



A banana plantation affected by the new strain of Panama disease.

FAO issues alert on new banana disease

TOF - The UN Food and Agricultural Organisation (FAO) has warned of a new banana disease that is said to be spreading from Asia to Africa and the Middle East, with potential to also affect countries in Latin America.

Highly destructive

The TR4 race of the Panama disease (also called fusarium wilt) is destructive and poses a serious threat to production and export of bananas and even livelihoods for millions of farmers who rely on the crop for food.

Banana is the 8th most important food crop among the world's least developed countries, according to FAO data.

"Any disease or constraint that affects bananas is striking at an important source of food, livelihood, employment and government revenues in many countries in the tropics," says Gianluca Gondolini, Secretary of Banana Forum, which promotes sustainable banana production and trade.

Farmers to suffer most from disease spread

Fazil Dusuncelli, a plant pathologist at FAO says the spread of fusarium wilt banana disease could greatly affect growers, traders, and families who depend on the banana industry: "Countries need to act now if we are to avoid the disease, which could cause massive destruction of much of the world's banana crop," he adds.

Preventive measures

FAO advises farmers to prevent the disease using quarantines, use of disease-free planting



material, and prevention of movement of infected soil into and out of farms. Also vehicles getting in and out of the farms should be disinfected to prevent spread of the disease.

Banana disease already in Mozambique

The disease has recently been reported in Mozambique and Jordan. It tends to infect the Cavendish banana varieties, which dominate the world banana trade.

Fusarium wilt is caused by the fungus known as *fusarium oxysporum f sp. cubense*.

The disease is soil-borne and the fungus can remain in the soil for decades. It cannot be controlled by current farming practices such as crop rotation and use of fungicides. The only way to stop is to prevent it from spreading through movement of diseased planting materials.

Dear farmers

Diseases pose serious problems to crops planted this season. Most farmers will tend to look for quick solutions to the problem notably by buying and applying chemicals. As experienced farmers will tell you, some pests have developed resistance to some of the chemicals in the market. This is partly why chemical companies are forced to develop new chemicals every year to overcome the problem of pest resistance to chemical pesticides. Besides, the cost of the chemicals is so high that many farmers may not afford them.

One way farmers can control the problem of pests is to use environmentally friendly methods of farming such as the use of plant extracts. Many times in this magazine, we have explained the benefits of using plant extracts on crops. They do not cost much except a little labour used in their preparation.

It is also possible to improve nutrient deficiency by using plants such as tithonia during preparation of the extracts.

Instead of buying chemicals farmers can also use biopesticides and fungicides that are now available in the market. In this issue we have featured some of the organic inputs farmers can buy and use to control various diseases and pests (page 4 and 5).

Poultry Keeping is becoming a popular farming activity in the country. But chickens are very susceptible to diseases, especially during the wet season. In the last one-month, we have received questions on various ailments affecting chickens.

Prevention is always the first line of defence against pests and diseases. Farmers need to vaccinate their chickens against some of the dangerous diseases such as Newcastle, coccidiosis, Mareks and gumboro.

in this issue

Chickens diseases 3



Organic inputs 4 & 5

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Charolais: A good beef breed for farmers

The breed has a high production potential with good management and good feeding. It is recognized and valued by beef farmers because consumers prefer it due to its lean meat.

John Cheburet | Charolais is an exotic breed that originated from France, in the South-Eastern region of Charolles. Charolais is kept mainly for beef because of its size, large muscles and fast growth. The colour of the breed is white with pink on the muzzle and pale hooves, long body and sometimes a coarse fur. Currently there are Charolais bulls that are being bred for black and red colour.

Charolais has medium to large body frame, with short, broad head and heavily muscled hinds and loins. Adult bulls can weigh up to 1,000 kgs and cows up to 900 kgs.

In Kenya, Charolais was introduced for cross breeding with local breeds to achieve good growth and uniformity. There are, however, pure breeds and semen available at Agricultural Development Corporation (ADC), Kenya Animal Genetic Resources Centre (KAGRC) and big ranches that specialize in commercial beef.

Advantages

The breed is kept specifically for meat production. It has a high production potential especially if well managed and fed well. Farmers who keep this breed say it has good physical characteristics for people who prefer lean meat. They are easy to feed and bring to the required market weight before selling. Charolais bulls have a quiet temperament, and are easy to handle.

Disadvantages

The breed has experienced challenges in adapting in Kenya mainly because it easily gets tick borne diseases like East Coast Fever (ECF). Farmers are



A Charolais bull at the Suam Orchards ADC farm, Kitale.

advised to dip their animals regularly to keep away ticks and to vaccinate them against ECF. Charolais cattle also do not tolerate heat well and thus are more suitable for cool areas with quality fodder throughout the year. Farmers who have reared this breed say the percentage of bone to meat in this breed is higher than most other breeds such as Hereford. This trait is transferred when cross-bred.

Cross breeding

Crossbreeding is common in the cattle industry. When the right breeds are crossbred, the farmer produces a superior animal, which inherits many of the best traits from each breed. Trials conducted in Kenya indicate

that Charolais-Boran, Charolais-Sahiwal, Charolais-Fleckvieh cross breeds show greatest vigour. Weaners range from 250-320 kgs live weight, which shows that Charolais has great value for farmers who wish to improve their local breeds for commercial beef production.

Semen from Charolais is available locally, courtesy of Kenya Animal Genetic Resources Centre (KAGRC), 0735655676, 0723736797. Inquire from distributors in your area.

There is less diversity in Charolais genetic pool because the breed is not yet popular with Kenyan farmers. You can also inquire from Agricultural Development Corporation (ADC) who have been importing semen to boost local reserves via the number 0722 922 593.



Characteristics of Charolais breed

- Bull temperament- Excellent.
- Natural conception rate – 86%.
- Artificial Insemination conception rate- 97%.
- Calving ease – unassisted births- 97%.
- Average calf birth rate weight- 42%.
- Growth rate to 550 kilograms (pasture fed) – 1.07kg per day.
- Charolais are good for growth and uniformity.
- They have superior natural liveweight gain for age.
- Tremendous muscling and conformity.
- Easy to manage in terms of temperament.

Avoid the effects of inbreeding

Breeding within small populations, such as a herd or flock, without introduction of new animals from outside, leads automatically to a certain amount of inbreeding. The decrease in fitness that results from such inbreeding is known as inbreeding depression.

The cheapest way of making sure no inbreeding takes place is to:

- Keep close breeding records of all animals in the herd.
- Make sure parents do not breed with offspring.
- Siblings do not breed with each other.
- Use AI - carefully noting the name of the sire providing semen at each AI service next to the name of the cow in your diary, so that after some time you will have a record of the family tree of every individual.
- Make sure the same sire semen is not used on his offspring.
- Ask your AI provider to bring different origins semen over time.

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. It is published monthly by **icipe**. The reports in the *The Organic Farmer* do not necessarily reflect the views of **icipe**.

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Disease prevention important in chicken rearing

Chickens are very vulnerable to diseases. Farmers can, however, keep away diseases through proper feeding, housing, hygiene and regular vaccinations.

Peter Kamau | The wet season is here with us again and with an increased incidence of chicken diseases. Poultry farmers should therefore need to remain alert to guard against disease outbreaks. Some of the poultry diseases can wipe out an entire flock or reduce the chickens' production potential. The first line of defence against poultry diseases is prevention. Since farmers may not know the characteristics of each of the diseases that may affect their poultry flock, it is always important to ensure chicken are protected against the most common diseases mainly through vaccinations.

Apart from vaccination, it is important for farmers to know what causes most of the chickens diseases so that they can maintain their chickens' health. The main causes of diseases in chickens are:

- Microorganisms
- Parasites (both external and internal, like worms).
- Malnutrition (poor feeding)
- Injuries
- Chemicals (eg sodium chloride-salt poisoning).

Hygiene

Maintaining hygiene is one of the most important steps a farmer can take to prevent diseases in their poultry flocks. The poultry house should be kept clean at all times. Ensure that the chicken droppings are swept every day. If possible, apply a disinfectant regularly to



A sick cock



A sick hen

kill any disease-causing germs or viruses.

Housing

A chicken house should be well ventilated to allow air circulation, but the house should not allow wind as this may affect the birds. Ensure there is adequate space in the house for all the birds to avoid overcrowding. The floor should preferably be cemented for easy washing and sweeping. It should also be lined with wood shavings to keep the birds warm and comfortable. If keeping layers, ensure nesting boxes are provided and built in a dark place where the hens are free from any disturbance. An ideal house should give each bird at least 2 square feet of space to move; overcrowded birds are prone to stress and even cannibalism. Well constructed chickens houses protect the birds from predators.

Signs of healthy chickens

- Healthy chickens remain alert and on guard.
- They have bright eyes and comb.
- They walk, run and scratch.
- They eat and drink continuously.
- They lay eggs as expected.
- They have normally smooth

and neat feathers.

- Their droppings are soft and they breath quietly.

Signs of sick birds

- They look tired and lifeless.
- They have dull eyes and comb (crest).
- They tend to sit or lie down most of the time.
- They lay few or no eggs.
- Their feather look ruffled and loose.
- They have wet droppings with blood, worms and may diarrhoea.
- They may cough, sneeze and breath noisily.

Disease management

In case of a disease outbreak poultry farmers should take the following measures:

- All sick birds should be isolated.
- Remove all dead birds, bury or burn them.
- Consult a veterinarian immediately who can identify the disease and give appropriate treatment.
- Vaccinate all birds as recommended against the most common diseases. Revaccination is also necessary to boost the chickens' immunity to diseases.

I paid dearly for not vaccinating my chickens

A few years ago I reared free-range chickens for both eggs and meat, which, I sold through the Green Dreams brand. I produced them in batches of 200 and 400 on my farm in Tigoni. Rearing them on free range required that I allow them out most of the days. It also meant I could not collect their manure for the *shamba* so I decided to rear them in the *shamba* itself.

With the help of my brother, we designed and built a mobile chicken housing unit made of panels that could be dismantled and moved in the field. The sole purpose of the housing unit was to protect the birds at night and to reduce heat loss (and thus weight loss due to the cold temperatures). We built a few units and had broilers and layers, including the Kenbro breed. The *shamba* was divided into several blocks covered in shade netting and it is these blocks that I then began to rotate the chickens.

I put them on free range

Every morning the birds would rush out of the housing into the open field protected from big birds and dogs by the netting, and they would feast on the weeds, grass, bugs and anything else they could find, while their droppings fertilized the ground. They would then return to their commercial feeders, which were placed outside the housing unit as they chose.

I did not vaccinate them

I was opposed to the stringent vaccination regime I was advised to follow and in my quest to produce organic meat and eggs I did manage to produce a few flocks without vaccinations. I was told, however, that the first few batches would not have a problem but then, the bacterial load causing diseases that could affect them would build up in much the same way that pests and disease build up in crop production if rotation is not followed.

Finally disease struck

To avoid diseases I was sure to move the housing units between batches, giving their holding ground time to solarise and disinfect. But one day the worst

Vaccination programme for chickens

Age	Vaccination	Method
1st week	Marek's and Newcastle Disease	Intramuscular injection eye or nasal drops
2nd week	IDB (Gumboro)	In drinking water
3rd week	IBD (Gumboro) Newcastle	Eye or nasal drops or in drinking water
4th week	Deworming, Gumboro forte	In drinking water
5th week	Lasota and Gumboro	In drinking water
6-8th week	Fowl Typhoid	Injection
9th week	Deworming (Every 2-4 weeks)	In drinking water
8- 10th week	Fowlpox	Wing stab
12-14th week	Fowl typhoid	Injection
16-18th week	Renew Newcastle vaccination	Optional (if disease is common)

Environmental friendly organic products that fa

TOF-Most farmers would like to buy organic fertilizers, soil conditioners, biopesticides, and fungicides to use in their farms in place of chemicals, but they do not know where to buy them. Many other farmers may not be able to distinguish between organic and chemical products in the market. A lot of chemical products are in the market due to aggressive marketing and promotions by agrochemical companies.

Chemicals have serious side effects

Some of these chemicals have many side effects on humans, animals, beneficial insects, the water we use from rivers and even the environment. If you read the labels in most of the chemical products, they will not tell you what side effects the chemicals are bound to have on the users. But many of the chemicals in the market that farmers are using to protect their crops against pests, diseases or weed control have serious long term effect on human beings, animals, beneficial insects, soil microorganisms and the environment.

Medical complications

Most of the medical complications such as allergies, cancer, skin ailments and organ failure have been traced to the food we eat, much of which has been grown using chemicals. Farmers, therefore, need to be very careful on the food they produce. Crops grown using organic pesticides, fungicides and even fertilizers is healthy and do not pose any danger to consumers as they do not contain any chemical residues.

Organic fertilizers good for soils

Some of the chemicals used in crop protection today end up in water bodies where they kill marine life such as fish while chemical fertilizers washed down rivers are responsible for growth of noxious weeds that are difficult to control. Besides, chemical fertilizers are responsible for increased soil acidity and leaching, which is to blame for a decrease in crop yields in most farming areas in Kenya today. In this issue, we provide farmers with some of the organic products they can use to correct nutrient deficiencies in their soils, control pests and diseases while restoring the damage done by many years of chemical's use.

The Biovision Farmer Communication Outreach Programme, which is part of the Farmer Communication Programme has started stocking the Farmers Resource Centres with some of the organic products, which farmers can buy at subsidized prices.

Resource centres with organic products

Machakos Resource Centre	John Mutisya	0727 621 162
Gilgil Resource Centre	Nellie Wambui	0703 360 100
Murungaru Resource Centre	Veronica Wangeci	0727 168 770

Product	Uses	Active ingredient	T
EM1	Growth Activator	Beneficial micro-organisms	Pr he
BM	Growth Activator	Beneficial micro-organisms	Pr he
Diatomite	Pest control	Tiny microscopic organisms that pierce and kill pests on contact	M
Mijingu Rock Phosphate	Organic Fertilizer	Mijingu fertilizer is rich in phosphates	Co to
Thuricide HP	Biopesticide	Bacillus Thuringiensis (Bt)	Co
Humax	Humic acid	Soil conditioner	Co cro
Cleanstart	Contains root guard, phosguard, humax and natural wet	Fungicide	A sch
Pyegar	Natural pyrethrum extracts	Biopesticide	A rep
Nimbecidine	Neem extract	Biopesticide	Co
GC-3	Garlic extract	Fungicide and biopesticide	Co fun
Rootguard	Fungicide and pesticide	Trichoderma, bacillus spp, Aspergillus spp, Escherichia spp, Azotobacter spp.	Co an me
Synergizer	Foliar feed	Contains 8% nitrogen, 32% phosphorus and 4% potassium	Fo
Fosphite	Selected Fungicide and Fertilizer	Contains potassium salts and phosphorus which act as fungicides and fertilizer	Co bli ru
Pyneem 20EC	Biological Pesticide	Pyrethrins, neem oil, inert ingredients	Co Pe
Pyerin 7.5EC	Biological pesticides	Pyrethrins and inert ingredients	Co an
PL Plus	Biological Nematicide	Contains Parcolemus lilacinous	Kil
TRICHOTECH® (WP)	Fungicide	Trichoderma harzianum	A dis de
Twin-N	Nitrogen inoculant	Has nitrogen fixing bacteria that meet the plants nitrogen needs	1
Vitazyme	Beneficial enzymes	A Biostimulant that helps improve soil nutrient uptake by plants	Se gr ev
Black majik	Soil Conditioner	Humatech 10%, potassium 70% and ulmic Acids	50 fe
Earthlee	Soil conditioner	Humus (80%) and carbon	Ap
Uptake 12	Soil conditioner	Concentrated potassium humate	20 so
Achook®	Nematicide	Neem extract	De

Farmers can use instead of chemicals

Target Pest/ disease	Remarks	Company
Promotes healthy plant growth	When used with plant extracts, EM1 suppresses most pests and diseases	EM Technologies Ltd 0721 640 174.
Promotes healthy plant growth	Improves Nutrient uptake, suppresses diseases	Peter Chandi 0733 546 491
Most pests such as weevils, aphids, mites	Diatomite also contains. Micronutrients such as calcium, Phosphorus and magnesium	African Diatomite Industries (ADL) Gilgil, 0722 277 120
Can be used to grow maize, potatoes, beans tomatoes etc	Mijingu does not contain nitrogen. Spray foliar fertilizers rich in nitrogen three weeks after germination	Kondola Enterprises Ltd, Nakuru 0737 711 101,0712 111 101
Controls nematodes and other pests	Does not harm beneficial insects. Pests cannot develop resistance	Farmchem Ltd, 020 552 71, 020 550 448
Can be mixed with foliar feed and applied on crops	Can be mixed with slow release fertilizers such as rock phosphate	Juanco SPS Ltd 020 2088 793
Strong Fungicide that controls fusarium, bacterial, rhizoctonia, pithium etc.	Good for tomatoes, potatoes, cabbages, capsicums, passion fruits avocados	Juanco SPS Ltd. 020 2088 793
Broad spectrum biological pesticide that kills and controls most insect pests	Non-Toxic to mammals, bees, fish and other microorganisms	Juanco SPS Ltd 020 2088 793
Controls nematodes mites, other pests	Does not harm beneficial pests	Juanco SPS Ltd 020 2088 793
Controls powdery mildew and 11 species of fungi and pests	GC-3 has no Serious toxicity effect	Juanco SPS Ltd. 020 2088 793
Controls most fungal diseases such as botrytis, and pests such as caterpillars, Diamond back-moth and	Rootguard is fairly tolerant to chemicals but rate has to be adjusted	Juanco SPS Ltd 020 2088 793 0722 078 056
Foliar fertilizer	Synergizer should not be mixed with solutions containing calcium	Juanco SPS Ltd. 020 2088 793, 0722078 05/6
Controls mildews, leaf spot, blights, fusariums, damping off, rootrot and rust	Fosphite has a long lasting effect about 28 days. But it should not be mixed with copper-based fungicides. Allow 20 days before applying it to copper treated crops.	Juanco SPS Ltd. 020 2088 793
Controls most insects during growth phase of affected crops	Safe for mammals and soil micro-organisms	Juanco SPS Ltd. 020 2088 793
Controls, thrips, whiteflies, worms, caterpillars and mites	Pyerin is not poisonous to mammals and soil organisms but it can affect fish, bees and birds	Juanco SPS 020 2088 793
Kills nematode eggs and young nematodes	The compound lasts long in the soil	Juanco SPS Ltd 020 2088 793
Fast growing beneficial fungi that stops disease causing fungi from growing and destroying crops	Eco-T should not be mixed with chemicals as it is a living organism.	Lachlan (K) Ltd 0722 209 474
100ml for every 2.5 acres	Do not mix with any chemical as it might kill the microbes	Lachlan (k) Ltd 0722 209 474
Seed treatment at 5ml for every one kilogramme of seed. Foliar spray at 20ml for every 20 litres of water.	Promotes rapid uptake of essential nutrients at all stages of plant growth. can be Mixed with all foliar sprays	Lachlan (K) Ltd 0722 209 474
100g of black majik is mixed with 50 kg of fertilizer	Reduces acidity and revitalizes soil to make it work better	Lachlan (K) Ltd 0722 209 474
Apply 20g-100g of Earthlee on the seedbed	Regular use of Earthlee helps improve soil and crop quality	Organix (K) Ltd 0720 937 535, 0735 712 090
10-100 litres of uptake for every 2.5 acres of soil during growing season	Apply at seeding stage and when transplanting	Organix (K) Ltd 0735 712 090
Depends on pests	Has antifeeding Repellent and growth disruptive effect on pests	Organix (K) Ltd 0735 712 090

Resource centres transforming farmers' lives

A visit to two resource centres shows that information and training provided is changing farmers from traditional methods of farming into modern agricultural methods that raise their yields and income.

Musdalafa Lyaga | Mr. Benson Muturi, the chairman and coordinator for Munyaka Agri-info and Resource Centre stands under a propagated avocado tree. A group of farmers sit in a circle under the tree facing him. In his hands is a handful of dry fodder and he is demonstrating to farmers how to tell if the feed is good for storage or nutritious for livestock. The extension practitioner is passing on knowledge that may seem simplistic to a bystander but to a farmer, this means the difference between raising low milk yielding cow that is poorly managed or a high yielding dairy cow that raises their income.

Farmers in need of information

Farmers in Kenya continue to face numerous challenges due to climate changes, unpredictable markets especially among the sophisticated urban consumers who form the bulk of the market, reducing water sources and emergence of new diseases. The need for information in order to deal with the dynamic agribusiness world is more evident now than ever before.

Agricultural extension services from both governmental, non-governmental, community based organizations and profit making

organizations play a crucial role in promoting agricultural innovation that help improve farmers' lives and livelihoods. The Outreach project of Bio-vision Farmer Communication Programme

has rural based resource centres spread all over the country where farmers can access appropriate and timely information on ecologically sustainable agriculture. The centres are managed by trained and para-professional field extension agents. In addition FCP works with partner organizations who benefit from getting FCP products for use in reaching out to farmers such TOF magazine and infonet CDs.

Mr. Benson Muturi, who is also the coordinator of Ikinyukia Community Based Organization, is one such beneficiary. His centre receives TOF magazine which he distributes to the members of his CBO. The member groups of the CBO also get trainings from field officers from Murungaru Resource Centre. About 100 kilometres in the plains of Kajiado County is the Faraja Latiae Farmers Resource Centre. Latiae is a Maasai word for good neighbour. At the centre we meet 24-year old Naisinya Oloishana who has walked for more than 30 kilometres to the resource centre.

Information changed me

"I am thirsty for information because I know what lack of information can do to a farmer," says Naisinya.



Farmers at an FCP Resource Centre in Kakamega

Naisinya says that three years ago, her family was in deep financial problems. Her husband had sold over 30 acres of their Isinya home and invested in local cow breeds without investing in other agricultural sectors as a diversification measure. Three years down the line, they had lost the animals to drought and were homeless. After surviving on handouts from neighbours, Oloishana decided to join a women's Self-Help Group, which eventually led her to the doors of Faraja Latiae. At the Centre, she received training on both crop and animal management and has since then been able to get back on her feet.

Says Oloishana, "I started by selling farm produce from Faraja Latiae where I had been equipped with skills in agribusiness which enabled me to raise capital which I invested in dairy goat breeding. Now I am a trained dairy

goat farmer, I sell goat milk for Ksh 100 per litre. I am able to get 20 litres per day."

Service helpful

According to Mr. Peter Muthee the Director of Faraja Latiae, the war on poverty can only be won by ensuring farmers have adequate information that enables them to produce adequate food without harming the environment.

"We as extension practitioners play a pivotal role in fostering development by disseminating information on innovations and technology, equipping farmers with skills, knowledge, farm inputs and even providing market linkages for the benefit of smallholder farmers to improve their livelihoods", remarks Muthee. Faraja Resource Centre is also a beneficiary of FCP, having received TOF magazine, infonet CDs and carrying out joint trainings with Outreach staff.

Information on sustainable agriculture and farmer trainings are available from our resource centres listed below.

Name	Resource Centre	Mobile No.
Nelly Wambui	Gilgil	0703 360 100
Everlyne Onganga	Kisii	0713 560 449
Eliud Makokha	Eldoret	0721 307 577
Alfred Amusibwa	Kamukuywa	0724 331 456
Peter Murage	Kagio	0724 331 375
Edinah Kanini	Wangige	0734 191 155
Sarah Karanja	Maragua	0713 212 454
Naomi Wangari	Turasha	0726 674 779
Victoria Mutinda	Kangundo	0738 254 262
John Mutisya	Machakos	0727 621 162
Veronica Wamiti	Murungaru	0727 168 770

Continued from page 3 Vaccinating chickens



happened. I woke up to learn that many of the birds in a batch of layers had died. On close observation and after calling a vet, I was told Newcastle disease had struck and with it 130 birds were dead in a single night! It was shocking to say the least, and very discouraging, not to mention the huge financial loss. The solution was to adhere to a strict vaccination regime and this proved to be a nightmare. Trying

to remember which vaccinations to give and at what date for each batch was simply exhausting but necessary.

Information on vaccinations important

Between day 1 and week 40, Layers require 10 vaccinations, between day 1 and week 18, kienyeji chickens require 8 vaccinations and between day 1 and 6 weeks broilers require 4 vaccinations! That is a lot of information to remember, especially if you are rearing flocks of chickens! Somehow I managed but the experience led me to develop the latest tool on the iCow platform specifically designed to make

poultry rearing less risky for farmers across the country.

New tool for information

The new tool is a series of chicken calendars, for kienyeji, layers and broiler chickens. By simply registering a flock on the Chicken Calendar for each breed of chickens, iCow will send SMS vaccination reminders according to the flock type and age and will also send information on best practices, diseases, and more.

The vaccination information will come one or two days in

advance giving farmers enough time to purchase the vaccine and administer the vaccination on time. It's so easy and so useful I am using it on my own chickens I recently started rearing again on a smaller scale for family consumption.

I have built a small net enclosure using cheap water pipes and shade netting to allow them to free range and protect them from the dogs and birds of prey. This also helps restrict them from spoiling my small vegetable garden. **Su Kahumbu**



For more on iCow simply dial *285# and have a browse through our menu of products designed to reduce every day risks we face in farming.



How to control nematodes in bananas

How can I control root knot nematodes in my banana plantation?

There are four major nematode species that affect bananas in Kenya namely Lesion nematodes (*Practylenchus goodeyi*), burrowing nematode (*Radopholus similis*), spiral nematode (*Helicotylenchus multicinctus*) and root knot nematodes (*Meloidogyne incognita*).

Adult nematodes are tiny worms (less than 1 mm long), which are not visible to the naked eye. They feed on the root and banana corms (the swollen part of the banana pseudostem at the base of the plant).

Nematodes feed on the root and the corm. They lay their eggs in the same region (around the root and the stem) where they take up to 30 days to mature. Infested suckers spread the pests especially during transplanting. Nematodes can also move from one plant to the other.



The white arrows show banana roots damaged by nematodes.

How to control nematodes

Crop rotation: One way farmers can control nematodes is through practicing crop rotation. Plant plants like sweet potatoes, which are not hosts for nematodes for at least 11/2 years to give the disease time to

clear. After this period bananas can then be planted.

Intercropping: Mixing bananas in the same field with other crops such as legumes (beans, soya, garden peas and groundnuts) helps to reduce nematodes and weevils.

Clean planting material: Nematodes and weevils are found mainly around the roots and corms of banana plants. To reduce them, farmers are advised to remove the roots and cut off the leaves (pare) the corms to a depth of 0.5cm. Any wounds (lesions) on the banana stem should also be cut off. In addition, the pared suckers and corms should be sterilised by:

- Immersing in hot water (54°C) for 20 minutes.
- Sterilizing in a solarium (glass house) at 54°C for 20 minutes.
- Dip in an appropriate biopesticide/nematicide solution for 24 hours.

Resistant varieties: There are a number of banana varieties that are genetically resistant to or tolerant to nematodes and weevils. Farmers can enquire from extension personnel or banana growers in their region on varieties that are not prone to damage by these pests.

Never use paraffin to control pests in your crops

Can I use paraffin oil to apply on crops affected by aphids? If so, how long will it take for the smell to disappear from the vegetables?

The use of synthetic products or chemicals is not allowed in organic farming. Organic farming is a holistic system that uses natural methods to produce healthy crops in a healthy environment. The use of products such as paraffin on food meant for human consumption is not allowed.

Making plant extracts

Aphids can be controlled using plant extracts, which you can easily prepare on the farm as follows:

Get 4 kg of different plants that have different insecticidal and nutritional benefits to the plants such as stinging nettles, neem, African marigold, Sodom's apple, tithonia, garlic, chilli, pyrethrum or lantana camara.

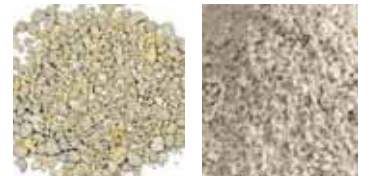


Preparation: Mix molasses and EM1 (these can be bought in any agro-veterinary shop). Add 5 litres of water. Dissolve bar soap into the solution. Chop up the plants into small pieces and put in a bucket. Fill the bucket with water to the brim and close completely to stop air from escaping. Let the mixture remain closed for 14 days. Filter the solution after the 14 days (use a piece of cloth to filter if using a knapsack to spray to stop the pieces from blocking the nozzles). Dilute it at the ratio of 1 litre of FPE to 100 litres of water.

Spraying: Organic plant extracts do not work in the same way as chemicals hence ensure you spray your crop up to three times a week. Do not wait until you see the aphids or any other pests to start spraying- do it continuously as a preventive measure. The plant extract will ensure your crop is protected from pests while remaining healthy as they have adequate nutrients.

The difference between rock phosphate and lime

Can I apply both rock phosphate and lime in my shamba at the same time?



The aim of using lime is to help reduce soil acidity in the soil. But Rock phosphate is a fertilizer that contains a lot of phosphorus and calcium alongside many other micronutrients that are good for the soil. Rock phosphate does not contain nitrogen- these can be supplemented by use of foliar sprays that contain nitrogen in order to balance the nutrients for the crops. However rock phosphate has the ability to reduce soil acidity, so it can be used for both purposes of reducing soil acidity and also as a fertilizer. Farmers using rock phosphate are also advised to add humic acid found in humates such as Earthlee®, Humax® or Black majik® (see page 4 and 5) at the rate of 500g for every bag of rock phosphate. This is due to the fact that rock phosphate is a slow release fertilizer which can take up to five years in the soil to break down completely to release nutrients for use by crops.

Effective Microorganisms

Apart from it being used in compost making, what are the other functions of EM?

The acronym EM stands for Effective Microorganisms. EM is a solution that contains beneficial bacteria which when applied

to crops acts as a growth activator. It makes the crops develop immunity against most of the diseases that are caused by bacteria and other fungi in the soil. EM has the added benefit of ensuring that the crops are able to take up most of the nutrients that are applied to the crops or those already in the soil. Farmer with small pieces of land can

maintain soil fertility and reduce frequency of crop rotations if they continuously use EM in plant extracts while reducing pests pressure during the crop growth phases.



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.

Push-pull technology improves food security for farmers

Musdalafa Lyaga | The rainy season has been with us for quite a while now. This is clear from the lush green vegetation in the farms. A woman walks around her small piece of land admiring the newly germinating maize seedlings. From the smile on her face it is clear that she is happy with the progress the new maize plantation is making.

"When my husband passed away in 1999 and left me with three children, I was so devastated," says Agnes Maureen Ambubi, who has increasingly become the face of Push-Pull farming system in Vihiga County. "After the death of my husband, I came to settle in this plot which my husband inherited from his parents in 2002 but it could hardly produce enough food to feed my family and we were almost reduced to begging," says the charming mother of three, who is now raising an orphan and a granddaughter.

Trained by *icipe*

Vihiga County is one of the most densely populated areas in Kenya. Food production has been especially hard hit by the culture of land sub-division to sons, which reduces arable land immensely.

Agnes first learnt of the push-pull technology from her neigh-



bours who were trained by staff from *icipe*, Mbita. "I decided to try the technology after seeing the drastic increase in yield in my neighbouring farmers' fields."

Mr. David Fritz who is the Head of Communication and Campaigns with Biovision-Foundation for Ecological Development is considering featuring her in a film documentary, which seeks to explain the impact of Push-Pull among small-scale farmers to the Swiss community. Agnes has come a long way to reap the benefits of the push-pull technology.

Late in the year 2002, she started a conventional push-pull plot. For the next 3 years she was amazed at the steady improvement in maize yields and improved soil fertility. After adopting the push-pull technol-

ogy, Agnes' yield increased from 35kg to 90kg of maize on her first harvest. This has since increased to 4 bags of maize every season, which has significantly improved her life and that of her family.

Educated her children

With the money from sale of maize, Agnes has educated her children. Her firstborn daughter has already graduated from college, while her second born a daughter is a beauty and hair instructor. Her third born child, a son, is an electrical engineer in Nairobi. She has also been constructed a house for family and ventured into both poultry and dairy farming.

"We have enough food throughout the year and I even sell the surplus dairy and poultry products. The push-pull technology has lifted me from poverty."

Communication promotes adoption of push-pull technology

Hudson Shiraku Were | Push-Pull was developed by Dr. Zeyeur Khan of *icipe* Mbita in collaboration with partners. The farming system has environmental and economical benefits for farmers.

Benefits

Desmodium acts as a cover crop that retains soil moisture and enhances soil fertility by fixing nitrogen. The desmodium, Napier grass or Brachiaria grass are a great source of animal fodder and have been proven to boost milk consumption when given to dairy cows.

The desmodium roots, as the intercropped plant, release chemicals which prevent Striga

weeds from attaching to the cereal weeds. At the same time the desmodium repels stemborers or drives them away (Push) from the main cereal crop like the maize. The stemborers are then attracted to lay eggs in grasses like the Napier grass (Pull), which are used as the trap plant around the cereal crop. After the stemborers lay their eggs on the Napier grass, it does not support their development hence most of the larvae do not mature.

Working with scientists

Farmers, scientists, media organizations, governmental and non-governmental organizations concerned with issues of food security are working together to

create awareness on Push-Pull technology. Many farmers from East Africa have adopted the technology.

Besides the adoption of the push-pull technology, the farmers also relay the challenges that they face to the scientists, which informs future research.

To help increase donor understanding, it has also been crucial to capture success stories and positive outcomes from push-pull farming systems.

Awareness creation

The Organic Farmer magazine and radio programmes help farmers understand and adopt the Push-Pull technology. TOFRadio is producing programme in which



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Farmer's Field Day: The Ngong Organic Farmers Association in collaboration with Kenya Organic Agriculture Network (KOAN), CSHEP and Mugima Education Centre invites all farmers groups/organizations/companies to a farmers' field day on 13th June 2014 from 8.30 a.m. to 6.00 p.m at Kiserian. Charges will be as follows: Farmers Ksh 50, Farmers' groups Ksh 500, individual exhibitors Ksh 2000, companies Ksh 10, 000, Ksh 10,000, banks Ksh 20,000, individuals Ksh 2,000. For bookings, contact Peter Kaipei Melonyie, NOFA- Chairman, 0722 614 583.

Kuroiler chicken wanted: I would like to buy Kuroiler chickens from farmers rearing them. Contact Robert Koskei 0722 751 059.

Chickens cages wanted: I would like to buy chicken cages. Is there any company selling them? Kindly contact Philomena Kaudo 0711 409 098.

Dairy goats wanted: Do you have hybrid Toggenburg goats, which are registered? I would like to order them. Call Alice Njonjo on 0704 771 130.

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

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

farmers will be interviewed on the benefits of the Push-Pull technology.

Different channels used in communication

To reach out to the young farmers TOF website (www.theorganicfarmermagazine.org) publishes and generates debates on the Push Pull technology among farmer networks. The video production unit will also be producing short films on the success stories of farmers who have benefitted from the push-pull technology which will be uploaded on The Organic Farmer website and Youtube. These videos will also be used for demonstration by the field officers. ■