

Protecting crops through nanotechnology in Southeast Asia

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First used by Alliance of Bioversity and CIAT scientists to detect COVID-19 in Colombia, nanopore technology can also analyze the spread of plant viruses.
Credit: Alliance of Bioversity International and CIAT / E. Ramirez

In a recent breakthrough, DNA sequencing technology has uncovered

the culprit behind cassava witches' broom disease: the fungus genus *Ceratobasidium*. The cutting-edge nanopore technology used for this discovery was first developed to track the COVID-19 virus in Colombia, but is equally suited to identifying and reducing the spread of plant viruses.

The findings, [published](#) in *Scientific Reports*, will help plant pathologists in Laos, Cambodia, Vietnam and Thailand protect farmers' valued [cassava](#) harvest.

"In Southeast Asia, most [smallholder farmers](#) rely on cassava. Its starch-rich roots form the basis of an industry that supports millions of producers. In the past decade, however, cassava witches' broom disease has stunted plants, reducing harvests to levels that barely permit affected farmers to make a living," said Wilmer Cuellar, Senior Scientist at the Alliance of Bioversity and CIAT.



Farmers and agricultural extension agents are trying to identify and stop cassava witches' broom disease before it stunts harvests across Southeast Asia. Credit: Alliance of Bioversity and CIAT / A. Galeon



Plant pathologists based in Vientiane, Laos, have identified the root cause of cassava witches' broom disease. Credit: Alliance of Bioversity and CIAT / A. Galeon

Since 2017, researchers at the Alliance of Bioversity International and CIAT have incorporated nanotechnology into their research, specifically through the Oxford Nanopore DNA/RNA sequencing technology. This advanced tool provides insight into the deeper mysteries of plant life, accurately identifying pathogens such as viruses, bacteria and fungi that affect crops.

"When you find out which pathogen is present in a crop, you can implement an appropriate diagnostic method, search for [resistant varieties](#) and integrate that diagnosis into variety selection processes,"

said Ana Maria Leiva, Senior Researcher at the Alliance.

Nanotechnology, in essence, is the bridge between what we see and what we can barely imagine. This innovation opens a window into the microscopic world of plant life and pathogens, redefining the way we understand and combat diseases that affect crops.

More information: Ana M. Leiva et al, *Ceratobasidium* sp. is associated with cassava witches' broom disease, a re-emerging threat to cassava cultivation in Southeast Asia, *Scientific Reports* (2023). [DOI: 10.1038/s41598-023-49735-5](https://doi.org/10.1038/s41598-023-49735-5)

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