phosphorus. The main source of these minerals are limestone and eggshells.

Vitamins: Indigenous chickens get vitamins by eating green grass, vegetables, fresh cow dung and sunlight. Sunlight and green grass or green fodder provide vitamins A and D while vitamin D may come from fresh cow dung. Farmers can also buy multivitamins and given them in small quantities.

Answers in brief

Cassava cuttings

Please advice me on where I can get cassava cuttings. Ruth Gathura, Kangai 0722 772 564

Try Singi CBO in Busia. They have clean cassava cuttings from KARI. Contact them on 0713 33 25 68.

Inbreeding in rabbits

How can I control inbreeding in my rabbits? Francis Githuka 0727 639 566
Controlling inbreeding is not difficult if a farmer keeps records. The only way to avoid the inbreeding is to keep related male and female rabbits in separate cages.

Silk worm rearing

Please let me know the contacts of ICIPE silk worm rearing department. Michael Mugo 0728 611 707

Contact the icipe Tel. 020 8 632 000 and ask for Everlyn Nguku, silk worm department.

Germination of seedlings failed

I came across your magazine Nr.60, May 2010. It was about tree planting, I have tried planting tree seedlings from KEFRI, but they did not germinate well. Please advice. Ndungu Thiongo, from Kikuyu.

Different tree seedlings require different conditions and management to germinate and grow properly. Perhaps there are important steps you did not follow when sowing the seeds or planting the seedlings. We believe KEFRI has the knowledge and expertise to advice you accordingly. They could even visit your tree nursery to find out what the problem is. Kindly get in touch with them and explain your problem.

Yellowing of maize

Apart from lack of nitrogen in the soil, what other factors contribute to yellowing of maize in the field?

Yellowing of maize can be caused by a number of nutrient deficiencies, the main one being lack of nitrogen. Usually the lower leaves are affected at first and later, the upper leaves. If the maize plant has both yellow and brown colour, it means the plant is also lacking potassium. Yellow colouration in the middle of the leaf may be an indication of zinc deficiency. However soil testing is best way to tell which nutrients the soil is lacking.

Silage

What is the function of molasses and salt in the process of making silage? Ruth Asami, Eburnangwe

Molasses contains sugar, which is needed by the micro-organisms that are responsible for the fermentation process of the silage. Without sugar, they will not be able to produce enough acids from the material. Acids are very important for good conservation of the silage. However, salt is not a necessary ingredient for the silage manufacturing process.

A problem with white flies in greenhouses

I am trying to grow tomatoes at Naivasha in a greenhouse and we constantly get white flies. If I use chemicals, it means I cannot harvest for 7 days and the tomatoes are all coming ripe. I have been using a mix of Mexican marigold, garlic and chilly. Do you have other remedies or suggestions like using soap? Renaldo Retief, retief@africaonline.co.ke

I have grown tomatoes under greenhouse, but they are infested with white flies. What do you advise? Lucy Nderitu, Murinduko, 0722 844 417



White fly eggs, larvae and adults is an adequate answer to the low food production of a tropical country like Kenya. Two of the main problems here are scarce water resources and poor soil fertility - and not low temperatures as in developed countries where greenhouses are common. Investments into efficient irrigation systems and into a sound agricultural education would make much more sense! It is almost impossible to control pests without large amounts of chemicals in a greenhouse, which will reduce soil fertility further.

Once white flies have infested a green-

house, they are very difficult to eliminate. In developed countries, white flies are often controlled by releasing natural enemies like parasitic wasps or other predators, but this is not an available option for small scale farmers in Africa. Everything that supports a good air flow will help. You may even remove one or two side walls. Providing a good phosphorous supply is also beneficial as its deficiency can promote white flies.

Chemicals are usually not very effective as white flies easily develop resistance against them. Soap and oils may reduce the population if used frequently. Neem based products are very good and have few side effects. A good combination is pyrethrum and rotenone: Mix plant extracts from chrysanthemum flowers and tephrosia leaves and spray the plants twice a week. Garlic and chilly extracts can also help. Always take care to spray the undersides of the leaves well.

Be aware that you should harvest tomatoes 7 days after application of any insecticide, even if you use a natural product!

Several farmers facing infestations with white flies in their greenhouses asked for our advice. As we have already pointed out in previous articles (TOF No. 16, 29, 52), difficulties with pests and diseases are typical for greenhouses. There are three reasons for this: high temperatures increase the speed at which pests develop, while natural enemies are not present, and crop rotation can not be practised. Although the government subsidizes this technology, we are not at all convinced that it

Cattle need minerals

Is it advisable to use ordinary salt for cows? Oliver Kisali, Majengo

Ordinary salt is usually pure sodium chloride. Plant feeding animals like cattle or goats need additional sodium because their diet is rather poor in sodium. It helps their digestion. It is possible to feed ordinary salt to cattle; usually about 20 to 50 g (a handful) is given per day depending on the size of the animal. Find out what brand of salt is cheaper!

It is also good to know that especially growing animals and lactating cows need high amounts of additional calcium and phosphorous, but also other minerals for healthy growth and development, good digestion and milk production, disease resistance and a long life. Ordinary salt is therefore not sufficient, and a mineral salt or mineral feeds should be given regularly. Feed leguminous plants and other plants other than grasses to backup calcium and mineral supply.



Compost is always good

What quantity of farm yard manure is needed per hole when planting? Kevin Okang'a Musonye / Buyangu

Generally, I would say: as much as possible for heavy feeders, for large plants, and in poor soils. Usually, between 10 and 20 t of farm yard manure is used per acre. That would make 2.5 to 5 kg per square meters, or in the case of plants that are seeded at a rate of 4 to 5 seeds per square meter, 0.5 kg to 1 kg per hole (a few handfuls). Make a hole, mix the manure into the topsoil, and place the seed or seeds inside.

Plant extracts without EM and molasses

Can I make plant extract in absence of EM1 and Molasses? David Muriuki Mararo, Mutira - 0729 985 243

Yes, this is actually possible. EM is beneficial because it acts like a starter culture of bacteria that will trigger the desired kind of fermentation. Molasses provides sugar that the bacteria need for the fermentation process: they convert the sugar to acids. But bacteria are also naturally present in the environment, and sugar is present in all green plant materials. This is

Selecting eggs for hatching

Can eggs from layer birds be given to other birds for hatching into chicks? Michael Imbwaga, Shinyalu Itenyi.

The hatching success depends on whether these eggs have been fertilized by a cock or not. If layer birds are kept without cocks, no chick can develop from their eggs. If you want to be sure that all of their eggs are fertilized and can hatch, you will need to keep about one cock for every 6 hens. If you have hybrid layers, be aware that their chicks will usually not lay as many eggs as their mothers, due to genetic reasons.

why fermentation will take place even without addition of EM and molasses. For the same reason, fresh milk will get sour after short time: bacteria use the sugar that is present in the milk as an energy source and produce lactic acid. Chop your plant material well to make sure that its ingredients can dissolve quickly into the liquid. You will have to use up your product immediately, as it will be less sour and not as well conserved as when you add molasses. *All answers: tsz*



Buy good quality mineral licks

Your dairy goat story was accurate

I fully support your article on dairy goats (TOF Nr. 63 August 2010). I was surprised two weeks ago to find out that in Githunguri, farmers given dairy goats by SACDEP Kenya 9 years ago have failed to register even a single goat. They did not get different bucks for breeding other than the first ones given to them when starting the project. In addition, there was mass deaths of these dairy goats especially the bucks mainly due to poor management. So they served their goats with ordinary bucks, messing up the high-breeds. Now these farmers have goats that cannot produce more than 1.5 litres a day (that is 0.3 to 0.7 litres twice a day).

Farmers are exploited

One such farmer was offering me a pair of 2-month old twins at Ksh 6,000 each as if they were pedigree. The second farmer had one buck selling at Ksh 8,000. But looking at it, I would say it had more characteristics of ordinary goat than her pedi-



gree mother, a clear indicator that he served his doe with an ordinary buck. Maybe only three farmers in the group seem to have maintained the breeding standards. Most farmers willing to buy dairy goats cannot tell the right quality. They are therefore easily exploited.

Anthony Muhia, Ruiru

I was suspicious, farmer

One year ago I tried to buy a good dairy goat. I went to a farmer who showed me the pedigree papers and told me, that the goat would give between three and four litres of milk a day.

I was not so familiar with goats, but

I had the impression that this goat did not have the quality of a pedigree goat. I told this farmer that I would think about it and that I would come again later in the month. I had time to do some research. I found out that the farmer had exaggerated the milk production of his goats. So I refused to buy. Your article was important; but the fact that farmers cheat each other is very unfortunate.

Peter Kuria, Nyeri

KSB responsible for inbreeding of dairy goats

I was extremely interested in your leading article on the scandal within the dairy industry. As one of the leading dairy goat breeders in this country, you have highlighted a problem that we have been facing for the past seven years. I have a pedigree registered Toggenburg buck but have found that trying to register my young goats with the KSB is a complete waste of time. Papers that I sent in over 5 years ago have still not been processed.

I have given up

I have therefore stopped sending my registration papers to the KSB but, instead, I keep very careful breeding records at home. And, because it is impossible to find a pedigree registered buck that is not related to other bucks, I have brought in a cross bred dairy buck to use on the young from my pedigree buck and pedigree does.

In this way I have been able to maintain the standard of my herd and my milk production. Because we find it almost impossible to find buyers for our young bucks, most of them are castrated and used for meat. This may seem a waste but my experience with selling young bucks to totally unsuitable homes for a ridiculous amount of money has made this a necessity.

Willing to assist

I have tried to find out about AI, with little or no success. I have written a number of papers on the upkeep and management of dairy goats, and would be very happy to assist your wonderful magazine in any way I can

on this subject.

You may be interested to know that, two years down the line, I am still receiving calls from farmers responding to an advert for young stock that appeared in your TOF issue in 2008 which proves that your circulation is far wider than probably what many people imagine. *The Organic Farmer* magazine is obviously passed on from farmer to farmer continuously over a long period of time. *Valerie Corr*

I was also cheated by goat dealers

This is indeed a serious problem. I purchased 4 does with the assistance of DGAK and selected them with the assistance of a DGAK official. The expected yield was about 3 litres per goat. I am however only getting about 1 litre per goat. The challenge as pointed out in the article is false information and the lack of pure bred bucks. At the moment, I exchange bucks with other farmers but if they all originate from the original 11 blood lines I have no hope of improving my stock. Despite this, I am selling milk in the Karen, Nairobi area and I am producing more than I can sell. I am therefore looking for additional customers. Perhaps the solution is for farmers to come together and petition the government to allow us to import a few bucks. We can share the cost and have fresh bloodlines to improve our stock. Interested parties can contact me on my email: njonjo@gmail.com.

We need your contacts please!

More and more farmers are reading *The Organic Farmer* magazine. That is why we need to update our mailing list in order to serve TOF organic farmers' community better. Please send us an SMS with the following information:

1. Your full name(s)
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Rabbits on sale: I have been farming rabbits in Rumuruti for the past 7 years and have developed an excellent cross-breed. I started by carefully selecting from local stock, choosing for size, ease of kidding and resistance to sickness. I then introduced an imported strain, the French Widder' this is a very large rabbit but is very difficult to rear. The result is a tough large rabbit with a dressed weight of 1.4kg at 5 months. I have tattooed my rabbits with their parentage and date of birth so as to prevent in-breeding. I have approximately 20 five-month old bucks and does available for sale to interested farmers. My price is 2,000/= on my farm in Rumuruti. Anthony, email: adodds@safaricom.blackberry.com

Tree seedlings: I have indigenous seedlings for transplanting. These include Sisijam, crotons Makhamia. Each seedling costs Ksh 25, Ben Saina 0724 971 350

Silage tubes and training: We have silage tubes for sale to farmers, training on upgrading of dairy cows. Contact Makechi Tel 0721 245 443, 0771 178 805.

Organic products and Training: We sell organic value added products including Moringa powder, carrot flour, beetroot flour, amaranth flour, dried vegetables, garlic flour, stinging nettle flour and ginger. We train on value addition skills to individuals or farmers groups. Contact us: The director, SUFOD P.O. Box 39251-00623, Tel. 0724 456 420, Nairobi
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