

Topic 1. Epidemiology and Ecology

Oral presentation

Mitigating Cassava Virus Pandemics in an increasingly Connected Global Environment: Lessons from the last 30 Years

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Viruses have a long history of association with cassava, but virus disease epidemics have only been recorded relatively recently. In the late 1980s, unusually severe cassava mosaic disease (CMD), caused by cassava mosaic begomoviruses, was first reported in Uganda. This was later recognized as the first report of a devastating pandemic of severe CMD that subsequently spread to affect more than 3 million sq km in 12 African countries. Cassava brown streak disease (CBSD), recognized for many years as being confined to coastal East Africa and the shores of Lake Malawi, began to spread to mid-altitude regions of East and Central Africa from 2004. It now affects 11 countries and continues to advance westwards. Most recently, four countries in South-east Asia are experiencing rapid spread of CMD, following a stepping-stone invasion of the disease from South Asia. These pandemics have generated increasing levels of research interest over time, and there have been major achievements in mitigating their impacts. In this overview of progress in advancing understanding and management of these pandemics, some of the key insights have been as follows: (i) Ecology and characteristics of viral pathogens, their vectors and interactions with the cassava host are complex, and therefore necessitate fundamental research; (ii) There are important differences in the distribution and epidemiological characteristics of virus strains, species and mixed virus infections, and patterns of spread vary greatly depending on the relative importance of vector- vs. cutting-borne infection; (iii) Increased intensity of cassava cultivation and the greater interconnectedness of countries and regions heightens the risk of cassava virus spread; (iv) Rapid surveillance is essential, and new ICT tools are greatly improving the speed and coverage of surveillance programmes; (v) Establishing and maintaining 'clean seed systems' is critical to effective cassava virus pandemic management; (vi) Conventional approaches have been highly effective in developing host plant resistance, but are slow; and (vii) Global collaboration has strengthened over the last 30 years, and must be sustained if the negative impacts of current and potential future pandemics are to be overcome effectively.