



Piglets with their mother: Rearing piglets (young pigs) can be challenging since they are prone to diseases if not well looked after. In this issue, we show farmers how to manage them to ensure they grow well and mature within the right time for the market **Page 3**

Dear farmer,

After five months of hard work, most farmers are harvesting or have already harvested maize and beans. Farmers do backbreaking work that very few people appreciate. But you should be proud that at least you play an important role in feeding the country. You also meet your own food requirements and generate some little extra income to meet your other financial needs such as paying school fees, clothing your family and paying other bills.

However, as you continue with your farming activities, planning ahead is very important. Right now, agriculture is becoming very competitive. We cannot continue to do things the same way that we have done before. The first thing any farmer needs to do is to choose the right variety of crops to grow especially what the market require. Many times in this magazine, we have encouraged farmers to think and act like business people.

Every season you should be able to plan ahead for the type of crop you can grow to earn you good returns, of course not forgetting that you need to have enough for home consumption. We are saying this because we have seen farmers who sell all their maize and soon go back to the market to buy the same, sometimes at a higher price. This has led to a vicious cycle of food insecurity and poverty in many rural areas.

Planning ahead saves you lot of resources and time. For example if you plan to grow tomatoes for the dry season, the best time to start planning is now. This is because you will need to set up a nursery for your seedlings. By November or December you should be transplanting the seedlings so that your tomatoes can hit the market during the dry season when tomato prices are very good.

To do this successfully, you will need to plan for an irrigation system, and know all the details on good tomato management. This will reduce chances of failure and other pitfalls that many farmers get into when they try new ventures. You can also diversify to make sure that if the price for one commodity goes down, you have another crop that may boost your earnings.

You may also avoid planting a crop which every other farmer is planting. For example if many farmers are planting tomatoes, there is a risk that these may flood the market when all of you plant at the same time. Try to stagger your planting such that your crop is ready for the market when others have already sold theirs. That way you will get good returns.

Plant these maize varieties during short rains

TOF - Farmers in some parts of the country have already harvested their beans and maize. They are now preparing land in readiness for the short rains that often start in late September or early October. Although rains have been good this year, there is need to make the right choice of maize varieties that are likely to do well in this season and which are early maturing. Each maize variety is developed for a par-

ticular climatic zone, amount of rainfall and other factors. When a farmer plants a late maturing variety during the short rains, the maize will not do well, which eventually leads to losses or less yields.

Planting the right variety reduces the chances of failure. This is why farmers should only go for varieties suitable to their region or those that can mature within short rains period. Farmers can buy the following varieties which are early maturing and suitable for the expected short rains:

Medium altitude varieties

During the coming short rains, varieties that grow well in medium altitude areas also tend to do well in high altitude areas because they take a short time to grow. Farmers in areas that maize did not perform well can plant medium altitude varieties and still get good yields. However, in areas that were affected by the maize smuts fungal disease, it is advisable to plant other crops in order to reduce the incidence of the disease in the affected regions.

Kenya Seed Company: H513, H515, H516, H517, H518, H519, H520, H521, H522

Western Seed Company:

WH507, WH505, WH403, WH402

Freshco: KH500-33A, KH50013A

Elgon Kenya: PRESTIGE-02

Dryland varieties

Rainfall patterns can be very unpredictable at times. Due to this possibility, it is important that farmers also plant dryland varieties together with medium altitude varieties just in case the rains fail. Some of the dryland varieties in the market are given below:

KARI: Katumani Composite (this is open-pollinated, which means that farmers can plant the maize they have harvested as seeds for two or even three seasons)

Kenya Seed Company: DH01, DH02, DH03 and DH04

Freshco: KDV1 and KDV-6 (open pollinated)

Elgon Kenya: Malaika 125.

NOTE: To avoid falling victim to fake seed dealers, farmers should always check for the Kenya Plant Health Service (KEPHIS) tag in every bag of maize, if it is missing, return the seed to the seller and let them know the seed is not genuine. Alternatively, buy your seed from well known and reputable dealers and not any agrovet shop.

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Protect your seeds against damping off disease

Damping off can affect seedlings particularly in high humidity conditions, poor air circulation and if they are crowded.

Berita Mutune | Damping off is a disease (or condition) caused by a number of different fungi that kill or weaken seedlings especially when they are in the nursery before or even after they germinate. The disease is most common in wet and cool conditions. It mostly damages plants when light levels and temperatures are low and seedlings tend to grow slowly.

Damping off affects seedlings

Damping off can affect most seedlings, particularly under levels of high humidity, poor air circulation and if seed is sown too thick. It is mainly a problem common when seed are planted indoors, but it can also affect seedlings planted outdoors.

Causes of damping off

Several fungi in the soil can cause decay of seeds and seedlings, including species of *Rhizoctonia*, *Fusarium* and *Phytophthora*. However, species of the soil fungus *Pythium* are most often the cause.

Rhizoctonia - Infected plants tend to develop a dry, reddish-brown stem rot called wire-stem;

Fusarium- fungus found in soil;

Phytophthora- enters the root tips and causes a water-soaked brown to black rot;

Pythium-causing roughly circular patches.

Symptoms

The main symptoms include:

- Seedlings may fail to emerge (pre-emergence damping off)
- Seedlings collapse, often submerged in a mass of whitish fungal growth.

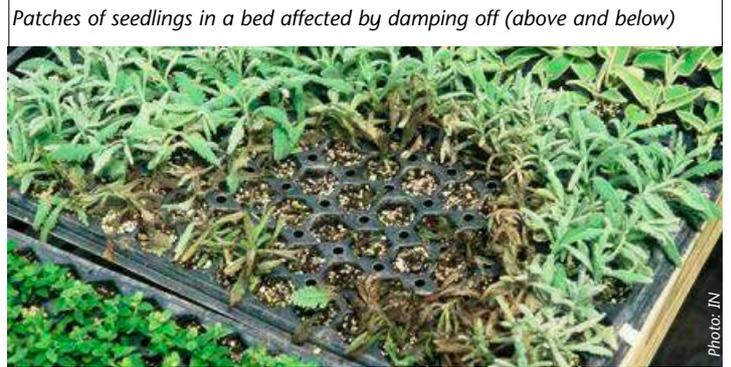
Other symptoms include:

Groups of seedlings may die in circular patches; the seedlings may have stem lesions (or wounds) at ground level. Stems of seedlings may become thin and tough resulting in reduced seedling vigor (they are often weak). Leaf spotting sometimes accompanies other symptoms, as does a grey mould growth on stems and leaves. Roots sometimes rot completely or become discoloured stumps.

Biological control

When a farmer notices the above symptoms on their seedlings, there is very little they can do to stop the disease because currently there is no biological or chemical fungicide that can control the disease. However damping off can be prevented or controlled by taking the following measures:

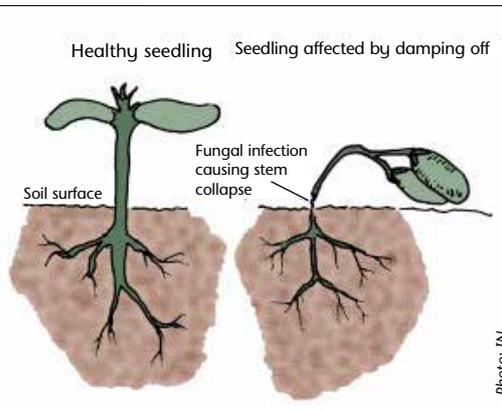
- Sowing seeds in a sterilized soil which can be heated to high temperatures in an oven to kill fungus in soil.



- Ideally, use new pots and trays whenever raising seedlings. If they must be re-used, wash them thoroughly and preferably also treat them with a disinfectant such as Jik solution. Never reuse pots and trays which had diseased seedlings.
- Plant seedlings thinly (create space between them to avoid crowding).
- To reduce survival of the pathogens, remove and discard diseased plants, and

- sterilize containers to remove dust, planting medium, and soil particles in which spores can survive.
- Maintaining drier conditions and allowing air circulation. This helps prevent the spread of the disease, although it can also prevent or slow down germination.
- If using rainwater for irrigation, please ensure that you filter to prevent the entry of leaves and other organic debris that could harbour some of the damping off fungi.

- Do not flood your nursery with water, instead use a thin spray of moisture, just enough to keep the nursery soil (or any other planting medium) moist.
- Ensure that both greenhouses and water irrigation tanks are cleaned regularly.
- Homemade solutions (including ones made from chamomile tea or garlic) have been used by some gardeners to control damping off.



Symptoms of damping off disease: The infected plant becomes weak and the stem collapses (left and right). The root system is also affected as shown (above right)

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The Organic Farmer is an independent magazine produced monthly for the East African farming community. It promotes organic farming and supports discussions on all aspects of sustainable development. The articles in the *The Organic Farmer* do not necessarily reflect the views of ICIPE nor Biovision Foundation.

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Publisher *icipe*-African Insect Science for Food and Health, P.O. Box 30772, 00100 Nairobi, KENYA, +254 20 863 20 00; icipe@icipe.org; www.icipe.org

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Better ways of rearing healthy piglets

Piglets are prone to many diseases. They therefore require maximum attention and care to ensure they mature into healthy productive pigs that will give you a good income.

William Ayako | Every new born baby requires good care for their comfort. They require nice warm rooms, clean beds to sleep, clean nappies every few hours, milk to feed on whenever they need it. The same applies to piglets. In order to maximize performance of piglets for successful weaning, it is important to note and adhere to the following tips.

Start with healthy piglets

Healthy piglets start eating earlier than the sick ones and this is an important factor to note if you want to avoid weaning problems. Most piglet problems may be due to dirty farrowing rooms and therefore it is important to ensure that the farrowing rooms are cleaned. Other piglet problems could be caused by inadequate milk production by the sow, lack of uniformity of piglets at birth and disease causing bacteria such as *E. coli*. It is important to note that the problems that start early in the piglets are hard to control later on.

Comfortable housing

Piglets are sensitive to strong wind and they need warmth, as such, the temperature in rearing rooms for piglets should be 25°C. The nursery rooms should be cleaned, disinfected and dried in advance before the piglets are moved inside. Piglets utilize a lot of energy to maintain their body temperature. Keeping piglets in wet and cold rooms is a major risk to their health and should be avoided.

Keep piglets from the same mother together

Mixing piglets from different litters is a major risk factor to diseases like *Actinobacillus pleuropneumonia* and *Streptococcus suis*. This problem is more common in piglets at weaning when their immune system is not fully developed and their protection from maternal antibodies decreasing. Therefore avoid mixing piglets from different litters in the nursery because this may enhance spreading of diseases through the rooms.



Piglets in a pigsty (pig house): Keep the pigsty clean at all times to prevent diseases such as diarrhoea (scoring) which is a major problem in piglets

Train piglets to eat

It is a big challenge to get the piglets to eat soon after weaning. It is important to start training the piglets before weaning. Introduce tasty and fresh feed in small portions from the second week of life. This would enable the piglets to start feeding from the feed containers so that soon after weaning, they can easily find the new source of feed. Do not change the nursery feed immediately after weaning but ensure a gradual change of feed to avoid piglets refusing to eat.

The feed containers should provide enough eating space for all the piglets to allow them to eat all at the same time. This would enable slow piglets to learn from the fast learners.

Clean water and feed hygiene

Piglets are very susceptible to infections after weaning. It is important to reduce the risk of contact with pathogens immediately after weaning. Reducing the amount of pathogens in drinking water and feed is a

good starting point. However, it should be noted that there are more ways to get oral infection such as through contaminated droppings and other pigs. Such oral infections should as well be avoided. Use of organic acid based solutions in drinking water and feed would reduce the risk of oral infections in piglets. The use of organic acid based solutions would kill the pathogens in feed, water and in the stomach of piglets. This is a common cost effective way to enhance the performance of piglets.

Sweet potato silage can cut your pig feed costs

Many farmers spend huge sums of money to buy feeds for their pigs. However, the feed costs can be drastically reduced if farmers can learn how to make sweet potato vines silage which has been proved to be nutritious and palatable to pigs. If sweet potato vines are well-prepared and preserved they can be a good supplement for pigs. Below we give you simple steps on how to prepare and store sweet potato silage:

- Cut 60-100kg of sweet potato vines and spread them to wilt in the sun for about 30 minutes.
- Chop the vines into tiny pieces and mix them with 10kg of maize germ or pig growers mash.
- Sprinkle ½ kg of mineral salt and mix thoroughly.
- Put the mixture into an airtight 250-litre plastic tank. Compress the vines firmly to remove any airspace as you do when preparing silage.
- Add some little EM1 solution to improve the quality of the silage.



Farmers use polythylene bags to store sweet potato silage

- Cover the tank airtight. Let it stay for 14 days (two weeks).
- Open the tank to check if the silage is ready. If the silage has a sweet smell and has turned yellow in colour, then it is ready for feeding.
- You can feed the sweet potato silage to pigs from 4 months of age, sows and gilts (young female pigs) and boars (male pigs) at any time before and after their usual daily rations.

Pig farmers who feed sweet potato silage to their pigs regu-

larly can cut their feed costs by 30 percent. In addition, the sweet potato tubers can be eaten or sold in the market. A kilogram of sweet potatoes costs between Ksh 60 and Ksh 80.

Pig farmers can also feed their pigs with *sukumawiki*, cabbages, lucerne, amaranth, pawpaws or bananas.

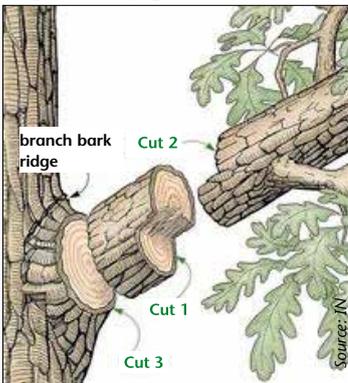
Hotel leftovers (sweal) can be given but farmers must ensure that the feed is not contaminated by boiling it to ensure that all disease-causing organisms are destroyed.

It's advantageous for farmers to learn tree pruning

Well-pruned trees remain healthy. They are productive and enhance beauty in any farm or compound. Knowledgeable farmers manage trees and beautify their environment.

Robert Kiprotich | A lot of farmers ignore pruning of their fruit trees (orchards), horticulture and agro-forest within their farms. This can be due to lack of knowledge on importance of pruning or how it is practiced. Pruning is trimming (a tree, shrub or bush) by cutting away dead twigs or over grown branches or stems to encourage growth.

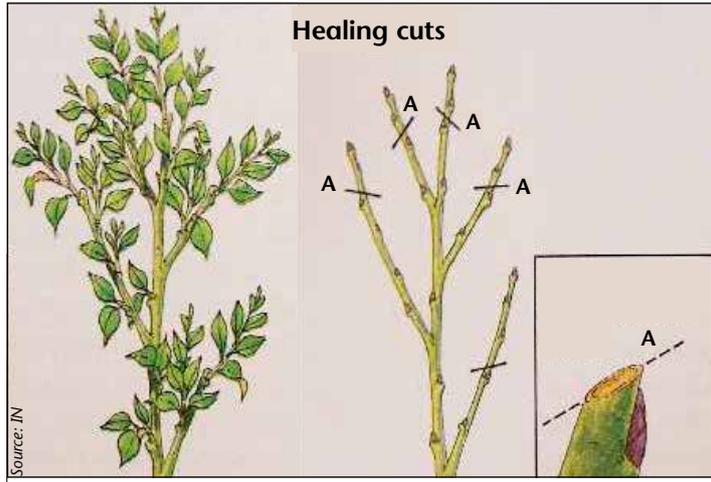
Note down how you want your crop/plant sculpture to look like. It is also important to study the sun and wind direction to decide the way you want to do pruning. Pruning requires that you start small with dry or non-living areas of the plant (dry branches) as you work on the focal point. It is advisable to prune any plant at its tender



Prune your trees as shown in cut 1, cut 2 and cut 3

(young) age because older trees would be difficult and hard to change their form through pruning.

The reduced branches would help in equal distribution of energy. Pruning can help spread the tree weight evenly through the whole plant. It also helps to reduce shade for crops growing



Make a slant cut just above the bud as shown in A (above)

underneath the tree, which require sunlight for their growth and development. Also a well-pruned tree would yield more and big fruits as more branches mean less energy, few branches give more fruits. Removal of sections of branches that indicate insect and plant disease attack would lead to minimal infestation and crop destruction. During pruning the following should be considered.

- Take note of primary branches.
- Take note of secondary branches.
- Prune in a way that you develop a better form (canopy).
- Develop equal balance (distribution).
- Energy efficiency is equal and well distributed.
- Check plant vigour.
- Observe and consider where lateral buds are located before cutting a branch.

Tools used for pruning:

- Pruning shears.
- Pruning saw.
- Secateurs.
- Collecting rake.

Pruning shears: This is the most commonly used tool when it comes to pruning shrubs, flowers, vines and small growth

tree. They are hand held and can cut to 3/4 inch thick.

Loppers: These are mostly for branches up to 2-2.5 inches thick and are useful for pruning in fruit and nut trees.

Pruning saw: Mostly capable of cutting branches in big trees, it makes it possible to cut wounds that are 1-5 inches in diameter, an edge shear can be used instead of pruning saw.

Pole pruner: This is commonly used to reach the deadwood in trees and can cut through branches up to 1 inch in diameter as most of the pruners can reach 8 ft. or more hence eliminating the need for ladder use.

Caring for pruning tools:

With the right tools, pruning can be easy. The tools should be kept in proper working order. Keeping them clean is a top priority. This helps in preventing spread of diseases from one tree to another. Carry a rag with you during pruning exercise for wiping the blades between uses and if by chance you prune a diseased tree wipe down the blade using alcohol before moving to the next plant.

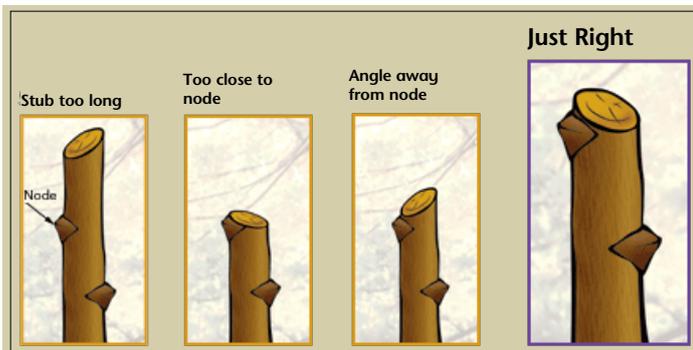
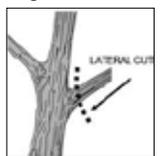
Smear using fresh cow dung (mixed with alcohol) as this helps to prevent infestation of fungal diseases. Lime fruit juice mixed with water is applied

at times as it prevents insect infestation and even some tree borers. Pruned young trees are vulnerable to any form of infestation, (this is done mostly to citrus fruit trees).

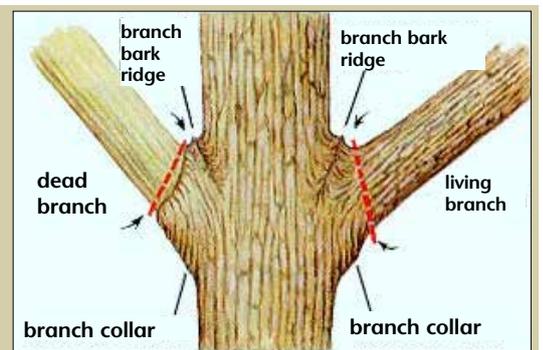
Cut branches and stems if you suspect any infestation. The infected part should be buried deep in soil to prevent spreading of the disease. Healthy branches and foliage that is in good condition can be used as mulch and for feeding livestock.

Important tips for good tree pruning

- Prune early in the life of a tree so that pruning wounds are small and to direct the growth where you want it.
- Begin inspection at top of the tree and work downwards.
- Do not worry about protecting cuts. Do not paint the wounds with tree paint because this cannot prevent or reduce decaying, it actually slows down healing.
- Keep your pruning tools sharp. One-handed pruning shears with curved blades (secateur) work best on young trees. For bigger branches it is recommended to use a handsaw or power saw.
- Keep safe. For high branches, use a pole pruner. If you find it difficult to prune a tree get a professional pruner (arborist) to do it.
- Follow the rules of good pruning of larger branches by cutting just outside the branch ridge and collar and a slight down and outward angle to avoid damaging the collar.
- When shortening a small branch, make a lateral cut. The cut should be sharp and clean, make it about a 1/4 inch beyond the bud as indicated above.



Pruning trees in the right way and at the right time makes them grow faster, productively and in a healthy way. This creates balance and minimises chances of break-off in branches especially during windy conditions and storms



Pepino melon: A fruit with numerous health benefits

Pepino melon is now available in the local market and seems to be very popular with all farmers, especially organic farmers. The increasing popularity of Pepino melon and its association with a wide range of health and nutritional benefits is the focus of this article.

Dr. Peter Mokaya | A recent visit to Githunguri sub-county Organic Farmers Field Day and another to Ngong Organic Farmers Field Day, held at Mugima Centre, revealed that organic farmers in many parts of the country, have taken to growing Pepino melon. Among other questions they asked during my interactions with them include:

What is Pepino melon?

Pepino melon also known as *Pepino Dulce* or *Pepino Pear* belongs to potato family whose botanical name is Solanaceae. The botanical name of Pepino melon is *Solanum muricatum*. This relative of potatoes, tomatoes, egg-plant, bell pepper and chilli pepper is called "melon" because of its melon-like taste and appearance. It produces fruits that are the size of a grown apple mango with a cream-coloured tough outer skin that usually has beautiful purple stripes. It has a sweet, mild flesh that is somewhat melon-like. It can be used fresh in salads or cooked.

What are the benefits of consuming Pepino melon?

The health benefits of Pepino melon, in particular, the chemical free organic varieties include the following:

- Pepino melon breaks down into glucose for great energy to get you through your day and increases stamina.
- It is full of great beta-carotene antioxidants that prevent many chronic degenerative diseases.
- It aids recovery from liver disease, lowers blood pressure, helps those that suffer from strokes to heal faster, and promotes cardiovascular health, in general.
- There is evidence that Pepino melon can help prevent cancer and diabetes. The diabetic effect is, partially, through the regulation of



Growing Pepino melon requires a lot of care. Sometimes the fruits require props or a well-mulched base to ensure they do not come into contact with the soil to prevent diseases

blood sugar levels because of the high fibre content and other yet to be documented mechanisms.

- Pepino melon lowers the "bad" cholesterol, that is, the low density lipoproteins (LDL) cholesterol and triglycerides, while boosting the good cholesterol, also referred to as high density lipoproteins (HDL) which improves the health and integrity of blood vessels.
- Pepino melon has anti-inflammatory effects which reduce systemic pain soothing away aches and pains.
- Pepino melon aids in maintaining skin elasticity and youthful appearance of skin and protects against oxidative

stress by aiding the elimination of toxins from the body.

- Some herbal experts claim it has antimicrobial and antiviral properties to the extent that some patients have reported improvements from HIV and AIDS related symptoms. So far these are only anecdotal reports.

What nutrients does Pepino melon contain?

Pepino melon is a "super food" rich in phytonutrients, vitamins, essential minerals and high amount of proteins and energy, in addition to abundant water.

- Pepino melon has a high content of Vitamin A, C, K and B Vitamins,

- Pepino melon has high amounts of oxidative carotenoid, beta carotene. Good for the eyes and prevents muscular degeneration.
- Pepino melon has adequate amounts of protein and some carbohydrates.
- Pepino melon has high amounts of essential minerals which include: Vitamin A, C and K and also B Vitamins, protein, plus iron and copper, which are essential for a healthy immune system and calcium for bones, potassium which is needed for relaxing and lowering blood pressure. Pepino is also a good diuretic.
- Pepino melon has good non-digestible fibre which helps in reducing constipation, improving bowel movement and healing of gastric ulcers.

Are there any negative effects from Pepino melon?

Like all things with positive benefits, Pepino melon has a few negative side effects to watch out for, although these are rare. The solanaceae family contains poisonous substances, among them, solanine in potato and eggplant, tomatine in tomato, nicotine in tobacco, and capsaicin in garden peppers. The glycoalkaloids in potatoes are known to contribute to Irritable Bowel Syndrome (IBS) and may negatively affect intestinal permeability. Pepino melon, may exhibit similar symptoms, although this is rare.

It is recommended to consume Pepino melon raw, as in salads, rather than cooked, to ensure maximum nutrient value.

Organically grown foods are rich in macro and micronutrients with the additional benefits of being free from contamination from toxic agrochemicals and environmental pollutants found in most conventionally grown foods.

For seedlings: Contact Wanjiru's Park Farm and Resource Centre, Limuru Tel. 0723 158 680.

Dr. Peter Mokaya, Director and CEO, Organic Consumers Alliance(OCA), Website: www.organicconsumers.co.ke Email: Peter.Mokaya@organicconsumers.co.ke or Mokaypm@gmail.com



A ripe Pepino melon: Ripe pepino change colour into yellow with purple stripes

Good returns, courtesy of poultry knowledge

Ms Philip did not know much about poultry production, but through support from Biovision Africa Trust extension staff, she has improved her poultry rearing enterprise which has changed her life.

Anthony Musili | Along the bumpy road into Machakos town, the chirping of chicks in ascending order is heard. It is mid-day and the scorching sun rays spread a mirage across the horizon. Esther Philip, a poultry farmer ushers me into her compound, with a poultry house strategically placed at the edge of her compound.

"My little flock of chicken hatched 50 chicks. Unfortunately, all were swept away by disease. I was demoralized until I met Mr. Anthony Musili, from Biovision Africa Trust (BvAT), who rekindled my hope in poultry farming," Ms Philip says smiling.



Esther Philip with her egg incubator

Ms. Philip has a passion for poultry farming and that is why she started the enterprise in 2014. Although she didn't have any prior knowledge of the farming venture, with her meagre information, she started off her business with 20 chickens. With zeal, she nurtured her chicken in a shanty she had put up to house the chicken. "My poultry venture grew to a 100 chicken in a short span. I sold about 80 chickens and I generated a good income from their sale," she says happily. "But, due to insufficient knowledge on the management of poultry, my poultry farming deteriorated swiftly," she adds.

Training empowered her

BvAT's Farmer Communication Programme

note of best housing practices, pest and disease management and feeding habits. I'm reaping the benefits now," she says cheerfully. BvAT provided her with personalised training and mentorship programme. The FCP programme issues farmers in the region with *The Organic Farmer* magazine which offers information on step-by-step instruction on each farming activity," he explains.

Ms Philip often calls the field officer to seek a clarification on any information in poultry farming. Prior to receiving FCP training, her poultry farming dream had been difficult to realise. Now she follows all the guidelines given to her. Hence, the good fruits she is reaping now.

She improved production

After the training, Ms Philip's

(FCP) empowers farmers with the right information to enhance their farming activities and exploit their full potential. "I'm affiliated to Nimutui Self Help Group (NSHG), where I met Mr. Musili who had invited me to give a talk to farmers on chicken management. I took

chicken's health improved and eggs collection increased tremendously. Her 20 chicken, too, laid more eggs from the usual 5 eggs she used to get to 15 eggs in a day. For disease management, she uses aloe vera, *Croton megalocarpus* and other herbs in their drinking water. Ms Philip is passionate about her poultry farming. "After the training, she was the first to implement the knowledge acquired during the training. From poultry management, disease preventive strategies and maintenance," Mr. Musili revealed. Due to her diligence in work, Ms Philip is now happy about her poultry venture. She is able to feed her family, pay school fees for her children. From the sale of her chicken stock, she has managed to buy an incubator from where her chicks hatch. Any farmer, in need of chicks and inspiration go to her for advice.

Challenges

With increased stock of chicks and frequent power interruption, running an incubator has given her many sleepless nights. At one time power interruptions made her lose half of the chicks in the incubator. However, she acknowledges that for every challenge, there is a solution. Whenever she experiences such power failures nowadays, she uses a blanket to cover the incubator as she waits for the power. In one incidence power interruption occurred while the hatching process had started. This challenged her to innovate remedial ways to complete the hatching process. "I boiled hot water and placed the incubator over the boiled water in a sufuria. But the temperature was so high that I had to pour the water into a plastic bottle and place it in between the eggs and the process went on smoothly." She states adding, "I only lost 6 chicks during the process." She uses a charcoal jiko in her brooder to provide heat to the chicks, a technology she learnt from *The Organic Farmer* magazine.

Ms Philip is enjoying good returns from her small poultry farming project. She sells week-old chicks at Ksh120 and their demand is high. She has also diversified her business venture. "I have opened a salon business from the savings made from poultry farming" She states happily.

Farmers can contact Esther Philip on 0723478531.



Chicks feeding in their house

cont'd from pg.... 2 **Protect your seeds against damping off disease**

Tips on good nursery management

Nursery hygiene plays a particularly important role in preventing damping off.

- Clean surfaces such as floors, benches, and all surfaces with an approved disinfectant.
- Organic matter can reduce the efficacy of disinfectants so clean off debris first.
- Improving soil condition especially drainage in nursery beds are usually positive for seedling growth and survival.
- Nitrogen application can be delayed until seedlings are past the danger of damping-off.
- The timing and depth of sowing and irrigation can be controlled to improve germination.
- If necessary, fumigants can be used to control disease development.



Tree seedlings in a nursery: Seedlings should be kept in moist but not wet condition to prevent damping off

Control of Fusarium wilt in water melon crop

I have a problem with my water-melons. The leaves are turning yellow and curly, and some of the fruits turning whitish and have hollow sound.

It is very difficult to tell exactly what the problem with your water melons could be. But from your description of the appearance of the leaves, it is most likely to be fusarium wilt. Fusarium wilt is one of the most common problems affecting all plants in the cucurbit plant family such as pumpkins, water melons, butter-nut etc. It is caused by a fungus species known as *Fusarium oxysporium* which affects each crop in the cucurbit plant family differently. Fusarium wilt is one of the most common diseases of water melon worldwide. The long-term survival of the fungus in the soil and development of new strains make it one of the most difficult fungal diseases to control.

Symptoms

Symptoms of Fusarium wilt are similar on all plants in the cucurbit family and are dependent on several factors, including the amount of inoculum in the soil, environmental conditions, nutrient levels especially nitrogen and the level of resistance in the affected plant. Initial symptoms include dull green colour followed by yellowing and finally development of wounds. The wilting starts with older leaves progressing to the young ones. Sometimes the entire plant may wilt and die within a short time.

Affected plants that do not die become stunted and have considerably reduced yields. If the level of the fungus is high in the soil, seedlings may die before or just after emergence from the ground. Since the fungus is soil borne, affected plants will be found in clusters depending on the distribution of the fungus density in the soil. Fusarium wilt is severe in light, slightly acidic soils when temperatures are between 25 and 27%. Higher temperatures appear to suppress the fungus but resulting in plants that are yellowed and stunted.

Fusarium wilt management

Fusarium wilt is difficult to manage without resistant varieties of disease prone melons or other cucurbits. However the farmers can try the following management options which can reduce the severity of the disease:



An infected melon fruit: Prevention is the best way to control Fusarium wilt on melons

Disease free seed and seedlings: Buying clean seed or seedlings is one of the best methods of controlling the disease. Farmers should buy seeds or seedlings from reliable stockists or seedling nurseries. The seedlings should be inspected for symptoms of Fusarium wilt, isolated and destroyed. Material used in packaging the seedlings may harbour the fungus and therefore should not be used in handling or storage of future seedlings—this prevents introduction of the fungus into new fields that do not have it.

Host resistance: Acquiring varieties that are resistant to the disease is the best and most economical method of control. However, there is no complete resistance to all strains of the disease. Resistance to the disease may break under high levels of the fungus in the soil.

Crop rotation: Water melons should never be grown continuously on the same portion of land. Rotation with crops that are not in the cucurbit family after 5 to 7 years can reduce the chances of the disease in water melons and other plants in cucurbit family.

Grafting: The use of water melon varieties that are not prone to the

disease as rootstock for grafting has been found to reduce chances of the disease and control it. But this method is labour intensive and costly.

Biological control: The use of antibiotic-producing fungi and bacteria such as *Trichoderma spp.*, *Gliocladium spp.* and *Pseudomonas spp.* has been found to reduce Fusarium wilt but only up to a certain level. Some field trials on these suppressants have not been very effective.

Cover crops: The use of cover crops such as hairy purple vetch as a soil amendment (green manure) may reduce Fusarium wilt in some areas but the magnitude may vary in other areas. While many of these methods give adequate control in the field, they may be useful only when used in combination with other management practices. No one method will result in adequate control of Fusarium wilt in water melons but combining various methods, adequate control can be achieved.

The hollow sound you feel in the affected water melon fruit shows that the fruit has not developed the inner fleshy and edible part due to the effect of the fungal disease.

Thank you for the informative article on the farming of groundnuts (TOF No. 118, March 2015). Just wanted to know what other fertilizer can be used instead of Biofix?

Depleted soils do not provide adequate nutrients for plant growth. Soils continue being poor because farmers are not putting back or replacing nutrients taken out of the soil through harvested crops and other losses like soil erosion. Nitrogen is the most affected nutrient; that is lost through high crop uptake, crop harvest, leaching and loss through gaseous form.

With this in mind, as a farmer you can respond by first knowing the deficiencies in your soil through soil testing.

Groundnuts are leguminous plants that fix Nitrogen (N) into the soil. The biggest challenges to groundnut growing are acidic soils and water logging that affects both the vegetative growth of the plant and pods.

Therefore, plant your crop in well-drained soils. If you are growing the crop in acidic soils, then it is advisable to use Lime at the rate of 200 kgs per acre together with Farmyard Manure (FYM) at the time of sowing to help in correcting soil acidity.

Lime application increases the availability of phosphate and supplies calcium which is important in legume crops as it helps in pod filling and therefore contributes to higher yields.

On Biofix is an inoculant that contains Rhizobium bacteria which boosts nitrogen fixation. Since it is an organic product, it is good for the soils and the environment. If you can find it, use it! *Elkana Isabo*

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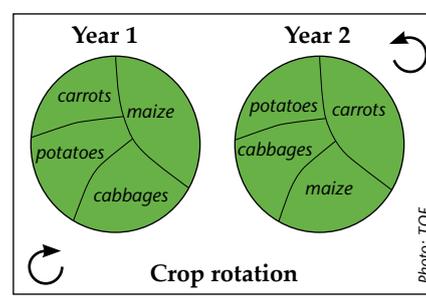
Farming Tip

Practice crop rotation at all times

There is a tendency by farmers to plant the same type of crops every year. This depletes the soil in the long term because maize takes away most of the major nutrients in the soil forcing farmers to add more chemical fertilizers in order to maintain their yields. But over time, the use of these fertilizers lowers the soil pH thus raising soil acidity levels to a point where maize yields drastically go down; a problem now facing farmers in all maize growing areas in the country. Some crops such as beans fix

nitrogen and therefore replace the nitrogen taken up by maize, potatoes, tomatoes or any other crops that are heavy feeders. Crop rotation also helps to control pests because pests prefer particular crops. If rotation is practiced, say, by growing a crop that does not host a particular pest, the pest incidence is reduced. Crop rotation is now recognized as one of the best methods to control some of the viral, bacte-

rial and fungal diseases where no chemical or biological method can cure such as the Maize lethal Necrosis (MLN), bacterial wilt, smuts etc.



TOF Rad answers your questions

TOFRadio is broadcast on KBC on Thursday at 8:45pm and Mbaitu FM on Friday at 8.30pm. 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 correspondence to the radio program. Send your questions and comments via SMS 0715 916 136.

Urban farmers recycle organic waste

Austin Omondi | Many people living in the cities can easily trace their roots to farming and bring with them food production skills when they come to the cities in search of livelihoods. Now urban farmers have a chance to practise Sustainable Agriculture while conserving the environment by using various kitchen and market waste recycling techniques.

It may come as a surprise that urban farming is increasingly becoming significant in enhancing food security and improving livelihoods by providing alternative incomes to city dwellers. Urban agriculture is especially important in developing countries. There is now a growing trend in the outskirts of major cities like Nairobi, Dar es salaam, Kigali among others where farmers are maximising on small land to grow crops and raise animals to take advantage of the nearby vast urban market.

Recycling organic waste

It does not go unnoticed that most of these cities have water and organic wastes in abundance which can be turned into food and income even though space remains a major challenge. Vegetables and fruits grown in multi storey sacks and animals unit can be a solution to farmers facing scarcity of land.

Jayne Kihara who is a lawyer by day but practises pig farming in her one acre farm in Ruaka, Nairobi County has been tapping the city markets for close to 16 years now. She says that she has really benefited a lot from what started as a hobby.

"Pork is so much in demand and I don't have to travel very far for markets. For feed, I give my pigs mostly waste from my kitchen and vegetables and fruits waste from the markets. I use very little money to buy pig feed from the shops," says Ms. Kihara.

Making biogas

In Kampala, Herbert Salih a retired civil servant practices zero grazing and feeds his cows on market waste. But Herbert cautions farmers to be careful



Fetching slurry from a biogas unit. Slurry is full of nutrients

when sorting out banana peelings, discarded fruits and vegetables to remove any harmful substances.

The retired civil servant sells milk and grows fruits and vegetables too in his small plot. He is proud of his city farm and relies on recycling. Converting market left overs into milk which enables him to make profits.

Herbert has gone a step further. He turns cow dung into biogas for cooking. He says that with the right artisan to do fabrication, making a biogas unit is easy and can be customised to fit the farmer's needs.

Says Herbert, "I would highly recommend this system for farmers especially in urban areas. In urban areas we use electricity or kerosene which is very expensive in lighting and

cooking, so biogas cuts down on the costs.

The principle of biogas is simple

Cow manure is collected and put in the inlet box.

Water is then added and the mixture thoroughly mixed with the grass and other debris being removed. The liquid is then released into the main chamber. Here it goes through a process called anaerobic digestion. This releases biogas which is primarily methane.

The gas builds up at the top of the chamber and pressure forces it into a pipe which then leads the gas to the kitchen for cooking and for lighting.

Slurry used as fertilizer

There is another very useful output from this process, the



A farmer applies slurry on her vegetable crop

slurry from the digested material. This odourless substance is rich organic manure. It is forced out of the biogas plant through fermenta-



Organic vegetables for sale: We have Turnips, radish, kales, spinach and amaranthus. Also selling Improved KARI indigenous day old chicks, mature chicks, eggs, cocks and meat. Located at Kinangop, contact Veronica Kimotho - 0720664984

Potato crisps for sale: We make potato crisps for sale in shops, kiosks or any outlet contact Mr. Francis Njuguna - 0725444341

Organic produce for sale: We are offering organic vegetables, fruit and spices for sale. We have sukumawiki, spinach, amaranth, chia seeds, rocket black, Chammomile, Fenugreek, basil, mint, asparagus, parsley, beetroot, lemongrass, Taragon, tree tomato and Pepino fruit and seedlings. Contact Wanjiru's Park Farm and Resource Centre, Limuru Tel. 0723 158 680.

Silage tubes for sale: We sell silage tubes, improved KARI chickens, day old chicks. Farmers in Western and North Rift, call Star Rays Educational Centre, Nangili 0721 245 443.



WhatsApp

Whatsapp Farmers Group: Join farmers and agribusiness experts. To join send your full name and county to 0721 245 443.

tion and can be used to fertilise vegetables, fruits, fodder grass and crops.

Urban farmers can practice recycling at its best. Instead of creating a rubbish disposal problem, food waste can be used to feed livestock, milk is produced and the manure from the cow can then be turned into gas for cooking and lighting through a biogas plant. Natural fertiliser can then be used to grow fodder for animals or crops for home with the surplus being sold in the market.

Urban agriculture is consistently overlooked when we all think of food production but it has a vital role to play in feeding the population and in keeping cities both healthy and green.

The key is in recycling resources that otherwise pile up as pollutants.

In Kenya, to get affordable Biogas unit at your farm, you can contact Kenya National Domestic Biogas Programme on the numbers 0719 635 516 or 0722 360 595.