# 

# Pack 115, Item

Type: Interview

2020

# \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Managing pests in stored cowpeas**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

### Notes to broadcaster

In Burkina Faso, more than 500,000 tonnes of cowpea (*Vigna unguiculata*) are produced each year. Two hundred thousand tonnes of this production are consumed while the other three hundred thousand tonnes are exported. However, farmers have enormous problems producing and storing cowpea, which is very rich in protein and is as popular with pests as it is with people.

In this radio script, three people—a farmer, a researcher, and an extension worker—talk about the scale of insects that prey on cowpea and the techniques used to manage these pests.

This script is based on actual interviews. You could use it as inspiration to research and write a script on a similar topic in your area. Or you might choose to produce this script on your station, using voice actors to represent the speakers. If so, please make sure to tell your audience at the beginning of the program that the voices are those of actors, not the original people involved in the interviews.

You could also use the script as guidance and seek out interviewees representing the different players in the cowpea value chain.

If you create your own programs on pest management in cowpea, talk to farmers, extension workers, and other pest management specialists in your area. You might ask them:

What are the major pest management challenges with cowpea in the field and in storage? Have some local farmers found solutions to these challenges?

What services are available to help farmers succeed with pest management?

The estimated running time for this item, with signature tune, intro, and extro, is 20 minutes

## HOST: Ernest Tibiri is a farmer in the village of Passakongo near Dédougou in western Burkina Faso. He grows maize, millet, sorghum, and cowpea. But Ernest encounters a lot of difficulties producing and storing his cowpea.

## Ernest, what is the crop protection situation in recent years in general and with regard to cowpea in particular?

## TIBIRI: It is very critical. In the last two years, there have been many attacks by armyworms. With cowpea, you can see pests like insects and caterpillars from the flowering stage and the formation of pods.

## HOST: Is this a problem you've experienced in the past?

## TIBIRI: No, I can say we've only been experiencing it in recent years. Ten years ago we didn't have this problem.

## HOST: Once you notice that the bean field is infested, what do you do?

## TIBIRI: Before, we used to treat the field with several types of commercial pesticides. But two years ago, we received training on treating pests with organic products.

## HOST: How does the treatment work?

## TIBIRI: We prepare the products with powders made from neem leaves and seeds. We also buy organic products such as *piol* from the market (*Editor’s note: Piol is a substance that contains extras of chili pepper, organic and garlic which repels insects*).

## HOST: Can you explain how you make the organic products?

## TIBIRI: For the product made from neem leaf powder, we take the fresh leaves and crush them. We then dry them to obtain the powder. We put the powder in water and we add chili pepper and onion powder.

## HOST: How long does it take to make?

## TIBIRI: We leave the mixture for at least 24 hours and then strain it. We add soap before processing. The soap helps to fix the product so that it lasts for a long time on the leaves of the plants. To make the product made from the powder of miner's seeds, we use the same procedure.

**HOST:** What crops do you treat with this product?

**TIBIRI:** Mainly cowpea and sesame.

**HOST:** How well does this treatment work?

**TIBIRI:** The results are good. We used it last year

and this year and it's effective.

## HOST: After the harvest, do you have pest problems?

## TIBIRI: The problem we have after the harvest is even more serious. If you store cowpea without proper measures, you lose all your production.

## HOST: How do you store it properly?

## TIBIRI: We haven’t been using jars and drums. We use triple-layer bags. These are bags with two impermeable liners on the inside that prevent air and moisture from penetrating the bag.

## HOST: Which locally-inspired organic products do you use?

## TIBIRI: We use wild herbs called *soukona* in the local language, Dioula. The scientific name is *Hyptis suaveolens*. And also *diiza*, whose scientific name is *Lantara camara*. These are plants that emit strong, repulsive odours and are used to preserve agricultural products and in homes against mosquitoes. We collect these wild herbs and dry and pound them to get powder. We put layers of this powder between piles of bean seeds in a container. We use either a barrel or any plastic container with a lid. The effect of the product and the fact that the seeds are in an airtight environment explains the effectiveness of this method,

## HOST: Is this storage technique effective?

## TIBIRI: It is effective if we use the right dose of the product. But you have to carefully watch the stored product. We must check some time later to make sure the cowpea is not infested and readjust the treatment, if necessary. Otherwise, it usually works. And the advantage is that even two weeks after the treatment, you can consume the beans. There is no danger to health.

## HOST: You don't use chemicals for storage?

## TIBIRI: No. We don't use chemicals because of the danger to human health. We only use organic products and triple-layer bags.

## HOST: What are the losses if the beans are not well-preserved, for example, in 20 100kg bags?

## TIBIRI: Heeeeee!!!! You lose all 20 bags. If one bag is infested, all the bags will be infested.

## HOST: Bakassa Koné is an agricultural extension worker at the Regional Directorate of Agriculture in Boucle du Mouhoun, in western Burkina Faso. Working with male and female farmers, he is familiar with the concern about pest insects in cowpea.

## How widespread is the impact of pests on cowpea?

## Bakassa Koné: Cowpea is a plant that is greatly threatened by insect pests, from the field through to conservation. Pests such as aphids and Mylabris species (*Editor's note: a type of beetle*) cause damage at the emergence and flowering stages and even during pod formation.

## HOST: What are the other predators found in the post-harvest period?

## Bakassa Koné: Following the harvest, insects such as cowpea weevils, with the scientific name *Callosobruchus maculatus*, and caterpillars attack the seeds or lay their eggs on seeds, which will be infested during storage. If no action is taken, the entire production is lost.

## HOST: And what are the measures to preserve the cowpea?

## BAKASSA KONÉ: When harvesting, the cowpea seeds must be thoroughly removed and cleaned to eliminate all impurities. They must then be dried to get rid of any moisture that can cause growth of mould. To preserve it, we recommend putting the cowpea in triple-layered bags. This is a bag designed by research and is composed of two waterproof bags and an ordinary bag.

**HOST:** What are the traditional cowpea storage techniques?

**BAKASSA KONE:** They involve mixing the seeds with ashes and closing the container tightly. The ash not only helps to suffocate the pest larvae, but also have a neutralizing action because it contains potash. The neutralizing action kills insects or makes them harmless. There are also farmers who keep their cowpeas in sand. This is relatively airtight, which reduces pest infestation and decomposition. These practices are effective, but can only preserve small quantities.

## HOST: Dr. Antoine Wango is an entomologist at the Central Laboratory of Agricultural Entomology of the Institute of Environment and Agricultural Research, INERA in Ouagadougou. This institute initiated the triple-layered bag.

## From what the farmers say, these beans are very much under attack by pests. Is it true that they are highly prized and if so, why?

## Antoine Wango: There is an extremely high incidence of pests on beans from the seedling to the post-harvest stage. This is due to the fact that we are dealing with a plant that is extremely rich in protein. And just like humans, insects also like anything that is good. So it's not surprising that there are a lot of insect pests on cowpea.

## HOST: How many insect pests do we have on the bean?

## ANTOINE WANGO: There are mainly three types: insects of vegetative growth represented mainly by aphids, of which the most fearsome species is the aphid, also called *beng karensé* in the local Mooré language, and whose scientific name is *Aphis craccivora*. The insect sucks the sap from leaves and causes stunting of the plant and deformation of the leaves. This is worse during drought, and the extent of damage depends on the severity of the drought and the resistance of different cowpea varieties to diseases which are carried by the aphids.

## HOST: What are the other two types of insects?

## ANTOINE WANGO: The two other types of bean pests are insects that attack the flowers and pods.

## The main ones are, first, the flower thrips or *Megalurothrips sjostedti*. These insects cause the flowers to fall and become deformed. Secondly, there is a group of pod-sucking bugs, the most important of which is called *beng vunuvuugu* in the local Mooré language, and also *Clavigralla tomentosicollis*. It sucks the sap from the pods and causes them to dry out. Finally, the pod-boring moth or cowpea butterfly, known as *pilipikou* in Mooré, and also called *Maruca vitrata*. It causes considerable damage by developing in flower buds, flowers, stems, and pods.

## HOST: What products do you recommend for treating these bean pests in the field?

## Antoine Wango: You should know that we don't have any organic products for treating cowpea in the field. But chemical products are used to treat the pests. Two treatments are recommended during the life cycle, at a rate of half a litre per hectare.

**HOST:** How do you rate organic treatment and storage products?

**ANTOINE WANGO:** Essentially, they are plant extracts that farmers prepare

and mix with cereals to preserve them. They are effective; however, they can only be used to preserve a small amount of cowpea. Researchers draw inspiration from these indigenous solutions and would like to improve them for large-scale use.

**HOST:** When is the treatment done?

## Antoine Wango: The first treatment is done when the flower buds begin

## to form. This treatment is necessary if the farmer is to effectively manage pests. However, these products have shown variable effectiveness, depending on the environment and strict adherence to the principles of use. But there is a commercial pesticide that gives good results and we advise farmers to use it to treat beans. The second treatment is applied at pod formation. Treatment with the same products is also necessary at this time.

## HOST: We notice that harvested beans that are well-dried and bagged are still destroyed by insect pests. How can this happen?

## ANTOINE WANGO: In the field, the insect, the cowpea weevil, lays its eggs on the pods of mature beans. When you harvest the bean, it is apparently healthy, but studies have shown that immediately after harvest, 5% of the beans carry the eggs or larvae of this insect pest. Farmers are often surprised to find that their safe products are destroyed. They even think that the bean generates its own pests since they didn’t notice any insects when they stored them.

## HOST: How is the bean safe from insects when properly packed in jerry cans?

## ANTOINE WANGO: It's simple. Like us, insects are living beings. With hermetic devices that exclude air, there is no exchange with the outside environment. In the same way that you lock up bean seeds, you also lock up insect larvae, which end up asphyxiating due to the lack of oxygen.

## HOST: What is scientific research doing to control these cowpea pests?

## ANTOINE WANGO: First of all, you have to have a seed that has germinating power. To do this, the seeds must be well-preserved. For conservation, there are chemicals and appropriate conservation techniques.

## HOST: Which chemicals?

## Antoine Wango: I am very cautious about naming the chemicals simply because most of our producers can neither read nor write. If they are not properly advised on how to use chemicals, it can be dangerous for human health. Butwe have four chemicals that are registered for use in storage. But they are mainly reserved for large storage warehouses where you can be sure that the instructions for use will be complied with.

## HOST: Aren't there any organic products that you would recommend to farmers?

## ANTOINE WANGO: No, at the level of the Sahelian Committee for Pesticides, there are no organic products registered for storing beans and other foods. But there are people who are increasingly promoting organic products on the market for in-field treatment and post-harvest storage. On the other hand, the farmers themselves used organic techniques to store their produce and continue to do so to this day.

## HOST: Which ones?

## Antoine Wango: These are plant extracts that they mix with the bean seeds and which act as an insect repellent. These plant extracts are effective, but there are limitations in the ability of large-scale farmers to produce them. These plants are well known in farming circles and are scientifically referred to as *Lantara camara*; *Hyptis suaveolens,* and *Cleome viscosa*. Research has even drawn on these experiences and knowledge to develop techniques and manufacture products for controlling insect pests. For example, the triple-layered bag was developed scientifically because hermetic or airtight storage was found to work on the farm.

## HOST: Tell us about this triple-layered bag?

## ANTOINE WANGO: They are still called PICS bags. It's a technology that was developed by our laboratory. These bags were designed by researchers from INERA and researchers from Purdue University in the United States to effectively preserve products, especially beans. It’s a revolutionary technology based on the principle of hermetic or airtight storage of foods.

## HOST: Please describe this triple-layered bag.

## ANTOINE WANGO: The triple-layered bag is composed of three elements: two internal and impermeable high-density containers and an outer bag. It should be noted that the bag comes with all three layers. You don't have to look for one bag and two inner containers to make the triple-layered bag.

## HOST: How do you use it to store beans well?

## Antoine Wango: The bean seeds are put in a container that is inserted into a second sachet and the whole thing is inserted into the outer bag. After you shake well to eliminate air pockets and once the bag is full, it is tied with a rubber band, not sewn, because the seam could leave holes for air to penetrate. Three rubbers strings are needed because the three parts of the bag are attached separately.

## HOST: Is there a recommended place to store the bag?

## ANTOINE WANGO: Yes, you must avoid places where the bag could be pierced and above all, do not place it on the floor or against the wall to avoid humidity, termites, and rodents. It is recommended to place it in a raised area such as pallet platforms or bricks.

## HOST: Can the bag be used several times?

## ANTOINE WANGO: Yes, as many times as you want, but each time, check that the inner containers are watertight.

## HOST: How effective is this triple-layered bag?

## ANTOINE WANGO: With triple-layered bags, you can store beans and many other crops for six months to a year without any problem. There are even examples of storage for more than four years with PICS bags. When the technology is properly used, I guarantee its effectiveness.

## HOST: Is it accessible?

## ANTOINE WANGO: A hundred-kilogram bag costs one thousand two hundred CFA francs (about US $2.17) and a fifty-kilogram bag around eight hundred CFA francs (about US $1.44). The triple-layered bag has been popularized in more than five thousand villages in Burkina Faso. Farmers are aware of its effectiveness.

**HOST:** We are at the end of our interview with our guest speakers from the agricultural world. Cowpeas are sensitive to pests that attack them up to the storage phase. With our guests, we talked about the extent of this problem and the techniques and products for treating these pests. Regarding storage, we learned from farmer Ernest Tibiri how to treat beans with organic products obtained from local plants. Farmers also use the principle of hermetic or airtight storage, which consists of not allowing the passage of air from the outside into the bean's storage container, thereby suffocating the insects that destroy their crops. This principle used by farmers has been improved by researchers who invented the triple-layered bag that our researcher Antoine Wango described in this program. Thank you for your constant attention.

## Acknowledgements

Contributed by: Harouna Sana, journalist specializing in agricultural and environmental issues

Reviewed by: Abdel Wahab Sawadogo, Head of the Plant Health Surveillance and Interventions Department at the Directorate of Plant Protection and Conditioning (DPVC)/MAAH

**Sources of information:**

Interviews:

Dr. Antoine Wango, INERA, Institut de l’environnement et de recherche agricole, December 2019

Bakassa Koné, Agriculture technician, Regional Directorate of Agriculture, Boucle du Mouhoun Region, December 16, 2019

Ernest Tibiri, farmer, Passakongo, Mouhoun Province, December 19, 2019

Dabat, M-H et al, 2012. La culture du niébé au Burkina Faso : une voie d'adaptation de la petite agriculture à son environnement ? *Autrepart* 2012/3, #62, pages 95 à 114. https://www.cairn.info/revue-autrepart-2012-3-page-95.htm

*This resource was produced with the support of the Government of Canada through Global Affairs Canada.*