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# Not all mosaics are lovely: Fighting cassava mosaic disease, cassava’s deadliest virus \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Notes to broadcaster**

Cassava mosaic disease (CMD) is the most important viral disease of cassava in Africa. The disease reduces the size of leaves and disfigures them. Leaves of infected plants have a green and yellow mosaic pattern. Infected plants produce small roots, especially if they are infected early in the season.

The disease is caused by a virus, and transmitted from infected to healthy plants by insects called whiteflies. It is commonly spread by planting infected cuttings. There is no chemical control for the disease.

To manage CMD:

* Choose planting materials from virus-free stem cuttings.
* Uproot and bury plants that show symptoms of CMD as soon as recognized.
* Plant resistant or tolerant varieties.
* Practice intercropping with leguminous crops to decrease whitefly populations.

In this script, we talk to farmers about the causes and symptoms of cassava mosaic disease. We also talk to a plant pathologist, who gives us essential tips on preventing and combating the disease.

You might choose to present this script as part of your regular farming program.

You could also use this script as research material, or as inspiration for creating your own programming on cassava disease problems or similar topics in your country.

Talk to farmers and experts who are growing cassava or are knowledgeable about the crop.

You might want to ask farmers:

Are you familiar with cassava mosaic disease?

Do you know how the disease is transmitted?

Do you know how you can prevent the disease from affecting your cassava crop?

And the experts:

Where can farmers get clean, disease-free cassava planting materials?

Estimated duration of the script, including intro and extro: 25 minutes.

**HOST:** Hello, my name is \_\_\_. Welcome to our program today.

 Today we will be talking about cassava mosaic disease in Nigeria. We will be speaking to cassava farmers from across the country about their experiences with the disease and how they managed it.

 In Nigeria, cassava is one of the most important food and cash crops. We produce close to a fifth of the world’s cassava each year—about 34 million tonnes. Cassava is a hardy crop that grows easily across the country, regardless of climate, and does not need a lot of care.

 To give you an idea of how easy it is to grow, when we studied agricultural science in school, it was cassava that we first grew, the idea being that even us city kids couldn’t mess it up.

 Cassava is truly a versatile crop, and can be used to produce industrial starch, ethanol, and cassava flour, amongst other products.

 Cassava mosaic disease could have a cataclysmic effect on cassava production in Nigeria. That’s why preventing it is of the utmost importance.

 But there is a lot of confusion about the disease. Most farmers don’t know how to prevent it, and are only aware of the symptoms after it’s too late.

 To learn more about the disease, we spoke to Dr. Elechi Asawalam. She is an Associate Professor at the Department of Plant Health Management at the Michael Okpara University of Agriculture in Umudike.

 Thank you for joining us, Doctor.

**Dr. Asawalam:** Thank you.

**Host:** Can you tell us what cassava mosaic disease is exactly?

**Dr. Asawalam:** Cassava mosaic disease is a serious viral disease that affects cassava. It is caused by a virus which is transmitted by the whitefly, which has the scientific name, *Bemisia tabaci*. It can also be spread through cuttings from infected plants.

 It is a very serious disease, in fact the most serious viral disease that affects cassava. Losses of yield range from 20%-90%, depending on the variety and the stage of crop growth at infection. In fact, we are only about 20 years removed from the worst ever cassava pandemic, which affected production across Nigeria, the DRC, Uganda, and other parts of East Africa.

**Host:** Which stage of the plant is most vulnerable?

**Dr. Asawalam:** Cassava is most vulnerable at the vegetative stage, the early stage when the leaf of the plant is still forming and growing.

**Host:** So it affects the leaves?

**Dr. Asawalam:** Yes. Even though cassava is a root crop, the disease affects the leaves.

**Host:** What are the symptoms of the disease?

**Dr. Asawalam:** The **s**ymptoms of African cassava mosaic virus disease are characteristic mosaic patterns on the leaves. There will be leaf deformation, or distortion of the shape of the leaves. Some parts of the leaves may be chlorotic, that is, yellowing.

 There can also be reduction in the size of the leaflets. The large cassava leaves consist of seven leaflets. In severe cases. you really don’t get any smooth leaves on an infected plant.

**Host:** So there is a raised pattern on the leaf?

**Dr. Asawalam:** The normal shape of the leaf is distorted, and you see this mosaic pattern. You also see pale yellow patterns, and small flecks or spots on the leaflet, in addition to the leaflets being smaller.

**Host:** How does that kill the plant? Is it because the mosaic pattern prevents the plant from doing photosynthesis?

**Dr. Asawalam:** Definitely! When the leaves are affected, it reduces the capacity of the plant to photosynthesize, and eventually the yields will be reduced. Because it affects plants at the vegetative stage, yield losses are high.

**Host:** Earlier, you said that the virus is transmitted by the whitefly. Does it transmit the disease by eating cassava leaves?

**Dr. Asawalam:** The whitefly is actually one of the major insect pests of cassava. We have other insect pests like the cassava green mite, but the whitefly is the vector that transmits the cassava mosaic virus.

 The adult whitefly attacks the undersides of the young leaves. Whiteflies are less active in the early mornings, and you can actually see them on the leaves then.

 The whiteflies suck the sap from the leaves with their piercing and sucking mouthparts. When they suck the sap from the leaves, this does not really cause any physical damage to the plant. But, as the whitefly feeds, it injects the plant with the virus which causes cassava mosaic disease.

**Host:** Okay! Like how a mosquito passes the malaria parasite into our blood when it bites us.

**Dr. Asawalam:** Exactly! Exactly!!

**Host:** So when a plant is infected, can it infect other nearby plants?

**Dr. Asawalam:** Yes, the plant can infect other plants, which is why we always advocate immediately removing the diseased plant once you notice it. If you don’t, the infection can spread and infect other plants in the field. And that can lead to a considerable yield loss, as high as 90-95%.

**Host:** How is the virus transmitted from plant to plant?

**Dr. Asawalam:** The whitefly doesn’t just stay on one plant. Also, it doesn’t naturally carry the virus; instead, it ingests it by feeding on infected plants. So when the whitefly feeds on infected plants or cuttings, and the plants are not immediately removed, it can then infect neighbouring healthy plants.

**Host:** Thank you, Doctor.

Dr. Asawalam will be back later in the program to tell us how to combat and prevent cassava mosaic disease. But first, let’s talk to a few farmers about their experiences with CMD.

 We have with us Mr. Afolabi Akintonde, a cassava farmer from Lagos. Hello, Mr. Akintonde, welcome to the program.

**Afolabi Akintonde:** Thank you.

**Host:** The purpose of this interview is to talk about cassava mosaic disease. But before we start, please tell us a little about yourself, and your experiences in growing cassava.

**Afolabi Akintonde:** Well, my name is Afolabi Akintonde. I am the Secretary of the National Cassava Growers Association in Lagos State**.**

**Host:** What made you get into cassava?

**Afolabi Akintonde:** I have always been interested in farming, ever since I was an adolescent. My father was a farmer, although he was into animal husbandry.

 I have been farming cassava for three years now, since 2013. Before cassava, I raised animals—cattle, sheep and goats, pigs, and poultry. You might say I am a complete farmer!

 Cassava is the crop I grow, though; cassava and a bit of watermelon on the side.

 My farm is in Oke-Ogan, which is in Ogun State. But I still live in Lagos, so I commute a lot to go and check it out.

**Host:** How have your experiences been so far?

**Afolabi Akintonde:** It was hard going at first. I headed a group of farmers to that site. The land is near a river basin. so we had good irrigation facilities, and so it is good for dry season farming.

 Things are a lot better now; we’ve certainly come a long way.

**Host:** What of cassava mosaic virus? Have you had any experiences with it in your three years of farming?

**Afolabi Akintonde:** Yes. We experienced it a bit. Because some of the other farmers in our group got discouraged, we could not properly manage the farm.

 I feel that this difficulty in managing the farm led to some of our plants being infected with the virus. We had areas that became overgrown with weeds and were hosts to rodents and other vectors.

**Host:** So how did you fight it?

**Afolabi Akintonde:** Well, you know, as the name implies, CMD is a viral disease. When we started noticing it on the farm, we first tried to use herbicides to contain it. We thought it was the weeds that were the cause.

 When that didn’t work effectively, we decided to isolate the part of the farm that had the disease. We uprooted the infected plants and burnt them so the virus would not spread to other plants.

 Burning the plants meant that whiteflies couldn’t continue to transmit the virus from an infected plant to a healthy plant.

**Host:** Thank you, Mr. Akintonde.

We’ll be talking with two more farmers, and then we will welcome back Dr. Asawalam to talk about how to combat CMD.

 Ezekiel Sammy experienced the disease a few years ago on his farm in eastern Nigeria’s Cross River State. Let’s hear about it.

**EZEKIEL SAMMY:** Hello, my name is Ezekiel Sammy.

**HOST:** Hello, Mr. Sammy. Can you tell us about your farm?

**EZEKIEL SAMMY:** We grew cassava. My farm was not all that small; it’s moderately-sized. A lot of people do farming as a side business, but it was my main source of income at the time.

**HOST:** Tell us about your experience with cassava mosaic disease.

**EZEKIEL SAMMY:** There was a time I noticed that the cassava wasn’t growing. The leaves were folding and I noticed a lot of flying insects both on top and on the bottom of the leaves. They were also on the stem. The insects were like flies but white. They looked powdery on the stems.

**HOST:** How did the leaves look?

**EZEKIEL SAMMY:** The leaf changed colour. It was whitish and dusty. The stem as well.

**HOST:** Was your harvest affected?

**EZEKIEL SAMMY:** Not so much the first time. We saw it in time and started to combat the insects quickly. But the second time, we didn’t notice it as quickly, and it affected the cassava. When we harvested it and peeled it, we saw a brownish pattern on the root. Brown lines and discolouration.

**HOST:** Was the size affected?

**EZEKIEL SAMMY:** Not really. The soil was good, so the cassava grew like normal, only that brown discolouration. One of my neighbours didn’t get it in time, though, and his didn’t grow the way it was supposed to grow. When it was time for harvest, he got a minimal amount of cassava.

**HOST:** Did you burn the infected crops?

**EZEKIEL SAMMY:** No, we didn’t. Once we drove the insects away, we felt we were ok.

**HOST:** You mentioned you combated the whiteflies. How did you do this?

**EZEKIEL SAMMY:** A friend of mine introduced me to ash.

**HOST:** Ash?

**EZEKIEL SAMMY:** Yes. Charcoal or firewood ash. We sprinkled it on the leaves and stems early in the morning or in the evening. We replaced it every two or three days and it really worked in removing the insects.

**HOST:** Thank you, Mr. Sammy. Before we talk to Dr. Asawalam again, we have one more farmer’s experience with cassava mosaic disease. We welcome Mr. Joogi Tor to the show.

**JOOGI TOR:** Thank you!

**HOST:** Before we start, please tell me a bit about your farm.

**JOOGI TOR:** Well, I first started farming a while back with poultry before getting into crop farming: maize, soya bean, and cassava. The maize and soya bean farm is in the north, in Kaduna State, and my cassava farm is in Benue State.

**HOST:** You said you experienced the disease. Tell us what happened.

**JOOGI TOR:** We got some species of new and improved cassava. At least that’s what we were told. We planted it, and all seemed fine. But when it was midway to maturity, we noticed that the leaves were folding themselves and they were almost yellow, as if they were about to fall off. We didn’t know what was going on, so we went to the local health science shop. They just gave us some plant nutrients to apply to fertilizer and spread, and said that maybe the soil wasn’t that good so the plants weren’t growing well. They told us that the extra nutrients could help the cassava plants grow better.

**HOST:** Did that do anything?

**JOOGI TOR:** No, nothing happened. We were really lost as to what to do. It affected the cassava. The yield was very poor and the stems were not good for replanting.

**HOST:** Did you know it was a disease of the plant?

**JOOGI TOR:** Not right then. It was long after when somebody told us that it was a disease, that the stems might be infected with cassava mosaic. We were shocked because we got the stems from a seller who told us that it was a new and improved variety.

**HOST:** Did you notice any insects on the stems or leaves?

**JOOGI TOR:** Honestly, we didn’t pay attention at the time, but yes, I remember there were some insects on them. I wasn’t looking on a daily basis, so I can’t say how bad it was.

**HOST:** Do you think you would know what to do if it happened again?

**JOOGI TOR:** You see,the problem is that we do not have enough information. There are not enough extension officers or workers around farmers in our state, so we lack the tools to properly combat this disease. When it happens, we just take it as bad luck or an act of God.

It didn’t just happen once, it happened twice to me, and both times I was a bit helpless. All we could do is not use the stems again. We thought they were defective. Talking to you now is the first time I ever heard that insects might be the cause. So if it was to happen again, I would look at it differently.

**HOST:** So you just got rid of the stems?

**JOOGI TOR:** Yes. We didn’t know any other way. We just hoped for the best. In the olden days you could go to your local government and get this information, but now we are just flailing about in ignorance.

**HOST:** Thank you, Mr. Tor. As the program draws to a close, we’d like to welcome back Dr. Elechi Asawalam to tell us how we can combat and prevent cassava mosaic virus on our farms.

**Dr. Asawalam:** Thank you.

**Host:** So, doctor, what advice do you have for farmers out there?

**Dr. Asawalam:** There are so many preventive measures. Sanitation is one of them. Sanitation means that you have to remove all infected plants and other plants that attract whiteflies so they don’t affect the healthy plants in the field, or even neighbouring farms. This removal is known as roguing.

 Another method for curbing the spread of the virus is to use virus-free stem cuttings for all new plantings. Make sure that the stem cutting is virus-free.

 Intercropping is also a very useful tool. As you know, cassava is a root and tuber. But you can plant another crop in between the cassava—a legume like cowpea or mung bean. This will actually decrease the whitefly population.

 Try to time your plantings. Avoid planting when the whitefly is most abundant. The farmer needs to avoid exposing vulnerable young plants to the risk of infection when whiteflies are most abundant.

 There are synthetic or chemical insecticides, but I would not really recommend them as they are hazardous to the environment. However, there are now biopesticides, or pesticides made from plants. Our local medicinal plant extracts like neem, scent leaf (*Ocimum gratissimum)*, ginger, bitterleaf, and many more can be extracted and sprayed in the field as a natural insecticide for the whiteflies. They have been proved to kill whiteflies.

 You can also plant hedgerows and strips of plants like mucuna, also called velvet bean, in between the cassava plants, which helps create barriers to whiteflies.

**Host:** Thank you so much, Doctor.

 Well, there you have it. It seems like the easiest way to prevent cassava mosaic virus is to be vigilant and conscientious on the farm.

 Watch out for diseased plants. If you notice your leaves are curling or turning white or yellow, you should immediately take action, and cull or rogue the affected plants before they infect the rest of your crop. You can do this by burying or burning.

 Also, keep the farm well-maintained, and combat any insect infestations and your cassava yields will not be too adversely affected. And lastly, always plant clean, disease-free stem cuttings.

 That’s all for today. I hope you all learned a lot; I most certainly did.

## Acknowledgements

Contributed by: Ted Phido, The Write Note Limited, Lagos, Nigeria

Reviewed by: Dr. Elechi Asawalam, Associate Professor, Department of Plant Health Management, Michael Okpara University of Agriculture, Umudike

**Sources of information**

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