

The Organic Farmer

The magazine for sustainable agriculture in East Africa



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Maize disease spreads countrywide

Up to now, there is no remedy against the devastating maize disease which threatens Kenya's staple food.

The Organic Farmer

Maize, Kenya's main staple food crop is now facing an uncertain future following a fast spreading maize disease that threatens its production across the country. The maize disease, now identified as Maize Lethal Necrotic (MLN) disease is caused by a combination of viruses was first reported in lower Longisa division of Bomet district in September last year. Later it spread to the neighbouring districts of Sotik, Konoin, Chepalungu, Transmara, Kisii, Bureti and Kericho (see TOF No 82, March 2012). The disease has now moved to other parts of the country where it has attacked the maize crops in Nakuru, Naivasha, Rumuruti, Imenti south, Embu and Kibwezi. Farmers in other maize growing in North Rift have also reported signs of the disease.

Transmitted through seeds

New scientific findings by KARI-NARL, the Ohio State University (USA) and FERA (UK) have established that the disease is caused by a combination of viruses, the main ones being the Maize

Chlorotic Mottle Virus (MCMV), a virus that has not been reported in Kenya before and the Sugarcane Mosaic Virus (SCMV) which combine to cause Maize Lethal Necrotic (MLN) disease.

Researchers say the disease is transmitted through seeds and maize pests such as thrips, stemborer, rootworms, flea beetles and other insects.

All varieties of maize planted in all above-mentioned regions are affected by the disease, which reduces the crop options for farmers. Research institutions have set up two trial sites in Naivasha and Bomet to test the resistance levels of different maize varieties to the disease. The disease has no cure.



Maize plants infected by MLN disease start drying from the leaves downwards.

Harvesting, handling and storage determines the quality of hay.
See page 2



Improve your potato yields through proper seed storage.
See page 5



Free health information for all

In this issue, we carry an insert on a new free health information service called iAfyA. You can visit their site at www.iafya.org and ask for any information regarding your health using your mobile phone browser.

Dear farmers,

The outbreak of the Maize Lethal Necrotic disease is a serious threat to food security in the country. Maize is Kenya's staple food on which the entire country relies. Any shortages in maize production has major implications on the economy, because the government has to use huge amounts of the country's foreign exchange to import maize to bridge the production gap.

Many farmers especially in maize growing areas may not harvest anything because the disease has wiped out the entire maize crop. This will not only be a loss to farmers. Consumers will have to pay more for maize due to the imminent shortage of the commodity next year. Whenever there is a shortage, maize prices rise considerably, affecting all consumers.

The disease would have been contained last year when it was first noticed in Bomet district. But the Ministry of Agriculture – and by extension the government, did not treat it as an emergency that required urgent intervention to stop it from spreading to other maize growing areas. We do not expect much from the government especially at a time like this, when every one within the establishment is preoccupied with the forthcoming elections.

Although our research institutions were quick to act by identifying the disease and even advising on the necessary control measures, not much information was passed on to the farmers on how they could have stopped it from spreading.

The preoccupation of many Kenyan farmers with maize is the other big problem. Very few farmers are willing to practice crop rotation or growing other crops, a practice that can easily control the disease. Continuous planting of maize has played a big role in the spread of the disease. Now we can see the problem of our dependency on maize. If farmers in the affected areas can go for such crops as sorghum, millet, potatoes, beans, bananas or cassava, the Maize Lethal Necrosis disease would be easily contained.

The least the government and other stakeholders can do for now is to launch a big campaign to create awareness among farmers across the country for crop diversification and disease control measures.

Good hay is key to good milk production

How to prepare quality hay that makes that precious white juice, called milk, flow during the dry season.

Theresa Székely

Observing dairy cows feeding in Kenya, one is left wondering: How do these cows produce milk with the quality of fodder they are given? On the other hand, we receive many questions concerning hay preparation. Farmers have noticed that feeding is key to the performance of their dairy cows. We would like to encourage these dairy farmers with a few guidelines on hay production – the perfect dry season feed.

When to cut grass for hay

Very often, farmers cut their grass only

Other questions on hay

With this article, we have answered a bulk of questions on hay. Few others are answered below:

What will I do if my cow does not want to eat the hay given to it?

If an animal refuses feeds offered to it, there is usually a good reason for it. Either the animal is sick, or there is something wrong with the feeds. Check for the quality of the hay: a greenish colour is a good sign. Yellow and brown colour means it has very poor nutrient content. Black colour can mean it is rotten. A smell of mould and whitish dust is a sign of poor harvesting and storage, and the hay may even be poisonous. You will have to compost it and to buy better material.

Apart from ordinary grass, what other materials can be used to make hay?

Almost all green plants that are suitable as animal feed can be used. Dried leguminous plants such as lucerne, calliandra and luecaena are a valuable protein and mineral source. Branches from fodder trees can be dried and the leaves collected in bags. You can apply the same procedures and rules as with grass.

How else can I add value to the hay that is being given to my cow when there is no grass and Napier?

You may supplement the hay with dairy meal and with fresh or dried leaves from fodder trees. Always offer mineral licks and sufficient water to your animals at all times.



The green colour of dried hay indicates it is still nutritious. Dried, green leucaena hay(right)

when it has grown very high or even when it has already died back. Such grass has lost most of its nutrients, especially proteins that sustain milk production. Milk is a protein rich fluid and cows need proteins to produce it. After flowering and seed production, grasses usually start to take back most nutrients from the leaves into the roots in preparation for the dry season, so that they can grow again from the roots when the next rainy season starts.

However, the most nutritious stage of grass is before flowering. This means you have to cut it when it is still young. In most regions, it will regrow again, and a second or even third cut is possible. Depending on the temperatures, the first cut can be done one or two months after the rains have started. The second cut can follow one or two months later. You may alternate grazing and cutting in the same rhythm. You need good fencing to keep your animals away from the grass production grass for some time to allow for regrowth of the grass.

Cutting techniques

Good hay can only be prepared from clean grass which is free from soil and dirt. If hay is mixed with soil, it will start to rot and moulds will develop which can even be toxic to animals. Never uproot grass for feeding! It is essential to avoid cutting too close to the ground, as this will disable regrowth. Cutting grass when about two inches from the ground is right. This is difficult to do with a panga. If you can, borrow or use specialized machinery, or learn how to cut grass with a scythe. The result will make a huge difference!

The cut grass should be spread out

evenly on the stubbles (grass stumps), do not allow cut grass to come into contact with bare soil. The time for drying depends on the solar radiation. In hot areas, one day may be enough, in others, two days are necessary. You may have to find the best time for best results.

Grass is dry when it is crispy

At least one turning over is also essential, about "half way". This can again be after a few hours, or only in the evening, if you cut in the morning. If you do not turn the material, the grass lying underneath will still be wet, leading to development of moulds during storage. The worst enemy for hay is rain! Hay that has been rained on is worthless and will rot. You have to decide carefully when to prepare hay! You need at least two days without rains. In areas where this is very difficult, you should prepare silage.

Storage

Hay must be stored in a clean, dry, well-ventilated and dark room. With suitable storage, it can maintain its quality for many months. In the sunlight and in humid places, it will degrade quickly. Making bales reduces its volume and makes it easier to transport.

Judging the quality from its looks

Hay quality and nutrient content can be judged at one glance, simply from its colour. If it is green, it is nutritious. If it is yellow or brown, it has already lost most nutrients and it is not suitable for lactating animals. An additional criteria is its smell: Sniff with your nose for a mouldy scent. This usually comes with a whitish dust. Do not use or buy such hay, it will do more harm than good to your animals.

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Stop the maize disease from spreading

Crop rotation, field sanitation and pest control are good measures that can reduce the damage caused by maize disease.

The Organic Farmer

When it was first reported last year and a diagnosis made by the Kenya Plant Health Inspection Service (KEPHIS) indicated a fungus, *Cephalosporium acremonium*, as being responsible for the disease. Many thought this was an isolated case of a disease that would soon be contained. Researchers have now discovered an additional number of viruses that are responsible for the disease now identified as Maize Lethal Necrosis (MLN) disease. But the rate at which the disease is spreading poses the greatest threat to maize production in the country.

Just to demonstrate how devastating the new disease is: Farmers in Bomet, where it was first discovered in September last year, lost over 62,400 bags of maize valued at Ksh 218 million. More than 65 per cent of the maize crop planted in the Bomet district was destroyed by the disease. All maize varieties are affected; many farmers believe that only some varieties are susceptible to the disease.

How to identify the maize disease

- At knee height, the upper maize leaves start yellowing and later on start drying turning brown from the mid-rib towards the leaf margins.
- The drying progresses to the lower maize leaves
- The stem and the nodes turn brown.
- In some cases the maize produces many shoots (excessive tillering)
- At the beginning it is only the upper leaves that appear brown
- Towards maturity the cobs shrink and do not put in any grains.
- In some cases the maize plant appear stunted.



How farmers can control the disease

The Maize Lethal Necrosis (MLN) disease has no cure. Once your maize crop has been affected by the disease, the only option left for the farmer is to cut, put it in a heap in an isolated part of the farm and burn it. Other measures farmers can take are outlined below:

- Once your maize is affected you cannot plant another maize crop on the same field for the next two or three seasons to ensure the field is free of all the disease-causing pathogens and viruses.
- Farmers in affected areas are advised to plant other crops such as sorghum, millet, Irish potatoes, sweet potatoes, cassava, beans, peas, bananas or any other crop apart from maize for two to three seasons.
- Farmers are advised to do scouting in their maize farms for signs of the disease as indicated above. If they

notice a maize plant with any of the symptoms, it should be uprooted, burnt or buried deep in the soil to stop the disease from spreading.

- Use of clean certified seed is very important. Farmers using maize seed from unknown sources can easily introduce disease into their farms.
- Regular spraying of the maize crop with pesticides and plant extracts is a good practice because pests such as aphids, stemborer, maize beetles and thrips are the main vectors that transfer the disease from one area or farm to the next.
- Ensure the maize field is clean and free of any weeds that act as hosts to some of the pests that transfer the disease to the maize.
- Never plant maize that you have harvested as seed again as this will re-introduce the disease into your shamba and spread it.

A cheap method to control pests in maize

Controlling pests in maize at the growing stage is a very important measure in reducing damage to maize, which leads to loss in the overall yield at harvest. Some of the pests that are very common in maize at the early stages of growth include stemborers, aphids, chaffer grubs, bollworms, thrips and beetles.

Instead of buying chemicals to control these pests, farmers can make their own pesticides at home using pepper and ash. Scientists have discovered that a mixture of ash and pepper is much more effective than using some of the chemicals that cost a lot of money. Farmers can buy pepper powder in the market if they do not grow it in their gardens.

How to make an ash-pepper mixture

- Buy ripe pepper or pick ripe ones from your own garden.
- Dry the pepper and make a powder by either grinding or pounding, then remove the big particles
- Sieve cold wood ash from the fireplace
- Get 1 gorogoro (2kg tin) of ash from the fireplace.
- Mix 1 gorogoro of ash with 5 teaspoonfuls of pepper powder.
- Mix the pepper and ash properly.
- Put the mixture in a used pesticide container that has small holes at the top.
- Apply the mixture from the container by shaking it once

into each plant funnel.

If you do not have an insecticide container you can use your hands to apply. A pinch of the mixture applied to every plant is enough – but remember to wash your hands after application.

When to apply

For good pest control with pepper and ash mixture follow the following guidelines:

- Plant early at least 2 weeks before onset of the rains.
- Look for pest damage every 3 days, starting from the second week after plants emerge in the lower drier areas, and 3-4 weeks in medium and high altitude areas like Trans-Nzoia and Uasin Gishu.
- Apply the mixture after you see a few holes on the leaves. If you see more holes later, then apply the mixture again.



Source: Dr. Margaret Mulaa, KARI, Kitale

Weaver ants easily control mango pests

Farmers using weaver ants to control fruit flies in Southern Tanzania have recorded increased yields and income.

The Organic Farmer

Weaver ants are tiny ants that belong to a group of beneficial insects on the farm that can be called 'friends of the farmer'. Since time immemorial, nature has created a balance between all living organisms. This balance ensured that harmful pests and diseases were controlled naturally by beneficial insects which acted as predators of the harmful pests (for instance the fruit flies), reducing their multiplication and damage to crops and the environment.

Weaver ants are social insects, which live in colonies on selected trees. They prefer to live in cashewnut, mango and cotton plantations. When their numbers increase, they often divide themselves and inhabit new trees on the farm; this is one reason why they are useful to the farmer.

How a weaver colony works

Weaver ants live in nests in trees. They built them using broad leaves, which they pull, and glue together using a sticky substance obtained from their bodies.

Like colonies of bees and other insects, each weaver ant colony has one or more queens whose duty is to lay eggs and produce more ants. Weaver ants in the colony are divided and given different roles; there are worker ants, food gatherers, and even soldiers who provide security to the colony. The main food for weaver ants are other insects such as fruit flies that live in the same trees, or honeydew, produced by other insects in the trees they inhabit.

Good bio-control agents

Weaver ants are small in size, but they are very tough fighters and can ward off any intruders or harmful insects that attack their colony. They are hard-working and will be seen moving from up and down trees carrying loads of food, some bigger than their own size, to feed the colony. The ants usually communicate through a unique scent (or pheromones), which elicits an immediate reaction from all ants in the entire colony to offer defense or undertake a particular task.

They help reduce pest levels

Weaver ants consume a large amount of food, and workers continuously kill a variety of insects for this purpose. Because weaver ants prey on harmful plant pests, any plant inhabited by weaver ants has low pest levels. Weaver ants have proved to be effective bio-control agents against agricultural pests especially in horticultural crops such as mango and cashewnut plantations. Fruit trees harbouring weaver ants produce



Weaver ants (above) eat fruit flies (right), their larvae and other pests thus controlling them naturally.

higher quality fruits, they have less leave damage – making it unnecessary to use expensive and harmful chemical pesticides.

To encourage weaver ants to do their work, farmers tie ropes between mango trees and orchards to facilitate the movements of ants to unoccupied trees. In some countries in South East Asia, weaver ants are provided with food to promote their fast growth and to discourage them from moving away.

Organic mangoes and cashewnuts

In Tanzania, cashewnut farmers using weaver ants to control fruit flies have managed to increase their cashewnut production by up to 75 per cent. Since the farmers do not use chemicals, the cashewnuts they produce are sold as organic, which fetches a higher price in the international markets compared to conventionally produced cashewnut that use chemicals to control fruit flies and other pests.

More income for farmers

For example, 1 kg of cashewnut that is grown organically is selling at Ksh 97 while the ones grown using chemicals to control fruit flies are sold at Ksh 83 per kg. From this it is easier to see the benefits organic producers stand to gain from using a less costly and an environmentally friendly production method.

Access to credit for farmers

In Tanzania farmers groups that have embraced organic methods in cashewnut production can benefit from credit schemes funded by the Swiss Development Corporation (SDC). The project is being implemented in Masasi region in Mtwara province, Tanzania. In order to protect the weaver ants and other beneficial insects in cashewnut plantations, farmers are advised to stick to the following guidelines:



- No chemical are used in their plantations.
- Crop residue is recycled and not burnt.
- Farmers are encouraged to facilitate the movement of weaver ants from one tree to the next using bridge ropes.
- Barriers are placed at the base of the cashewnut trees to stop predators from attacking weaver ant nests.
- - Since weaver ants can only prevent fruit flies in cashewnut and coconut trees, farmers are advised to survey their plantation regularly to ensure they able to identify diseases and other pests and to use plant extracts and other biopesticides to control these diseases and pests.

This article is a translation of a text published in our sister magazine, Mkulima Mbunifu, which is distributed in Tanzania.



Weaver ants derive their name from the way they weave their nests using plant leaves.

Potatoes: Seeds and storage cause problems

Potato farmers could earn good income if they had good seed and proper storage facilities in their farms.

The Organic Farmer

Potatoes play an important role in Kenya's food security; they might even become more important with regard of the devastating maize disease (see pages 1 & 3). It is hard to understand why the potato industry has been neglected for a long time. The sector experiences two mayor challenges: Lack of good seed and poor storage facilities.

More certified seed needed

Lack of certified seed has forced farmers to recycle seed planted the previous season, spreading diseases such as bacterial wilt and other viral infections. More than 95.6 per cent of all potato seed planted by farmers in Kenya are transferred from the previous season. Out of the 60,000 metric tonnes of certified seed required to meet the country's demand, research institutions and certified seed producers can only produce 2,640 metric tonnes of quality seed. It is therefore very difficult for farmers in most parts of the country to get good quality seed for planting. What makes the problem worse: Although 90 per cent of farmers store their own seed, only four per cent of them have received training on seed storage.

Poor sprouting causes poor growth

What farmers are forced to do in most cases is that at the time of planting, they use the available potatoes in their seed store, regardless of whether they are well-sprouted or not. Such poor potatoes will only produce one or two

stems, which leads to poor yields. Moreover, climate change has led to reduced rains in most potato growing areas. It is only well-sprouted potato seeds that can do well in reduced rainfall amounts.

Lack of knowledge on the benefit of well-sprouted seed on potato productivity has led to poor potato yields on many farms. But this will change soon. A training programme

has been launched where farmers will be trained on how to build suitable stores for potato seed storage on their own farms (see box bottom left).

How to store potato seed

Farmers in the project areas are taught selection of seed, and how to prolong their storage period such that they have well-sprouted seed potatoes within 8-9 months, that means until the time of planting. For example, when the potatoes are harvested in January or February, they should have sprouted well for planting by September the same year if stored under the right conditions.

Farmers can benefit from increased yields if they can practice the following tips for seed storage:

- Two weeks before harvest, cut off the stems at the base; this allows the potatoes to harden and reduce moisture loss.
- Sort potatoes immediately after harvest. Only potatoes the size of a chicken egg or smaller are suitable for seed.
- Remove all bruised potatoes to prevent entry of disease causing agents and rotting. Do not wash potatoes meant for seed; the water may be contaminated.
- Do not store potatoes in direct light; they turn green and cannot be used as seed or even for consumption.
- Place the potatoes in a raised platform or a dry floor. The store should be rat-proofed.
- Do not use synthetic bags for potato storage, sisal bags are ideal as they allow



Seed potatoes in a Diffused Light Store (DLS) (above). The more the sprouts in a potato seed tuber (below), the higher the yield.



air circulation. Alternatively, store them in net bags, which allow light and ventilation.

- Storage stores should face the East-West direction; this reduces the amount of light getting into the store (Diffused Light Stores)
- If using an ordinary store, cover your seed potatoes with grass to help them sprout and prevent the amount of light getting into the potatoes.
- Good seed potatoes should be well sprouted; there should be a uniform sprout in all eyes.
- Potato sprouts should be at least 2 cm in length before planting.

Storage is the big problem

Potatoes are perishable; this makes it very difficult for farmers to store them for a long time after they are harvested. They have to be marketed immediately. If the market is flooded with the commodity, prices go down, exposing farmers to losses. In the developed countries, potatoes are stored in huge silos with refrigeration. The lack of this infrastructure in the developing world forces small-scale farmers to use other methods.

In any way, after being dug out, the tubers should be well dried. Make sure your potatoes are not exposed to sun, rain or wind. By the end of two weeks, they'll have thickened skins and any nicks will have healed. All damaged tubers should be rejected and the sound, healthy ones can then be kept in the store.

continued: page 6

Storage and marketing projects started

The twin problem of potato storage, both for seed and market may come to an end if two projects started recently prove successful. In the first project, farmers will be trained on proper selection and storage of seed on their farms. The National Council for Science and Technology is funding the three-year pilot through Mount Kenya University in collaboration with KARI and the Ministry of Agriculture. Already seven farmers from seven districts in potato growing areas have been trained on on-farm potato seed storage under the project.

To stop exploitation by middlemen and improve potato marketing, a programme, Small Holder Marketing Project (SHOMAP) will help farmers deliver their potatoes to collection centres. Potato processors, supermarkets, hotels and other buyers will buy potatoes from these centres at the prevailing market prices.

Farmers' benefits from credit scheme

In an effort to improve their earnings, a farmers' group in Kangundo wrote a proposal for credit – and succeeded.

The Organic Farmer

In the year 2009, quite a lot of things changed for the members of the Ukulu Maiuni Self Help Group in Kangundo. After using chemical fertilizers and pesticides against pests and diseases for many years, they applied for training in organic farming. But they had other objectives as well. The members wanted to improve both their income and livelihood as small-scale farmers.

They therefore got in contact with *i-TOF* field officer Victoria Mutinda. After some training in soil fertility, crop rotation, preparation of plant extracts to replace pesticides, they asked Victoria to help them write a project proposal. "We realized that we needed to do more to come out of poverty", argued Patrick Mulaa when *TOF* visited the group some months ago.

Victoria assisted them in writing a proposal. The effort was a success. In 2010, the group obtained Ksh 120,000 from the *Njaa Marufuku Kenya*. As per the proposal, it decided to build up a tree nursery and to venture into chicken rearing as income-generating activities. Again, the *i-TOF* field officer came in and trained the group on poultry management and on how to establish



mango and moringa tree nurseries. The group purchased seeds of trees like the moringa, olive wood, mango and neem. The sale of seedlings was a good idea, a moringa seedlings goes for Ksh 35 while a mango one goes for 100.

At the same time, the group bought chickens. The members now sell the eggs as a group, which is a more efficient marketing strategy. Every day, they deliver 105 eggs to the market, at a price of Ksh 300 per crate. "Our lives have changed," says Patrick. "At least a little bit. It will change more, since we have seen that working as a group empowers all of us," he adds.

Answers in brief

Turning liquid fertilizer into powder

Is it advisable to dry your fertilizer into a powder or dust form and keep it in stores for future use? We are used to that.

We are not sure what method you can use to convert liquid fertilizer into powder. Liquid fertilizer from plant extracts should be used immediately after preparation. If it stays longer, it loses nutrients and may not benefit your plants.

Liquid fertilizer application

How is the liquid fertilizer applied on the plants?

You can use a knapsack sprayer to apply liquid fertilizer made from plant extracts. Use a piece of cloth to strain and prevent small particles that remain in the liquid from blocking the nozzles of the sprayer. You can also sprinkle the foliar feeds on the plants using plant leaves. For slurry application, avoid applying directly on the leaves. Apply around the base of the plants.

Liquid fertilizer application intervals

How long should my fertilizer stay after applying on the crops?

Liquid fertilizer using plant extracts is not like chemical fertilizer which is often made in high concentrations. It should therefore be applied regularly, preferably on a weekly basis until you notice a change in your crops. If it is opened, then it should be used as soon as possible before the nutrients are lost.

Using ash in compost

In which system is one advised to use ash as a form of adding nutrients during composting? In composting or in preparation of liquid fertilizer?

It is important to add ash because most organic matter used in compost and even plant material has very little potassium in it. Ash is a good source of potassium and this is one reason it should be applied to compost and even liquid fertilizer to balance its nutritional content.

Use liquid manure in growing season

When should liquid manure be worked up in the soil?

Liquid manures, or manure teas and plant teas, provide quick nutrients during the growing season. They are cheap and effective nitrogen rich organic fertilizers which are often used for vegetables as a top-dressing or as foliar feeds. They can be prepared from animal manure or from green plants.

Less work with a sack

Why should I put all the animal waste in a sack instead of direct pouring into the drum while making liquid manure?

If you prepare liquid fertilizer, you fill a sack with manure and hang it into the drum with water. This way, the hard stuff remains in the sack, while the nutrients go into the water. So it is easier to sieve the liquid fertilizer and to put it around the plant stems.

>>> from page 5: Potato seed storage

Whether the potatoes are placed in bins, bags or boxes, the main consideration is air circulation. For this reason, a slatted box is usually best. The storage atmosphere should be well moistened (90 per cent relative humidity). Exposure to light hastens sprouting



Githenya Kariuki prepares potatoes for storage using saw dust.

and produces a green colour or sunburn, hence potatoes should be covered or shaded from light. As the storage season advances, potatoes should be examined from time to time and when sprouting is evident, remove the sprouts and reject the damaged or diseased tubers.

Using sawdust

Some farmers in potato-growing areas have discovered how to preserve potatoes using sawdust. The potatoes are sorted for storage by removing the bruised, those with tuber moth holes and the rotting ones. The farmers then spread a thick layer of dry sawdust across the clean floor of the store. They

then spread the potatoes on the sawdust and add another top layer of sawdust to cover the potatoes. Githenya Kariuki, a farmer in Kinungi area in Naivasha has used this method for the last five years. He says that he has managed to extend the shelf-life of his commercial potatoes for up to 5 months without any sign of damage. This method may benefit farmers to store their surplus potatoes until the market prices are favourable. It also helps improve the household food security because the farmers can store potatoes all year round for home consumption or even sprout them for replanting.

Silage: Molasses improves preservation

I tried making silage but during harvesting time it had rotten. Where did I go wrong?

Silage preparation is tricky. After it has been put into containers and sealed, anything can happen. Even if you follow all rules, the fermentation can fail. Follow these rules:

- Cut grass for silage at a young age, when it starts flowering. Spread it in the field and let it wilt for some time to reduce water content. Fine, short young grass should be wilted in the sun only for a few hours.
- If you take a hand full of the material and squeeze it, there should be only a slight feeling of moisture in your hand. But if it is too dry, the fermentation cannot take place.
- Coarse plants such as Napier grass, maize plants, sorghum plants etc. need to be chopped. Try to use a chaff-cutter,

as it will provide the finer material than if you use a panga.

- Be careful and sure that the grass is cut neatly and spread evenly on the stubble. It must be kept clean and free from soil. When spreading and preparing the wilted material for packaging, use clean sheets to prevent contact with soil or dirt.
- Addition of molasses (2 to 10% of the fodder weight, diluted with 10 parts water) improves preservation and quality of the silage. More mature materials need higher application rates of molasses than young ones. Sprinkle the solution evenly on the spread out grass.
- Compact the material in the container and make sure there is as little air inside it as possible before tying it airtight.
- Holes in the bag or container can spoil the silage. tsz



Purple vetch can accumulate 90 kg of nitrogen per acre and will provide about 45 kg of nitrogen per acre to the subsequent crop.

Green manures

Improve soil structure

Which plants are good for use at practicing green manuring?

We realize that more and more farmers are beginning to discover the benefit of green manures - and for good reasons! They decay easily and release nutrients quickly. Leguminous plants fix nitrogen from the air and store it in the plant. About half of this nitrogen will be available to the subsequent crop, and some even for the next two crops grown on the same field. Green manures improve soil structure, increase water holding capacity and decrease soil loss by erosion.

The most important green manure crops are pigeon peas (*mbaazi*), dolichos lablab (*njahi*), cow peas, crotalaria (sunn hemp), purple vetch, sesbania and others. A very efficient plant which can be used for green manure is tithonia. The plants are usually slashed two to three weeks before sowing the main crop and ideally before or at the flowering stage, when they have accumulated a maximum of nitrogen. They are worked into the topsoil to decay and to feed a subsequent crop with their nutrients. tsz

Farmers interested to know more about green manures send us an SMS with the Keyword Green manure and the address; we will send you the TOF leaflet No. 6, Green Manures, Covercrop and Mulching.

Choosing a vet

How can farmers know the difference between a qualified vet officer and a *juu kali* (an unqualified) one?

Reputable vets are well known through farmers' experience. Farmers in your locality can advise you on the best one from their own experience and past records of their performance. Sometimes it is important to rely on qualified veterinarians although their charges are much higher than those charged by animal health assistants.



Good housing and proper feeding are very important in poultry keeping.

Chickens need different feed

What is the difference between a layers mash and a chick mash?

Layers mash is a special feed given to birds that are meant to lay egg. Chick mash is a special feed given to chicks one week old and above to enable them to grow.

Chickens need fresh air

Why should there be enough ventilations in the poultry house as they these may subject the bird to cold?

Sufficient ventilations keeps the poultry house dry; you have to avoid all form of wetness. Ventilation enables the birds to be exposed to fresh air, and regulates the temperatures inside the house.

Chickens diseases

I am an indigenous chicken farmer, my fowls are coughing and have boils on the comb which are affecting the eyes, some are unable to see. Millicent Onyango

The symptoms appear similar to those of Black Head disease. This is mainly caused by poor hygiene in the chicken shed including inadequate ventilation. Buy Trimethazole from an agrovet shop and put in their drinking water as recommended by the vet assistant. You can also buy healing oil from the same outlet

and apply on the wounds. The chickens will improve if that is the cause.

Keep chickens house clean!

How can one avoid diseases and parasites in a poultry house?

One of the most important measure to avoid diseases and parasites is cleanliness in the chicken house. Remove the manure regularly, sweep the floor, brush sometimes the walls, as pests and mites hide there. Provide fresh water and observe the chicken daily.

Cannibalism in chickens

What causes cannibalism in chickens?

Cannibalism in chickens is a common problem. One of the causes of cannibalism is the confinement of chickens in a small space. Increase the amount of space available for each bird. All chickens should have plenty of feed and water at all times; when chickens are idle with nothing to eat, the tendency to peck is higher.

The chicken housing should be comfortable, if temperatures are higher than normal, the birds become easily irritated which causes pecking. If the birds have inadequate nutrients such as methionine and salt in their feed; this increases craving for feathers and blood and hence pecking.

The many benefits of tephrosia

Tephrosia can be used as organic pesticide, as treatment against ticks on livestock and as soil improver.

Tephrosia vogelii (kibaazi in Kiswahili) is a small African leguminous tree. It is useful for two reasons: It has bacteria associated with its roots that are able to fix atmospheric nitrogen. Second: It has a poison in the leaves and seeds (rotenone), that makes tephrosia to a quite efficient organic pesticide. The advantage of tephrosia is that, unlike most synthetic pesticides, it leaves no residue on crops because rotenone breaks down within 3 - 5 days after application.

Take care! tephrosia is poisonous and therefore dangerous to humans and animals. When using tephrosia, try to keep the extract away from your skin and use gloves if available. Wash hands with soap as soon as you have finished applying it.

Control of field insects

To produce an extract, harvest leaves from the tephrosia plants and pound them in a mortar. Boil 500 g of fresh leaves in 1 litre of water for 30 minutes. Sieve through a tea strainer, dilute with five litres of water and apply it with a sprayer. Add a bit of soap to help the spray stick to the plant.

This mixture can be sprayed on garden vegetables, fruits, field crops and nursery seedlings to control different



kinds of insect pests. It is important that the sprays have direct contact with the pests. If the pests are underneath the leaves, be sure to actually hit them. This treatment is effective up to seven days. After that time, the process must be repeated.

In many African countries farmers use Tephrosia leaves for the protection of stored cereals and legumes. They dry the leaves, pound them into a powder and mix 100 grams of powder with 100 kg of maize or beans. This treatment gives protection against weevils, the Larger Grain Borer or bean bruchids and is effective up to three months. After that time the process must be repeated. Thoroughly wash the tephrosia powder off grains before using the maize or beans for food.

Protection of domestic animals

Prepare the extract as described above. Apply it on the animal; you can as well add neem extract. This treatment will effectively remove ticks and flies lodged in the animal's fur. Rotenones are very

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toxic to pigs, so don't use it on pigs. But you can clean chicken houses with tephrosia extracts.

Tephrosia improves soil fertility

Tephrosia leaves and seeds contain high amounts of nutrients, especially nitrogen. When the trees are cut and the leaves worked into the soil, these nutrients can be used by the plants that are grown after tephrosia in the field. Tephrosia trees in a field have another advantage: Farmers in Uganda use tephrosia to fight the moles. They plant them as scattered plants in a field or as a barrier around fields. **TOF**

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iAfya's Mama Fatuma helps you to understand your health easily... **What is Malaria?**



The kids think it's funny to sleep under a net to avoid getting malaria.



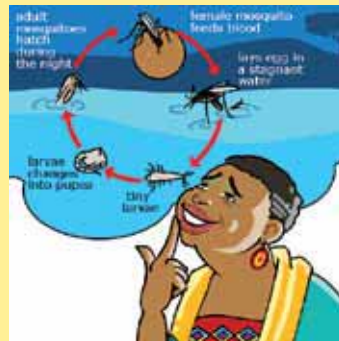
Mama Fatuma knows where malaria comes from



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Look out for our next issue on: **How does one get Malaria?**