



A maize field affected by the MLN disease (above). Any maize planted in a farm that was affected by the MLN disease last year will be affected again. Farmers should plant a different crop to break the disease cycle.

Stop maize disease through crop rotation

If your maize crop was affected by the Maize Lethal Necrosis Disease last year, do not plant again in the same field that was affected.

The Organic Farmer |

With this year's planting season just approaching, some farmers whose maize was affected by Maize Lethal Necrosis (MLN) disease last year want to know if



An affected maize leaf

there is any danger of their maize crop getting affected if they plant maize in the same field this year. Can a farm that was affected by the MLN be planted with maize again? The answer is no.

Researchers advise that maize crop planted in any field infected by the MLN will surely be affected unless farmers plant another crop different from maize such as beans, onions or potatoes. What most farmers do not know is that the disease is transmitted by insect pests. Once the maize crop is harvested, pests do not disappear

completely as some pests such as thrips dig into the soil where they undergo part of their life cycle. When the maize is planted again, the pests attack the young germinating maize while it is still in the soil, thus passing the disease to the next maize crop.

Tests have shown that dressing the maize seed with strong pesticides does not help either. Maize tends to get infected regardless of whether the seeds are dressed or not. The best solution lies in practicing crop rotation in all affected areas. In this issue we repeat other measures farmers can take to protect their maize if they notice any signs of the disease. *Page 2*

TOF modules out of print

Many farmers have been calling TOF and sending SMSs requesting us for modules on various subjects. We would like to inform all farmers that the modules are currently out of print. We are updating the modules and will make them ready for reprinting soon. We have noted all the requests made and will send you the modules once they are ready.

Dear farmers

Many times in this magazine, we have highlighted the dangers posed by the spread of bacterial wilt, a devastating disease that can wipe out between 50 and 100 per cent of potatoes in an infected potato field. The government has done little to address factors responsible for its spread across the country. One of these factors is marketing uncertified potato seed. Since the late 80s and early 90s, a lot of land meant for potato seed multiplication was given to politically connected individuals and politicians.

Despite efforts by KARI to introduce various options to ensure farmers have quality seed, there has not been substantial support from the Ministry of Agriculture. Potato seed cannot be produced under the formal seed production system. Although there are strict controls by the Kenya Plant Health Inspection Service (KEPHIS), they have stifled rather than develop the sector.

Attempts to introduce informal seed production systems where selected farmers are trained and provided with certified seed for multiplication has received very little support from the government. This requires the government to support the research efforts of its institutions and scientists.

Reports that the government has allowed importation of new potato seed varieties without subjecting them to the mandatory tests by KEPHIS is worrying as this raises the possibility of introducing diseased varieties or those that may not be suited to local conditions.

Following the confusion in the potato sub-sector, farmers are now going back to using their traditional potato varieties which may complicate efforts to control bacterial wilt. The government urgently needs to make a major policy shift towards development of potato seed in the country.

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Maize disease: Plant a different crop this year

Farmers whose maize was affected by Maize lethal Necrosis disease are advised to change to another crop during the current season because pests carrying the disease are still in the soil and will reinfest any maize crop planted on the same land this year.

The Organic Farmer | One reason why the Maize Lethal Necrosis Disease (MLND) is spreading to new areas in the country is that many farmers are not willing to practise crop rotation by planting other crops that do not belong to the grass family. The fact that maize is the main food crop in the country is one reason why many farmers find it difficult to plant other crops that are not affected by the disease.

The disease is spread by crop pests such as thrips, which remain in the soil after the maize is harvested. Immediately the maize is planted, the pests still in the soil will attack and infect



The disease first shows in the upper leaves of the maize plant.

the maize that is germinating. Although the disease is not soil borne, the pests in the soil are carriers of the disease and will transmit it to the next maize crop if farmers plant maize in the same shamba that was affected last year. This is one of the reasons why it has become difficult to break the disease cycle in all maize growing areas

in the country. Below are a few measures on how to identify the disease and ways to control it:

How to identify the disease

The MLND disease is caused by a combination of two viruses; the Maize Chlorotic Mottle Virus (MCMV) and the Sugarcane Mosaic Virus (SCMV).

Since viruses can only survive on living plant material, new research findings show that the disease is able to survive in the soil through pests mainly thrips, which undergo part of their life-cycle in the soil. The main mode of transmission of the disease is through insect pests, which transfer it from one crop to the other. Farmers can identify the disease by looking for the following symptoms:

- When the maize is at knee height, the upper maize leaves start yellowing and later dry up, turning brown in colour from the mid-rib towards the edge of the leaf (leaf margin).
- 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 in colour.
- As the maize matures, the cob shrinks and does not put on any grains.
- In some cases the maize plant may appear stunted.

How to control the Maize Lethal Necrosis disease

As research into MLND continues, scientists have found new facts about the disease and how farmers can control it. Below are important measures that farmers can take to eradicate the disease in their farms and also reduce its spread to new areas.

- So far, the disease has no cure. Therefore farmers should be wary of people promising to sell them chemicals that can control the disease.
- The situation in most growing areas is that farmers plant maize at different times such that we have maize at different stages of growth; when this happens the disease is easily transmitted from the older crop to the younger maize, which leads to a continuous infection of maize and persistence of the disease in the affected areas and even its spread to new areas. Farmers

should avoid this practice.

- Crop rotation has been identified as one of the options that can help reduce the incidence of the disease considerably. Crop rotation or planting of alternative crops that are not affected by the disease such as beans, Irish potatoes, sweet potatoes, sorghum peas, bananas for two or three seasons can help break the disease cycle and prevent its spread to new areas.
- Farmers are advised to use only certified maize seed. At present all maize seed in the country has been fortified with stronger pesticides, but research shows that this is not helping either as the virus-carrying pests still manage to survive and attack the next crop. Farmers in areas not affected are advised to continue spraying their maize with plant extracts or biopesticides to control pests such as

stemborers, thrips, aphids and maize beetles which are the main vectors of the disease.

- Farmers are advised to inspect their crops every day for signs of the disease. If they notice any of the signs mentioned above, they should uproot the infected maize stalk and bury it to prevent the disease from spreading to the rest of the maize.
- Infected maize can be fed to animals except the rotten maize; farmers have to protect the animals from mycotoxins that can cause poisoning. Animals and people who consume animal products such as milk and meat can be affected by aflatoxin poisoning.
- Ensure that your maize field is clean and free of weeds that act as hosts to insect pests. The pests carry the disease-causing viruses and transfer the disease

from plant to plant. Plants in the grass family such as Napier grass have been found to be the main reservoirs of the disease. Napier grass or other pasture grasses near maize fields are partly responsible for passing the disease to any maize crop planted in the vicinity.

- Destroy all volunteer maize, weeds or crops in any field where you intend to plant maize, as they may harbour insect pests that can transfer the disease to your new maize crop.
- Dry maize stocks or composted material cannot transmit the disease and is therefore safe for animal feed. Farmers can also use the affected maize as silage as long as the rotten part of the maize is cut off and discarded or buried to prevent animals from eating it.

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How to produce high quality beef in dry season

Beef producers often incur losses when fodder is in short supply. But adjusting animals' feeding program can help farmers produce quality beef during periods of drought.

Josephat Chengole | Beef production is mostly done in the arid and semi arid regions of East Africa. But these are fragile and largely unable to support livestock in times of drought. In such conditions, pastoralists desperately sell their animals at low prices. This should not be the case.

Seasonality of pastures

In the dry lands, pastures are seasonal, available in plenty during the rainy season and scarce during the dry season. In the rainy season, farmers should produce adapted grasses like *Cenchrus ciliaris*, *Enteropogon spp*, and make hay or silage for use during the dry spell. It is also important to grow the pasture grasses under irrigation as it happens in Baringo and release the animals on the pasture during the dry season.

When you feed hay, do not waste it by providing cows with more than they can eat or use in their bodies. For example, feeding hay on the ground results in excessive waste. Using containers or troughs greatly reduces wastage of the fodder. Also, consider feeding alternative feeds that include crop residues like chopped maize stalks.

Select the right breeds

Select breeds that are adapted to dry areas. The hardiness, heat tolerance and disease resistance of the Zebu cattle enables them to better cope with having little feed. These animals are also excellent in converting feed for increased body weight (feed conversion efficiency is superb).

Stocking densities

Should be lower than the land's carrying capacity. This means that the number of animals should be well supported by the size of land. Rotate animals on pastures in such a way that the animals do not leave the grass degraded in the paddocks. Excessive grazing affects the quality of available pasture.

Consider culling

Remove cows from the herd that have been identified as poor



Buffel/African foxtail grass is highly regarded by cattle producers in the semi arid lands of Baringo County.

mothers, have poor udders, teats, feet and legs, bad disposition, and other physical problems. There is no reason to spend scarce resources on animals that will not stay for a long time in your herd. The earlier you do it the better.

Early weaning of calves

Essentially, the nutrient needs of a dry cow are lower than that of a lactating cow. A dry cow needs 50% to 65% of the feed of a cow nursing a calf. Young calves have an efficient feed conversion rate for dry feed. It is better therefore to wean calves early as a way of using the limited feed better especially during the drought. This must, however, be



A Hereford bull at Suam orchards ADC farm in Trans-Nzoia county.

done well so as not to affect the performance and survival of the weaned calves.

Marketing

Farmers should never sell emaciated animals (those in poor body condition). This means you have to store feed for your animals for use during the dry season. Sell the cattle when everybody is buying and buy when everybody is selling. Have your pasture ready under irrigation and feed the emaciated animals to be ready for sale when the market conditions improve.

Foxtail, the choice grass for

beef farmers in arid areas.

Also, called the foxtail grass, *Cenchrus* is a nutritious grass that is often used to fatten beef animals in the rangelands. It is a tolerant grass, perennial, matures fast and has multiple benefits. The grass is suitable for areas with an annual rainfall of 300 to 1200 mm. Though drought tolerant, it does not tolerate flooding or water-logging. It is used as a permanent pasture for grazing, for making hay or silage. It responds quickly to rain, which makes it an ideal pasture for the arid and semi-arid areas.

Growing Cenchrus

Foxtail grass is grown from

seeds, mainly during the rainy season. You need 3-6kg/ha when planting. Growing the grass successfully depends on land preparation. Plough the land to loosen the top soil. Use a rake or harrow to prepare the soil into fine tilth, then broadcast the seed.

Since the seeds are light and can be blown away by the wind, plant on a day with minimal wind and moist soil. Avoid days with heavy rains, as the seed will be washed away by runoff water. To cover the seed lightly, drag tree twigs over it. If you plant too deep then they will not germinate.

How to manage the sown grass

The amount of grass harvested is dependent on how the grass is managed. Apply manure during planting to promote good root development. Apply 4 tonnes of farm yard manure at planting.

To remove weeds, manually pull them by hand once the grass has grown and you can identify the weeds. It takes 3 – 6 months for the grass to grow, although this depends on the amount of rainfall available.

Utilization of the grass

Foxtail grass can be grazed directly or cut, carried and fed in stalls or feedlots. The best time for animals to graze is at the piping stage - just before flowering or cut and carry when the field is at about 50% flowering. Avoid over grazing *Cenchrus* pastures as they get degraded as they take time to grow again when the rains come. For places that mostly lack pastures during the dry season, foxtail hay is excellent as it provides the much needed nutrition for the animals especially when they are being fattened for the market. Although the yields of the grass depend greatly on management, soil fertility and available rainfall, the harvest in the second year may double that of the first year.

Commercial pasture

Other than storing the grass to feed animals during the dry season, you can make hay for sale whether you have animals or not. Although the size of the farm is not critical, the bigger the farm the higher the profit because of economies of scale.

Notice: Interested farmers can get *Cenchrus* seed from KARI-Marigat at KES 600 per kilogramme. Talk to the Marigat sub-county Livestock Production Officer 0724 84 88 16.



Buffel/African foxtail grass (Cenchrus ciliaris)

Government allows potato seed imports

Dutch companies have been allowed to import seed without following laid down procedure as farmers ignore certified seed and go back to using their traditional seed varieties.

Peter Kamau | Many years since the problem of potato seed shortage hit Kenyan farmers, the country is yet to come up with a strategy to improve the quality and quantity of available seed. The seed shortage, which has been worsened by the spread of bacterial wilt in all potato-growing areas is expected to worsen because the government is yet to take any measures to ensure the country develops a strategy to ensure farmers have adequate and quality seed.

New untested varieties

The government has allowed the importation of new potato seed varieties from Netherlands without subjecting them to the mandatory inspection procedures by the Kenya Plant Health Inspection Service (KEPHIS),



Importation of potato seed without inspection is likely to compromise seed quality in the country.

which reduces the possibility of bringing diseased varieties into the country (Kenya Gazette Notice No. 3769, July 2013).

Unlike potato seed developed locally by research institutions, imported seed is likely to be too expensive for small-scale farmers since the costs of importation and taxes are likely to be passed on to the farmers making its price higher than for local seeds. Besides, companies multiplying the imported seeds are required to pay royalties (Also called Plant Breeders Rights) to the overseas

companies to be allowed to multiply and sell them to farmers.

Experts ignored

Despite all the concerns raised by agricultural experts about the dangers involved in importing potato seed, two Dutch companies have already imported and released into the Kenyan market 4 new potato seed varieties (*Arnova*, *Arizona*, *Rudolph* and *Connect* varieties). Scientists at KARI says some of the seeds were allowed into the country without undergoing important mandatory tests at KEPHIS as

stipulated by law.

According to the scientists any seed coming into the country has to undergo a three-year National Performance Trials (NPTs) at KEPHIS, where it is tested for Durability Uniformity and Stability (DUS) tests and other tests for diseases.

Kenya requires 60,000 tonnes of certified potato seed, to be produced on more than 20,000 acres of land. But current allocation is only 200 acres availing 600 tonnes of potato seed. This accounts for a mere 1% of Kenya's seed requirement.

Farmers now reject certified seed varieties

Scientists and policy makers may have to go back to the drawing board if they are to tackle the problem of potato seed in the country. For many years farmers have relied on research institutions and the government agricultural extension services for direction and advice on which potato seeds they should plant. But the confusion in the potato sub-sector has made farmers to go back to using their traditional potato varieties, some of which have better qualities than varieties developed by research institutions. But most of the traditional varieties are responsible for the spread of bacterial wilt and many other potato diseases.

Sangi variety the most popular

One of the most popular traditional potato seed varieties is *Sangi*, which was introduced into the country by Mr. Peter Njoroge, a farmer from Karati village in South Kinangop. The variety has spread to all potato growing areas in the country. According to Dr. Jackson Kabira, the Director of



Peter Njoroge, holding *Sangi* potato tubers in his farm.

the National Potato Research Centre, Tigoni, the *Sangi* potato variety is now planted by more than 80 per cent of potato growers in the country.

KEPHIS reluctant to release variety

Six years ago, KARI realised the importance of *Sangi* potato variety in the country and starting cleaning it to ensure farmers have clean planting material. Although the variety was presented to KEPHIS for

registration and official release after undergoing the mandatory National Performance Trials (NPTs), KEPHIS has been reluctant to release the seed to farmers. As a result, KARI has been forced to give the variety to a few farmers for multiplication and sale to other farmers while awaiting its official release.

Research starts on traditional varieties

A survey conducted by KARI in most of the potato growing areas in the country shows that farmers prefer the traditional potato varieties to certified seed due to their availability and marketability. In a report that is yet to be officially released, scientists say apart from the *Sangi* variety, farmers in every region prefer their own local potato varieties. For example, farmers in Elgeyo Marakwet region prefer two local varieties, *Sangi* and another one called *Discus*. In Central region farmers have three common varieties - *Sangi*, *Thima Thuti*, *Mugaruro*, *Kalusi* and *Ndera Mwana*, in Mau Narok, farmers prefer Tigoni long.



Workers sort out potato seeds at KARI, Tigoni.

Involving farmers

"In future, we have to involve everyone in the entire potato value chain when developing any new potato varieties. Farmers' participation is very important to ensure the varieties are acceptable to them," says Dr Kabira.

In line with these developments, KARI is collecting all traditional potato varieties in the country to evaluate them and later involve farmers in the development of new types that have characteristics, which farmers and the market prefer. The institution has not yet secured funding for the new initiative.

Prevention the best weapon against wilt

It is easy to control bacterial wilt disease and increase potato production if farmers can take a few measures to ensure their farms are not infected.

Peter Kamau | In several past issues of this magazine, TOF has educated farmers on the dangers posed by bacterial wilt. The disease poses the greatest threat to potato production in the country. Many farmers across the country are, however, threatened by the disease, but they do not know how it spreads to their farms or how to control it. Indeed some claim that their farms have been attacked by a strange disease but are helpless in controlling it.

Bacterial wilt is a devastating disease that affects potatoes when the soil becomes contaminated by bacteria called *Ralstonia solanaceae*. The disease is spread when diseased potato seeds are replanted or when farmers plant clean ones on infected soil. The affected plant stems die and the potato tubers also rot.

How the disease spreads

Bacterial wilt can spread through infected crop residues, contaminated surface run-off water or even water used for irrigation. Farmers can also spread the disease through farming tools such as *jembes* or forks when contaminated soil attaches itself to the tools. Insects or soil-borne pests such as nematodes can also spread bacterial wilt to potato



Many farms in Kenya cannot produce potatoes due to the spread of bacterial wilt.

plant roots. Strict phytosanitary measures can keep the disease away.

Symptoms

Farmers can tell the signs of bacterial wilt by observing the potato plants. If the plants dry up or wilt, they should dig the potatoes from the plant and cut the potato into half.

If the potato tuber has a black ring with white spots, then the plant is infected with bacterial wilt. Sometimes it is difficult to identify the disease if the potatoes do not change colour. But if the leaves turn yellow in the long term, this shows the plant is infected.

Sometimes the potatoes may appear stunted, and sections of the diseased plant may wilt

completely and dry up while other parts look healthy.

Controlling the disease

Although bacterial wilt has no known cure, it can be controlled if farmers follow simple techniques to manage it. The safest method is crop rotation.

Practise crop rotation

- Farmers should never replant potatoes or any other crop in the potato family such as tomatoes, bananas, eggplants, capsicums, chilies and groundnuts on a field with affected potato crop for a period of up to 4 years.

- To "clean" this field, farmers should plant other crops such as beans, maize, cabbages, peas, lettuce, cucumber, sorghum, wheat, onions, potatoes carrots sweet or grass.

Select a suitable site

- Avoid planting seeds in low-lying or waterlogged areas. If your land is sloping, use the upper sections of the farm.

- Stop run-off water from flowing into your potato fields. Such water could be contaminated with bacterial wilt.

- Remove potatoes that grow on their own (volunteer potatoes) from your farm. Such potatoes could be infected.

- Proper and regular weeding can control bacterial wilt. Many weeds serve as hosts to the disease.

Get certified seeds

- If available, farmers should buy seeds at certified seed growers or seed multiplication



Wilting of potato leaves is a clear sign of bacterial wilt (above).

The white ring in the tuber (below) indicates the presence of the disease causing bacteria.



centres working with KARI's National Potato Research Centre, Tigoni in Limuru.

- If you use your own seed, plant whole undamaged tubers.
- Avoid buying potato seed from your neighbours. If such seeds are infected, they transfer the disease to your shamba.

Uproot diseased plants

- Diseased plants should be uprooted with surrounding soil and buried far away from the potato field (see box left: Positive seed selection).

- Affected plants should never be put in a compost heap; burn them or bury them.

Positive seed selection

With lack of certified seed together with the spread of bacterial wilt, small-scale farmers have no source of good quality seed. However, there is a very simple method through which a farmer can produce their own "clean" seeds. This is called positive seed selection. With this method a farmer can increase their potato yields by more than 50 percent and also reduce diseases such as bacterial wilt.

Important steps

- Walk around your potato garden looking for all diseased plants and uproot them together with surrounding soil, burn the plants.
- Mark all the healthy potatoes that show no sign of disease with a stick. Marking can be done at

the time of flowering when it is easy to identify healthy potatoes and diseased ones. Check regularly for any signs of disease.

- Two weeks before harvesting, cut the leaves of the selected plants to allow them to harden.

- Harvest the selected plants separately. Select the best ones, usually those of the same size as an egg. Avoid bruising the potatoes to prevent infection.

- Store these potatoes properly on a cool dry place with reduced light, for use as seed for the next season.

- In the next season, select a portion of the farm that has not been planted with potatoes or any other crop in the potato family for at least four years to plant the potato crop. **TOF**

Farmers in Gilgil acquire biogas units

After reading about biogas production in the TOF magazine, two groups in Gilgil have put up their units, creating the interest of other farmers.

Benson Chege | In November last year, members of Kioko and Mwireri's Self-Help Groups visited the Gilgil Farmers Resource Centre run by Biovision's Farmer Communication Programme (FCP) in Gilgil town. The groups have received information on crop and animal production, conservation and water harvesting and other income generation activities from the resource centre.

They read TOF magazine

During the visit, the Secretary for Kioko SHG Ms Rachel Warungo and a member of Mwireri group Ms Helen Wanjiru, saw a copy of *The Organic Farmer* magazine. After going through it, they came across an article that featured biogas production and were particularly interested in it. The two learnt that it was not too expensive to instal a biogas plant, especially with subsidy granted to interested farmers through the

Kenya National Domestic Biogas Program (KENBIP) implemented by the Kenya National Federation of Agricultural Producers (KENFAP).

Farmers learn about biogas units

The group members immediately requested the Community Information officer in charge of the centre to visit their groups and talk to other farmers about the benefits of biogas. The officer immediately contacted the KENBIP supervisor in Nakuru Mr. Stephen Macharia.

On 25th of November, the two visited Kioko group members' farms where Mr. Macharia gave a quotation and conditions that the members needed to meet to qualify for a biogas system. The group members were so excited by the information as most of them did not know how much it would cost. Some of the farmers had earlier thought a biogas system was only affordable to the rich.

Farmers trained on biogas units

On 29th of November, Rachel and Helen visited Mwireri Group



Photo: KENFAP

members again. The group that has 14 women were briefed on what they were required to do to get the biogas systems installed in their homes. Immediately after the session, 5 members requested to be enlisted in the programme while the rest pledged to mobilise funds to put up their own units.

Biogas units installed

To date, five members in the two groups have put up their own biogas units while the rest have enlisted to benefit from the biogas programme. Many other farmers who have heard about

the biogas systems have visited the resource centre with requests to be linked to the organizations and companies installing biogas units to set up their own systems. They have also learnt about other services the centre provides and are happy to access information on how to establish various agricultural enterprises.

The initiative by the two groups which were formed in 2005 to help members acquire water harvesting tanks will encourage other groups in the region to put up biogas units and even start other income generating projects that will improve their livelihoods.

The soil infertility problem in Kenya is now a crisis

TOF - A study conducted in 164 sub-counties in Kenya shows that most soils in the country lack the most basic nutrients that sustain crop production and the best possible crop yields. Areas where maize is planted had the lowest quantity of essential nutrients like Nitrogen, Phosphorus and Potassium. The results showed that of the soils sampled 67 per cent were low in micro nutrients such as Zinc and 87 per cent were low in organic matter. The soil had low pH levels meaning they were acidic and not suitable for maize production.

The report unveiled during the launch of soil testing results at Egerton University presided over by President Uhuru Kenyatta on February 8 confirms what TOF has been telling farmers time and time again, that Kenya's soils are depleted to a level where they cannot sustain food production. The report by Agricultural Input Access Programme shows that farms under the survey required an average of 8 tonnes of manure per hectare to restore lost soil fertility.

For close to 45 years, farmers in



Photo: TOF

A KARI scientist takes soil samples in Kahuro village in Muranga.

Kenya have relied on chemical fertilizers without knowing their consequences. Many small-scale farmers are unable to practise simple farming methods that restore and maintain soil fertility such as crop rotation. It is not uncommon to find big fires caused by farmers as they burn valuable crop residue that can be recycled back into the soil to restore essential nutrients. TOF

advises farmers to make use of crop residue and mountains of farmyard manure that lies idle as soil fertility continues to worsen.

The importation of large quantities of chemical fertilizers may appear a good initiative by the government but it does not address the long-term solution to the problem of soil infertility in the country. Chemical fertilizers, as we already know are responsible for the infertility. Fertilizers such as DAP, Urea and CAN have been used for a long time in our farming systems and are responsible for the excessive acid in soils especially in the countrys maize growing belt in North Rift and Uasin Gishu counties.

What is lacking are extension services to educate farmers on the proper use of fertilizers including measures they can take to improve their soils. Since the mid-1980s, the government extension services have been scaled down to a point where farmers are only expected to seek for extension officers if they demand their services. The few extension officers still in govern-

ment service receive very little supervision and lack the incentive to visit farmers to offer training.

The focus for agricultural development now lies with the county government. Development conscious leaders can change agricultural policy and allocate more resources to agriculture as one way of changing farmers by introducing them to sustainable farming methods that addresses soil fertility of the soils, agribusiness, marketing and related ventures that improve agricultural production.

Already, the Trans-Nzoia county government has taken a move in this direction by banning the use of DAP fertilizers in favour of other fertilizers that do not induce acidity in the soils. Expecting the national government to take such decisive action is expecting too much. County governments can take advantage of the leeway given to them under the new constitution to initiate development initiatives that help their farmers to uplift their livelihoods through support in agriculture.

Causes of flower and fruit drops in avocado trees

My avocados trees have been aborting all flowers every season. What can I do to prevent this?

The main cause of flower fruit drops in avocados is an issue which has been studied for many years, unfortunately there is no conclusive result that has been found yet. It appears as though it is caused by a combination of factors. Various studies have shown that the amount of carbohydrates in an avocado plant can determine its ability to flower and produce fruits. Low carbohydrate levels can influence the fruit yield by reducing the number of flowers and fruits in avocado trees.



An avocado tree about to produce flowers.

Studies have shown that the growth of an avocado tree and its fertilization through pollination occur at the same time; both processes compete for nutrients stored in the tree. The competition for nutrients has been thought to be one of the reasons that the tree loses its flowers and fruits.

Feed your trees

It is therefore important that

farmers ensure their avocado trees are provided with adequate nutrients throughout their growth cycle to ensure they do not experience nutrient deficiencies that cause flower and fruit drops. Applying adequate amounts of manure around drip lines of the avocado trees just before the beginning of the rainy season provides some of the nutrients that the trees require for proper growth. Avocado

trees also require calcium, which is found in lime or dolomite (farmers can buy these from most agrovet in major towns). Lime can be applied around the collar (base) of every avocado tree. For bigger trees, apply 1 kg of lime in same way that you apply fertilizer on other crops.

Windy conditions can cause flower drop

Other physiological causes of flower drops and fruit in avocado trees is excessive sunlight or wind, especially for tall trees. Shorter trees (low park grafted) have been found to have lower incidents of flower and fruit drops since they are protected from wind. Some farmers have reported lower incidence of flower and fruit drops where the trees are widely spaced with just enough sunlight for photosynthesis to take place. Perhaps you can try some of these cultural practices to see what will work in your avocado orchard.

No hormones in organic farming

Is there any method of making organic hormones for inducing crop growth?

Organic farming standards do not allow the use of hormones in both crop and animal production because they have many side effects on humans. Organic farming in essence involves the use of natural methods that promote growth in plants and animals. Organic farming allows the use of natural growth activators such as Effective Microorganisms (EM1) which is a liquid solution of beneficial bacteria that speed up the decomposition of organic matter that releases essential nutrients for use by plants. EM1 is used by many organic farmers to make compost and Fermented Plant Extracts (FPE) for use in disease



Photo: TOF

and pest control. Other natural growth activators are obtained from seaweed; they include Vitazyme® and Enhance®. Natural growth activators allow

plants to utilize nutrients in the soil much more efficiently in the same way that enzymes work to speed up the uptake of minerals and other nutrients in the soil. The natural growth activators are environmentally friendly and do not cause any side effects like hormones do.

EM is useful when making silage

Can I use EM1 during silage making?

Effective Microorganisms can be used during silage making as one way of helping the anaerobic bacteria to soften up the silage material and the entire process of silage making. The silage acquires a sweet scent and taste that the animals like.

How to feed FPE through drip irrigation

Can drip irrigation be used to supply nutrients such as FPE (Fermented Plant Extracts) and liquid fertilizer?



Photo: TOF

Preparing Fermented Plant Extract (FPE).

Yes. FPE contains the same nutrients that are used in liquid fertilizers though it is usually in less concentrated form. The use of fertilizers in liquid form to feed plants is called fertigation. When using FPE in fertigation, it is always advisable to filter it properly to ensure that particles in the plant extract do not block the flow of water through the drip pipes. This can be done by filtering the water through a piece of folded cloth to filter out all the particles that would otherwise block the flow of water through the drip system. Fertigation is a cost effective method of applying fertilizers and biopesticides directly to the plants thus reducing wastage, cost and time used to fertilize the plants.

Eliminate couch grass without chemicals

How can I eliminate couch grass from my shamba organically?

Couch grass is one of the most difficult weeds to remove from the *shamba* once it has established itself. One reason is that it can revive growth even after it has been cut and chopped during cultivation. The easiest solution that farmers use is the use of glyphosate (Round-UP® Turbo, Touch Down® Rofosate®) and other sprays that elimi-



Photo: TOF

nate the grass through systemic action (chemical travels through the plant tissues). Since organic farming does not support the use of chemicals weed control methods, we would advise

you to plough the affected part of your land during the dry season; work down the soil profile to ensure all the grass is removed manually and piled far away from the ploughed field or buried to stop it from regenerating. The use of a tractor plough or harrow is not recommended as it pulls pieces of couch grass along the ploughing path "planting" it again contributing to the spread of the grass to the entire field.

TOFRadio answers your questions

TOFRadio: TOFRadio is broadcast on Milele FM at 8:30pm on Tuesday, and KBC on Thursday at 8:15pm. Tune in and listen to farmer experiences and expert advice on agribusiness and eco-friendly farming methods. On this page, we respond to some of the issues raised by farmers in their correspondences to the radio program. Send your questions and comments via SMS 0715 916 136.

Maintain a dairy cow's fertility and milk production

Keeping a dairy cow fertile after calving down is not a simple affair. The cow has to be fed well as this contributes to milk production and also its own body maintenance-growing and rebuilding its body. Yet, a cow's ability to come on heat and get pregnant is a farmer's great concern because delay mean extended time to get another calf and also get milk in another lactation.

Nutrition is the single most important factor affecting a cow's fertility. Therefore, a well managed feeding plan is key to ensuring the cows are in good condition before and after calving. As a farmer, you need to pay close attention to your animals two months before and two months after calving.

Steaming up

This usually happens 60 days before the expected date of calving down. The pregnant animal is provided with extra



concentrate, which can be a high quality dairy meal. Ensure the cow takes all the concentrate provided without being harassed by other cows. Give her the concentrate using a bucket or the feeding trough at the milking shed. When given like this, heifers get used to the milking parlour. This extra feeding provides extra nutrition to the cow and growing foetus. It also builds energy reserves for milk production after calving down. Give 2kg per day during the first month and increase to 4kg per day per cow for the last month, split into two servings; 2kg in the morning and 2kg in the evening. Give each cow at least 100g per day of balanced livestock mineral lick.

After calving

When lactating, the biggest challenge for cows is energy, meaning feed should have adequate amounts of carbohydrates. Ensure the cows

get quality fodder plus a high quality concentrate. Any milk production above 7 kgs should be supplemented by giving 2kg of concentrates for each 3kg of milk produced.

In addition to the ordinary dairy meal, 1kg of whole maize meal can be added to the food ration for the first 3 months after calving down. This way, cows will be able to come on heat after a period of 45-60 days after calving down. Make sure water is available to the cow at all times. Remember to check body condition of the cow and adjust feeding as may be necessary.

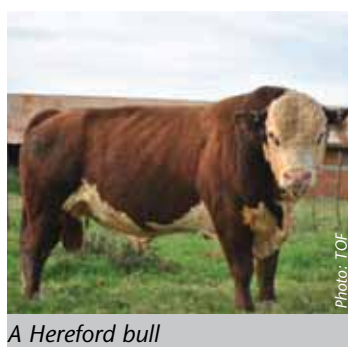
Detect heat and serve

Apart from proper feeding, a farmer should talk to the Artificial Insemination provider to select the right semen for the cow. Make sure the cow is served when she comes on heat. It would be waste of resources if you were to feed your cow correctly, then miss to detect heat. ■

How to manage beef cattle for healthy growth

Feeding: Young beef cattle (steers) need adequate feed in order to grow well. Apart from grazing, the steers will need silage and adequate clean water at all times. They should also be fed on ground maize (*chenga*) mixed with molasses and feed additives such as Yeassac® to improve digestion. The daily feed rations should be given as follows:

- 50g of concentrates.
- 10g of molasses for mixing with feed.
- 1kg of griedest maize in the morning and evening.



A Hereford bull

Other management practices for beef cattle:

De-budding: This is the removal of horn buds (first growth of

horns). This should be done between 1-2 months after calving (seek assistance of a vet).

Dehorning: This is the removal of the horn by cutting with a dehorning wire or other suitable tool. It should be preferably be done in the first year to reduce injury to other animals and even humans especially for bulls.

Dipping: This should be done after 5 days. Plunge dips are better than spraying.

Vaccination: Beef cows should be vaccinated against foot and mouth disease, East Coast Fever (ECF) and rinderpest. ■

 farmers forum

0717 551 129 / 0738 390 715

Indigenous tree seedlings: We would like to buy to indigenous seedlings. Contact us on 0725 104 591.

Guinea fowl wanted: I am interested in West African guinea fowl which are bigger in size compared to the local ones. Call me on 0724 873 849.

Fruits seedlings for sale: We have the following fruit seedlings for sale to interested farmers: 3000 yellow passion seedlings, 2000 avocados (Hass variety) 2000 grape tree seedlings. Call 0720 720 242 email: greenplants091@gmail.com

Strawberry for sale: We have strawberry seedlings for sale. Contact Chefresh Farm on 0725 556 292, Eldama Ravine.

Kienyeji eggs needed: We need a supplier for *kienyeji* eggs. If you have them SMS "eggs" to 0722 878 635.

Dairy goat wanted: I am interested in a dairy goats preferably one with breeding records or registered with KSB. Indicate the breed you want to sell and quote your price. Call me on 0722 255 203, Njuguna, Githunguri.

Hay wanted: I would like to buy 270 bales every week. Anyone able to supply can contact me on 0721 985 438.

Cream separator for sale: Suryoday cream separator as new, complete with operation manual Ksh 46,000. Highest offer secures. Call 0734 913 049 from 8 - 5am.

Advice to farmers

We have been receiving many calls and enquiries on items advertised in this column. We would like to bring to the attention of buyers and sellers of various items advertised that **they should contact the advertisers directly through telephone, emails and facebook accounts given and not The Organic Farmer magazine.** We would also like to advise farmers to be careful not to send money before they have verified the quality of any items they intend to buy. The magazine will not accept any responsibility for any loss as a result of any transaction between the buyers and sellers of items advertised in the magazine. The symbol ■ denotes the facebook address of the contact advertiser - it is not possible to access facebook unless you have an account.