

Small Yams, Big Deal

Yams are a big deal to tens of millions in dozens of countries. Available year-round, it's a reliable food source, especially for the poor in tropical regions.

Yams are rich in vitamin C, potassium, vitamin B6, manganese, starch and dietary fibre, and contain little saturated fat and sodium, therefore protecting against osteoporosis and heart disease. 90% of the world's yams are produced in West and Central Africa. There are more than 150 different types of yam, which have different textures, starch quality, colours and sizes.

The *Dioscorea esculenta*, or Chinese Yam as it's called in Ghana, is one of the smallest varieties still in existence. The Chinese Yam is quite tasty and slightly sweet. But it's becoming extinct in Ghana, having fallen out of favour with farmers who have chosen to plant high yielding nonindigenous crops. It's also being affected by the destruction of natural ecosystems, as well as socio-economic changes.



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(Photo: S.Henriques/IAEA)

But with 150 yam varieties, I asked the Ghanaian researchers why they are trying to save this undersized yam from extinction? The answer: crops farmed large scale for profit (commercial agriculture) are all similar because they need to conform to the needs of the market; flowering at the right time of year, growing to a certain height and yielding a predictable amount.

That conformity ensures profitability: if plants develop at different times of the year or are too short for mechanical harvesting or yield too little, farming becomes inefficient and too cost-intensive.

Since commercial crops are so similar genetically, a disease that decimates one variety is likely to destroy all the others as well. Wild varieties on the other hand, like the Chinese yam, contain a wealth of genetic diversity, about 95% more diversity than high yielding commercially farmed varieties.

So when the agricultural sector is faced with diseases or pests that threaten the survival of their high yielding crops, researchers can sift through wild/less commercial varieties to find genes that can be incorporated into farmed varieties to give them the necessary disease resistance.

While modern commercial agriculture has many advantages, its spread threatens the survival of many wild or original plant genetic resources like Chinese Yams that are vital for present and future agricultural development. But, I asked, if the wild varieties are so robust and versatile, why try to alter Chinese Yams?

Scientists believe that if there were fewer, but larger tubers on each root (the size of sweet potatoes for example), Chinese Yams would be more attractive to consumers in Ghana and in neighbouring African countries.

That's what researchers like Kenneth Danso at the University of Ghana are using radiation to achieve. "We're exploring radiation-induced mutation because it has the potential to add traits of interest without changing the entire genome of the plant, while marginally increasing the tuber sizes and decreasing the number of tubers per vine," says Danso.

But, I wanted to know, how will Danso and his colleagues convince smallholder farmers and consumers to become interested in Chinese Yams again?

"I hope that farmers will start planting Chinese Yams again if we can make them bigger and therefore more profitable," says Danso. "There are still many years of research to undertake before we can tackle that problem. First we have to figure out how to improve the yams, then we can work on marketing."

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