

The Organic Farmer

The magazine for sustainable agriculture in East Africa



Nr. 77 October, 2011



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The other side of greenhouses

TOF - The current popularity with greenhouses in the country can be explained away as an attempt to reduce the risks associated with the weather changes in crop production. However, most of the greenhouse investors do not belong to the traditional farming community; they are suitable for people in the higher income bracket.. They see, in the greenhouse farming, a source of additional income, considering that through good management a greenhouse can pay back the investments within two to three years. Small-scale farmers can hardly afford Ksh 180'000, the minimal price for a 8x15 m greenhouse.

Challenging to organic farming

A greenhouse creates a controlled environment for crops to grow under. The cost of such a set up normally requires that the crop must be of good economic value in order to make any meaningful return. Current crops under

greenhouse production are tomatoes, peppers, and eggplants. However all these crops belong to the same family, the solanaceae. The problems start here: One basic principle of organic farming is crop rotation, which helps to break the pest and diseases cycles in plants. If a greenhouse farmer will not change to other suitable crops which help to "clean" the soil from pests and diseases, they need to control them with chemicals. TOF has visited quite a number of greenhouse owners who began with the strong will to go organic; but after two or three seasons they gave up and bought chemicals. Of course, there are exemptions, and in one of the coming issues we will write an article about a successful organic greenhouse farmer.

In this issue we inform you more about greenhouses, the benefits, the risks, the costs and where farmers can buy them. *Page 5 & 6*

A well-managed forest can give you a good income.

Page 4

Our trees Our future



Harvest early, store properly

According to the UN agricultural programme, nearly 40 percent of the harvest in Africa is lost because of improper storage. Food security would hardly be such a problem if farmers would take more care of the storage of their products. It is beats logic to work the whole year only to abandon your precious crop the last minute at harvest time. *Page 3*

Dear farmers,

A number of farmers have written to us requesting for training on general farm management. The reason they ask for training is very simple: In order to succeed in modern farming, one needs appropriate skills that help to increase income, both in crop and animal production. Farming is not a matter of just putting maize in the soil, weeding it and waiting to harvest. It requires the right skills on seed selection, land preparation, proper use of fertilizers, pest control, harvesting and even storage. It is encouraging that a few farmers are beginning to realise the need to acquire the right skills in farm management.

Sometimes we feel that farmers do not understand the consequences of neglecting important tasks that have to be done on time and in the right way. One example for instance is the case of harvesting of maize. Despite repeated advice on the need to harvest early, not only from our magazine, many farmers wait until it is too late. More over, they throw the maize on the ground during harvest instead of keeping it on a proper place; this is especially responsible for contamination by aflatoxins. Early harvesting of maize, proper drying and careful storage can save a lot of maize and increase income for the farmer.

The need to acquire skills and do things the right way is even greater when farmers invest a lot of money into such enterprises as greenhouse farming. Many farmers have rushed to set up greenhouses hoping to make a lot of money only to end up with mountains of debt. Greenhouse farming requires a high level of management and skill, including the right choice of crops and proper timing (see page 5).

Farmers should take farming as business. To succeed in any type of business, one requires knowledge and the appropriate skills. Farming in Kenya and elsewhere in Africa can only be transformed into a profitable occupation when farmers accept to improve their management skills and adopt sustainable production methods that increase both the quantity and quality of the crop yields, including income.



The Organic Farmer is available on facebook. We can now reach farmers who are more open to technology and eager to learn new techniques. Facebook is attractive and interactive. *Be the next fan of TOF on Facebook.*

My hen prefers brooding

• *What can I do to broody hen that refuses to leave the nest even after taking away the eggs? Philip Sang Chebugundi, Progressive farmers Self Help Group.*

• *Some people say that dipping the bird in water and taking it out of the brooding nest can solve the problem of a broody hen. Is this true?*

tsz - Such a bird has gone broody, and to excuse it: This is a powerful natural hormonal state. Just consider - is it not very unnatural for a bird to lay dozens and dozens of large eggs, months after months, and never to sit on them and



Busaa residue for chicken

Most birds like busaa (local brew) residue when it is sieved. What is the reason for this? Phillip Sang, Progressive Farmers Group.

Brewery waste is very good animal feed. The brewing process mostly make use of the carbohydrates in the grains, and turn some of them into alcohol. All the proteins, minerals and a good deal of the vitamins are left behind in the brewery waste.

Use fresh eggs

For how long can I keep eggs before I give them to birds for sitting on to hatch?

Hatching eggs should be as fresh as possible and not older than seven days for good hatchability; older eggs will not give good hatchability due to evaporation.

Soya beans in concentrates

Can I use soya beans for concentrate? Remi Wamalwa, Ngalasia group.

In fact, soya bean (by)products are often used in commercial dairy feeds. They are rich in protein and energy. In order to maximize your income from soya beans, you may consider pressing the oil first and then feed the soya cake. Soybeans should not make more than 10 to 15% of the total ration dry matter, as they may cause scouring, acidosis, and decreased performance.

never to raise chicks? Sometimes, even hybrid layers can't be prevented from behaving naturally.

Depending on your goals, you have several possibilities: Take advantage of the very strong mothering instincts of this bird and use her as a brooder. Give her up to 15 (fertilized) eggs from other birds to sit on them. Discouraging a hen that is in a broody mood is sometimes not simple. But it may be necessary, and broodiness is even contagious. The earlier you react, the easier it will be. Try to change her environment! Block off her nesting box for example. If this is not enough, you may need to give her a holiday - remove her from the pen and accommodate her in a completely different place for a few days. A cool place is best. Make sure she has water and feed. This should make her forget about sitting on eggs all day.

12 - 15 eggs for a brooding hen

How many eggs is a bird capable of sitting on comfortably and successfully take them through the process of hatching?

tsz - A brooding hen can hatch 12 - 15 eggs per sitting if she is comfortable and feels safe. Keep food and clean water near the hen, but outside her nest, during all the time. This will make sure that a maximum number of chicks hatch. Protect brooding hens from predators, rodents and distress.

When the chicks hatch, they can be taken away from the hen after one week and put into an artificial brooder. Since a hen is still in a brooding mood

Keep eggs cool

Are eggs placed in a fridge capable of being hatched? Sabina Ngare

Eggs for hatching can be stored in the fridge at 4-8°C to minimize embryo development. But it is important to bring them to room temperature before incubation. This give a shorter hatching window incase of artificial incubation.

Salt and chicken

Why is salt dangerous to poultry? When given to chicken, they die. Sabina Ngare Matunda.

Too much salt is not good for any animal. Chicken will require at least 1% salt in their diet for mineral balance.



Huge interest in chickens

Chicken rearing has become more and more attractive to farmers. Farmers eager to learn more, can order the TOF module No. 20 about chicken production. Much more information (especially on feeding) you find in the infonet-biovision CD, or you go to www.infonet-biovision.org, click on animals and click on chicken.

after that, you can give her new eggs to sit on. This can be done continuously for two or more times. Collect them in advance from good layers which can supply eggs for hatching. Ensure that all the eggs you give to a brooder hen have about the same age and will hatch at the same time. Store them in a clean and dry place to prevent going bad. Eggs older than 14 days must not be used for hatching.

If a brooding hen is left without eggs after the chicks were removed from her, she will usually start laying again after about two weeks.

Layers are different

Why do layers lay more eggs?

Layers are bred specifically for laying eggs according to the way they are in the hatcheries. However, production of eggs has to do with several factors, such as good housing, a well balanced diet, disease control and management. When you manage your birds well, you experience good egg production from your birds. You just have to observe the standard attached to them and you will not curse yourself. Hybrid layer will lay about 300 eggs while some indigenous chicken can lay up to 180 eggs every year when kept under optimal conditions.

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

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Take care of your maize: Harvest early

If current rains persist, farmers who do not harvest their maize early will incur huge losses due to rotting.

Peter Kamau

There is one issue farmers ignore every year at their own peril: Harvesting their maize on time and storing it in the right way to ensure the harvest is not infested or destroyed by pests. Proper drying also prevents the maize from being contaminated with toxins, the most dangerous of these being aflatoxins.

Current rains a threat to maize

Losses due to late harvesting and poor storage can be huge. Research has shown that for every 100 bags farmers harvest in Sub-Saharan Africa, 40 bags are lost due to rotting, especially during periods of heavy rains and also as a result of poor storage methods and handling. If the Meteorological Department weather forecast for the current short season rains is correct, farmers in all maize growing areas in the country now face a real threat of losing a lot of maize this season unless they harvest it on time.

All maize that was planted in April and May this year is due for harvest in the months of October and November.

Why harvest early?

Some varieties of maize open the husks (ears) when they reach maturity; if it is raining, the water enters the maize cob and the maize acquires a yellow colour and eventually starts rotting. When maize ears open, weevils and other pests gain easy access and start destroying the maize even before it is harvested. Maize that is left to stay in the shamba after it matures is also prone to fungal infestations.

Maize is ready for harvesting immediately the grains harden; any farmers can be able to check this and decide when to start staking the maize in readiness for harvesting. The farmers can also check the silky flowers on the tip of the maize cob- when the flowers turn black, the maize can be harvested as soon as possible.

Post harvest management

Dry your maize immediately after harvest while the maize is still on the



Early harvesting and proper drying ensures maize does not develop moulds (as shown in the picture below).

(Photo TOF)

cob. The maize should be spread on a tent on dry ground or paved, clean surface. All rotten maize cobs should be removed and even those showing signs of weevil infestation. It is not advisable to store maize while on the cob for long. Research has shown that maize on the cob is more prone to weevil damage. Always shell maize immediately it is dry enough or when ready for long term storage.

Monitoring the moisture level

One of the most important steps a farmer needs to take after harvesting maize is to check the moisture level. Moisture is responsible for both rotting and attacks by moulds which grow on the maize grains and produce aflatoxins. When maize is harvested early, the moisture content can be very high, sometimes as high as 37 per cent. The maize has to be dried until it attains a moisture level of 12 per cent which is the recommended level for long-term storage.

A quick moisture test method

It is difficult for the majority of small-scale farmers to buy a moisture meter for measuring purposes. But there is a simple method every farmer can use for this purpose as outlined below:

- Put a handful of grains and ½ handful of salt in a dry soda bottle.
- Shake for 2-3 minutes and allow the grains to settle. If the salt sticks onto the walls of the bottle, it is a sign that the maize has moisture.
- Dry again and repeat the test until no salt sticks on the sides of the bottle. If not salt is seen on the bottle, this is a sign that the maize has dried adequately and can now be stored.

Tips on how to store your maize.

- The maize store should be properly cleaned. Remove undesired grains, cobwebs, and any other material in the store where pests can hide.

- Preferably, the shelled maize can be stored in airtight containers to prevent pests from getting into the maize and destroying it.

- Ensure the maize is harvested early before the husks open which allows water, weevils and moths to enter the maize cobs.

- Sort the maize before storage to remove any cobs that may be infested with weevils or moths.

- Shelled maize should be sun-dried for 3-4 days to bring the moisture content to 12 per cent, which is safe for long term storage.

Try diatomite for maize storage

Once the farmers have taken all the measures we have given above, they still need to take care of the maize to ensure it is not infested by weevils, moths and other pests during long-term storage. The problem is that most of the storage pesticides in the market are no longer effective against pests such as the Larger Grain Borer (LGB) commonly known as Osama, which is very destructive. Diatomite can solve the problem. Diatomite is a powder with very sharp particles that pierces all insects on contact; this dehydrates the insects killing them. Unlike chemical pesticides, no insect can resist diatomite. Farmers are therefore assured of total protection of their maize from weevils and other damaging pests. Diatomite can protect your maize for up to 4 or 5 years without any pest damage. Farmers groups can organise themselves and buy diatomite as a group. It is only available at African Diatomite Industries in Gilgil. Farmers groups in Kirinyaga region are already buying it this way and dividing among themselves. Interested farmers groups can make orders directly from the company by calling 0700 409 199 or 0722 277 120.



Well managed forests give income and pride

Forest owners need to think in long-term, the more care they attend to the trees, the higher will be the benefit.

The Organic Farmer

Just like other crops on the farm, trees need proper management in order to grow healthy. Forest owners who manage their trees well, get good quality products such as timber, building or fencing posts and other by-products such as firewood and charcoal which they can use.

To begin with, a forest owner has to decide what type of trees they want to plant and tend until maturity. After planting, the next big task for the forest owner is to ensure proper growth, health and quality of the trees. Good forest management allows for the regeneration to meet future tree requirements. The following forest management practices are used to improve the quality of trees.

Thinning

The main purpose of thinning is to control the amount and distribution of available growing space. By reducing the number of trees in a stand in a forested area, farmers and forest owners can influence the growth, quality and health of the remaining trees. Thinning also provides an opportunity to remove the unwanted smaller trees that are not formed properly.

Low thinning: The tree undergrowth is cut and removed.

Crown thinning: The tree branches on the top (or crown) are cut and reduced to the desired size.

Selection thinning: The most dominant trees are cut to give room for other trees to grow.

Mechanical thinning: Some rows of trees are cut while the rest are left to grow.

Ecological thinning: The main aim of ecological thinning is to increase the growth of selected trees that favour the development of wildlife habits, rather than focusing on growing trees for commercial purposes. Ecological thinning is a new approach of improving biodiversity by protecting forests that harbour different wildlife or endangered tree species.

Coppicing

Trees that form a dense growth are thinned by cutting branches to make them grow or sprout more vigorously. Coppicing can be done to obtain firewood, charcoal or wood for other uses.

Pruning

Pruning is the removal of lower branches of young trees to avoid the growth of knots that grow over the branch stubs and spoil the quality of tree by-products.



How to transplant a tree

Sometimes, a farmer or forest owner may not like a particular tree or shrub to grow in a specific part of the farm. One of the options is either to cut it down or transfer it to a different part of the farm through transplanting. However, transplanting of trees is not easy as many would think. Many trees die when transplanted. To increase chances of survival, transplanting of trees should be done very carefully. Determine whether a tree or shrub grows well in sun or shade. One must also know the right spacing and water requirements. A tree for instance, that takes much water should not be planted next to another tree that does well in dry conditions.

The following steps can help a farmer do it successfully:

Step 1: Dig a new hole before you dig up the tree or shrub.

Step 2: Estimate the width and depth of the rootball by doing some exploratory digging around the plant. The width of the new hole should be twice that of the rootball (lump of soil around the root system). The depth of the hole should be kept a bit shallower.

Step 3: When you reach the bottom of the hole, do not break up the soil beneath- some people deepen the hole to allow the roots to penetrate deeper but this is wrong as it would encourage the tree to sink after planting which can lead to rotting.

Step 4: Dig out the tree or shrub. Do not start digging right at the base of a mature tree or shrub. Start digging about 3 inches from the base, all along the perimeter. Get a feel for where the main mass of the roots lie. Also determine the weight of the plant, root system and the soil clinging to the roots. Get someone to assist you to lift it, if heavy. Once uprooted, a tree must be planted within the next two hours; keeping it longer will affect the roots and reduce chances of survival.

Step 5: Make sure to keep as much of the root ball (roots and clinging soil) intact as much as possible. If the plant is too large, you may have to cut some of the roots with a sharp panga or pruners. Make a clean cut.

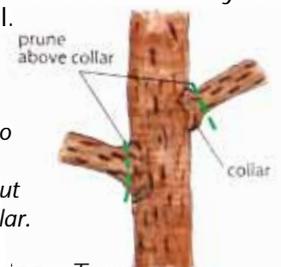
Step 6: Once you have removed enough soil from around the sides of the plant, you can easily slip a shovel under it and begin to loosen the plant's grip on the soil below. Spread a mat on the ground nearby and gently move the tree onto the mat.

Step 7: Using mat as a transporting medium, drag the tree or shrub over to the new hole. Gently, slide the tree into the hole and keep it upright. Shovel the excavated soil back into the hole. Press the soil down firmly and water it as you go round it, to remove air pockets. The formation of air pockets will cause the tree or shrub to shift after transplanting.

Step 8: Make a mound of soil in a ring around the newly transplanted tree or shrub to form a basin that will trap water. The basin will collect water and ensure the transplanted tree roots are well watered until the tree establishes itself.

Step 9: Spread a 3-inch layer of mulch around the new transplant. Keep it a few inches away from the tree base to promote air circulation. This will also keep away rodents.

Step 10: If there are no rains, the tree should be watered continuously for it to grow well.



Do not cut too close to the stem but above the collar.

Source: *Growing Trees and Gardens for life*- ISBN 9966-54-9
Email: info@jacaranda-africa.com

Knowledge a must for greenhouse farming

Proper management and the right technical skills are important for successful greenhouse farming.

The Organic Farmer

Greenhouses have become very popular in Kenya. These plastic constructions are increasingly difficult to ignore in our landscape. There is a very aggressive promotion for greenhouses that takes advantage of the fact that farmers are desperate to get more profit from farming, but are completely inexperienced in this technology. According to these companies, greenhouses are goldmines that offer the most profitable business opportunities which no farmer can afford to miss. Reality, however, may look quite different. But without doubt, greenhouses offer a number of advantages:

- They protect vegetables against strong wind and rain
- Inside a greenhouse, temperatures are usually increased, leading to increased growth and earlier harvest compared to out-door production
- Drip irrigation saves water and makes crop production independent from rainfall
- Crops can be planted and harvested when prices are high
- With good planning, the initial investments can be recovered within 2 to 3 years.

Challenges

However, these benefits do not fall

from heaven.

There are three major challenges:

The costs

Farmers need capital or securities to get a bank loan to start this business. For many small-scale farmers, both are not available. "Greenhouse farming is an issue of the middle class," a Kenyan magazine wrote recently. Greenhouse owners are often people with white collar jobs.

Management

Plant growth is determined by the controlled condi-

tions inside a greenhouse. Greenhouse production requires constant temperatures and humidity control - around the clock. In large-scale professional greenhouse production, this is done with the help of technical equipment which small farmers cannot afford. But farmers need to check temperature and humidity in small greenhouses. A greenhouse can overheat very easily in the bright sun, and condensation must be checked. Therefore, ventilation is



The entrance cubicle provides a changing area and a footbath for greenhouse workers.

essential and must be easy to handle and to adjust. This is especially important in hot regions, where temperatures inside a greenhouse may go up above the optimum suitable for plant growth. "You are literally tied up to a greenhouse", a greenhouse producer from Thika said to *TOF*. It is very important to have reliable workers who know the requirements of greenhouse crops and can handle the challenges that occur during production.

continued on page 6

I would go for shade nets and drip irrigation

Su Kahumbu, a pioneer in organic farming is very well known by our readers, She is very sceptical about greenhouses, as you can read in the following text.

I have yet to see a greenhouse under real organic production methods that is still producing organic healthy products a year on.

What are our real issue?

Do we need to make money quickly, only to end up with bank repayment schedules to buy green houses, as if this is the only solution. Or is it simply that the input providers of greenhouses have a great marketing strategy and other providers of useful inputs are asleep as I suppose?

As farmers we do not need to invest only to end up bankrupt, we should be wise and weigh our options. Our problems are too much sun, and too little water. So we need to spend our water wisely and try to keep it in the ground around the root zone for as long as we can.

Too little water ...

Drip irrigation is clearly the answer. It sounds expensive when we are ignorant, yet in reality it is not as expensive as it seems. The providers of drip irrigation should make their products more readily available to the small-scale farmers. There is no real reason why I should not be able to buy any size of drip lines from an agrovet shop, the same way I buy electric cable.

... too much sun

We can mulch against too much sun,

and we can use shade net. And preferably use both. Shade net is much more affordable than green housing, it does not result in any build up of pest or disease and, by nature of being cheaper, encourages and favours crop rotation.

The real choice we have to make is what to invest in first, shade net or drip kit, as the ideal farm today should have drip lines under mulch and shade netting.

I would go for netting first. This allows you to keep your moisture in the soil. Drip lines alone with good mulch is also an option, however we all know that the hot sun rays on our crop leaves are causing undue stress to the overall performance of our crops.

I urge all farmers today to invest in shadenet and then drip irrigation. Agrovet shops should make these input available and at an affordable price to small -scale farmers.

Su Kahumbu



>>> from page 5: **Greenhouses**

• Disease and pest management may be the biggest challenge in greenhouse production.

The problem of pests and diseases
To recover the huge investments, high value crops such as tomatoes, peppers, eggplants or chilli are planted in greenhouses. This is a very small choice of crops, and all of them belong to the nightshade family which is susceptible to early and late blight, but also to different pests like white flies. Pathogens and insects can establish in a greenhouse environment in a very short time, and they are very difficult, if not impossible, to get rid of effectively.

To avoid this, organic farmers usually rely on crop rotation. This prevents pests and diseases associated with any crop family to accumulate in the soil. But when farmers grow the same crop in a greenhouse over and over again without rotation, diseases and pests become a big problem. Typically, after the second and third greenhouse season, the promised bumper harvests start to decline, and pests and diseases can only be controlled with increasing amounts of pesticides. This or even total crop failure may force the farmer to pull down the expensive structure. In anticipation of these problems, some companies that produce and sell greenhouses offer advice and training to their customers.

Greenhouses & organic production
Organic greenhouse production is a major challenge, as only a limited number of pesticides can be applied. A pesticide-reduced greenhouse means that growers must practice good sanitation and pest management methods from the very start. A key element must be rotation, which means that a wide range of crops will have to be cultivated in the greenhouse.



• Suggested crops that can be planted in greenhouses besides crops from the nightshade family are: Cucumbers, courgettes, melons, broccoli, radishes, kohlrabi, okra, salads and lettuces, parsley, coriander, fennels, spinach and Swiss chard, beetroots, sugar snaps and snow peas, garden peas or garlic. Good marketing skills and abilities are required of the farmer!

• Good management includes the use of resistant varieties and biological pesticides that are allowed in organic production, such as insecticidal soaps, botanicals (neem products, tephrosia, pyrethrum etc.), and mineral-based pesticides (mainly sulphur and copper based).

• Good ventilation and air circulation, rigorous sanitation practices, and maintenance of optimum temperatures and humidity levels are essential. And before a crop is planted, it is important to thoroughly inspect the greenhouse. Screens, doors, and walls should be checked periodically for any tear and openings sealed!

Planning and documentation

Planning is central for a profitable greenhouse production. You should not start before you have set up a complete budget using realistic calculations. If you plan to take credit, you will have to present your budget to the bank.

Makeshift and wooden greenhouses are cheaper but more prone to damage by termites and wind.



Answers in brief

Cracks in oranges

My oranges are cracking just at the stage of maturing and turn yellowish. How can I avoid this loss? And what could be the cause?

Fruit cracking is caused by fluctuation of water uptake. Regularly irrigate your trees, particularly during fruit development

How animals get worms

How do animals get in contact with internal parasites?

Internal parasites such as roundworms and flat worms produce eggs that pass out with the manure and are left in the *boma* or in the pasture. There they develop into small larvae that are taken up by grazing animals.

Cows lick soil

I have observed that some animals like cows lick soil, what is the reason behind this? Twajijenga Self Help Group.

Cows need a lot of different minerals. If they do not get enough cattle salt and mineral licks, or if these are of low quality, they will try to compensate when they find soil or ashes that taste good to them

Compost turning

Will there be any effect when I delay in turning my compost manure?

The composting process may delay. Turning is a way of checking whether your compost is too dry or too wet and to ensure good mixture of the material and sufficient air in the heap.

Prices and producers

Before you buy...

Metal houses of 8 x 15 Meter cost around Ksh 180'000; they are usually sold as a complete kit including the drip irrigation system. They should last 10 to 12 years.

Timber constructions are cheaper, around Ksh 100'000 for the same size. But to put up your own construction is technically more demanding, and termites, wind resistance and durability of the polythene are usually a problem. The polythene sheeting needs changing every 2 to 3 years.

Please compare all offers not only with respect to the price, but also concerning construction height, ventilation, plastic quality, and ask which services are included in the quotation. You should also go to see them with your own eyes before you buy.

... where to buy

Some greenhouse manufacturers in Kenya:

- Agro Tunnel International Ltd., Karen (Nairobi), Tel. 020 2012626 (office), Oliver 0722 520 083, 0733 520 083, Frida 0720 560 727 e-mail: agrotunnel@gmail.com
- Amiran Kenya Ltd, Old Airport North Road, P.O.Box 30327, 00100 Nairobi, 0719 095 000, e-mail: pr@amirankenya.com
- Horticultural Crops Development Authority (HCDA), Nairobi, Airport Road, Opp. JKIA, P.O. Box 42601-00100 Nairobi, +254-20-2088469, e-mail: md@hcda.or.ke
- Shetia Industrial Chemical Ltd, P.O.Box 394, 01000 Thika, UTI complex, Kiboko Road, 020 237 07 07; 071 277 07 07

Why are my pumpkins rotting?

My pumpkin fruits are rotting at an early stage before maturing, what could be the reason for this?

It is almost impossible to determine the cause of a crop problem without having a very detailed description of the symptoms. Fruit flies or a number of fungi can attack pumpkins. Check the following list:

1. Take care of your crop rotation

- Avoid accumulation of pumpkin diseases in the soil and plant pumpkins, squashes, cucumbers, courgettes and melons only once every 3 to 4 years on the same plot of your shamba.
- Beneficial rotations: Plant any of the mentioned crops after maize, grass, onions or potatoes. Plant sweet pota-



Correct use of diatomite

For diatomite to be effective on plants, they should be wet. Is it advisable to dip birds and the other domestic animals in water to wet their fur too?

Diatomite must be used as a dust to work properly. On birds make sure the dust gets inside the feathers and make skin contact. Diatomite dust can absorb water, so when it comes into contact with insects, it works by extracting fluid from them, thereby killing them slowly. If you dip your birds in water first, you minimize the effect of diatomite. Therefore, use dry diatomite!

Dosage for application

What quantity of diatomite should be applied to animals - can you overdose or underdose your animals?

Diatomite has no overdose on external application. Against mites and soft ticks in poultry birds, dust the chicken regularly with diatomite and add it to dust bath areas. To control ticks, fleas, lice, mites of cattle, pigs, goats, rabbits, dogs, etc., rub the dust regularly into the animal's coat. Beddings should also be dusted. Some believe that diatomite may help control stomach parasites as well, so there is no problem if animals that have been dusted lick themselves. Unfortunately, there is no research on the efficiency of internal use against parasites, and we are not able to give any recommendations about this.

toes, carrots, cassava after them.

- You may also have to avoid growing cabbage or beans on plots where you grow pumpkin, because they can promote certain fungal diseases.

2. General crop management

- Plant pumpkins only on fields with good drainage
- Use disease-free seed
- Plant pumpkins with sufficient space between them. 10 to 15 feet between rows are appropriate.
- Control weeds and pests well
- Use fungicide sprays as recommended
- Use drip irrigation and avoid overhead irrigation, because moisture on pumpkin plants encourages fungal growth. Irrigate only during dry periods!
- Remove and destroy pumpkins that are infected

3. Fruit flies:

Do you find little white maggots inside the rotten parts of the fruit? If yes, spray with a pyrethrum solution in the evenings, e.g. with "Flower-DS". Start shortly after beginning of flowering, and repeat approximately every 5 days. Frequent applications of neem products can keep fruit fly attack to a minimum. *tsz*

Resistance against plant extracts

What should we do to those pests that are resistant to plant extracts?

What you have observed is most probably not resistance to plant extracts. There are several possible reasons if pests survive treatments with plant extracts. Especially home made extracts are difficult to dose as the insecticidal compounds in plants can vary widely. Here are some reasons and some advice:

- The concentration of the extract was not high enough. Make a more concentrated extract next time.
- Some plant extracts like neem or tephrosia do not kill the insects instantly. But they make them sick. The pests stop eating and die slowly, or they will not be able to develop into

Use natural pyrethrum

Pyrethrum is said to be very poisonous insecticide. For how long should I wait before I start picking my fruits and vegetables for consumption?

Though pyrethrum is quite poisonous when freshly harvested, it breaks down very quickly when exposed to the sun. After few days, there will be no poisonous compounds left and the produce will be safe to eat. If you want to be absolutely sure, wait one week.

However, this is not the same for the commercial synthetic pyrethroid compounds in the market, which can have very long periods to break down (this is a reason why they are stronger). So if using pyrethrum in organic farming, make sure it is of natural origin.



Watery animal waste

What causes watery animal waste? James Wasike, Kamukuywa.

Young green pastures with plenty of access to water may make the animal waste quite thin. However, smell and colour will change if diarrhoea is the problem. Hay is the best feed in such a situation. Make sure animals have also access to a good mineral lick. This will help stabilize the digestion.

adult insects (which prevents them from multiplying).

- Plant extracts must be prepared carefully and should be used immediately as they break down quickly in the light.
- They are more efficient when applied in the evening.
- Do not spray when it is about to rain, as the rain will wash away the solution.
- Repeat the application several times about two times a week.

Plants can be used as fertilizer

Can shrubs like tithonia, comfrey and desmodium be dug and worked into the soil as organic fertilizers?

Yes. Tithonia and comfrey especially decay quickly and release nutrients that can be taken up by other plants.

Be careful with comfrey

My dairy cow eats comfrey with a lot of comfort when mixed with other dairy feeds. Is this dangerous? Leah Murabwa

Comfrey (*Symphytum officinale*) sometimes contains poisonous alkaloids. As these compounds are toxic to the liver, the recom-



mendation is to apply comfrey only externally and to avoid ingesting high doses of comfrey regularly. Small amounts mixed with other feeds may not be harmful, but we also think it is best to be cautious and to avoid feeding too much comfrey to livestock.

Selling & buying

Water melons for sale: Shimba Hills Kwale, top quality. Email: jttalu@yahoo.com

Fingerlings available: Monosex Tilapia available on order, catfish fry and fingerlings available too, 0722 655 606, 0733 655 606

Tilapia for sale: One thousand tilapia pieces for sale in two months time, interested farmers can make advance bookings. Contact Njagi dakarnjage@yahoo.com

Tree seedlings for sale: Grevillea, prunus africana, Dorbea, Podo falcus, Cedar juniperus, cypress, call Daniel Thenya 0723 689 960

Buck for sale: A pure bred buck (male goat) available for sale, call 0722 364 337

Modules available

The modules on various topics in organic agriculture are ready. They are easy to understand and explain every topic with a lot of pictures and graphic illustrations. They contain all the basic information that farmers need to know. The 21 modules, packaged in a springfile and are a useful handbook for farmers. Interested farmers can send us Ksh 50/= for each module via SMS to the following mobile number 0717 444 405, or pay Ksh 700 for all 21 modules. Please do not forget your full names and postal address.

Modules ready for dispatch

- No 1: Organic agriculture
- No 2: Crop rotation and intercropping
- No 3: Organic disease and pest management
- No 4: Organic crop nutrition
- No 5: Compost, manures and liquid manures
- No 6: Green manures, cover crops, mulching and weed management
- No 7: Conservation agriculture
- No 8: Water management
- No 9: Drip irrigation and greenhouses
- No 11: Fodder production and concentrates
- No 12: Dry season fodder
- No 13: Goats: Housing and feeding
- No 14: Goats: Breeding, milking, kidding, health
- No 15: Cattle: Housing and feeding management
- No 16: Cattle: Milking and calving
- No 17: Cattle: Breeding
- No 18: Cattle: Diseases
- No 19: Cattle: Parasites
- No 20: Chicken
- No 21: Sheep rearing
- No 22: Agroforestry



Ants feeding on sap produced by aphids and a lady bird (right) eating aphids.

Fewer aphids in organic crop fields

Natural enemies can control aphids in a sustainable way and much cheaper than chemicals.

TOF - Farmers who spray insecticides to control aphids as a preventive measure only achieve a short-term effect with this method. In the long term, their fields will end up with even more aphids than untreated fields. This is the result of a study done at the Bio-center of the University of Würzburg (Germany). The researchers used crop fields planted with Triticale. This is a cross between wheat and rye. Its cultivation is on the rise across the globe, because it delivers good yields even in poor soil conditions.

The scientists compared five untreated triticale fields with five fields which were sprayed with insecticides to fight the aphids. The results were remarkable and should attract the attention of every farmer: "The preventive application of insecticides against aphids does not produce any advantages even though it consumes a lot of time and money," Jochen Krauss one of the scientists sums up.

"To be sure, the application of the insecticide led to a short-term decrease of the pest density," says Krauss. "After four week's time, however, significantly more aphids could be found in these fields than in insecticide-free fields. This also astonished the farmers who made their fields available for the study."

No natural enemies

The scientists offer two possible explanations for this phenomenon. One possibility is: The insecticides indiscriminately kill off beneficial animals that feed on the aphids, such as ladybugs or the larvae of lacewings and hoverflies. Because their enemies are missing, the aphids find it easier to return and proliferate than in insecticide-free fields. Another possibility is an indirect effect: The insecticide just kills the aphids,



Lacewing feed on aphids

after which their enemies leave the field for a lack of prey. Final result: In this scenario, the aphid population can also recover better after their return because the natural enemies are missing.

Greater biodiversity

In conventional fields that have not been sprayed with insecticides, the pest control through natural enemies seems to work better – thanks to the higher biodiversity in these fields. The biodiversity is far greater in fields under organic management. The researchers found five times as many plant species and 20 times more types of pollinating insects in the 15 organic crop fields included in the study than they did in conventional fields. Furthermore, they detected three times as many natural enemies of aphids and five times fewer aphids in the organic fields than in the conventional fields.



Ladybird feeds on lacewing larvae

