

## **A first survey on plant virus infections of African nightshade from small farms in Western Kenya**

Juliane Langer<sup>°</sup>, Lucie Aba Toumnou<sup>\*</sup>, Benard Mukoye<sup>\*\*</sup>, Susanne von Bargen<sup>°</sup>, Martina Bandte<sup>°</sup>, Christian Ulrichs<sup>+</sup>, Waceke Wanjohi<sup>\*\*\*</sup>, Carmen Büttner<sup>°</sup>

A first survey on plant viruses in African nightshade was carried out in small farms of Western Kenya. Food security and income generation of subsistence and semi-commercial farmers in African countries is one of the world's key challenges. In this context, diverse abiotic and biotic stresses affect the productivity of protein-, fat- or vitamin-packed vegetables. Among biotic factors, viral diseases of vegetables gain considerable negative economic impact by compromising plant health, thereby affecting both yield and quality. In developing countries farming practices are usually smaller in scale and of lower input cost. Traditional growing of self-produced seeds, often due to inaccessibility of certified seed, and also growing of traditional, unimproved varieties increases the risk of infection.

Virus disease management measures available are often poorly adapted to technological and educational standards of local agriculture. Concerted efforts to develop a sustainable integrated pest and disease management are therefore of high priority, furthering the sustainable production of healthy vegetables. Detection of viral pathogens at initial stages of infection is a critical element in local disease management. Furthermore, routine diagnostics are important tools in large scale virus testing and also in the production of virus-free planting and propagation material.

The objective of this study is to get an overview on the potential incidence of virus infections in African nightshade. In this regard different farms in Kenya were surveyed for visual inspection of their Nightshade crops in Uasin Gishu, Bungoma and Kakamega counties which are the major African nightshade producing areas in Kenya. Fresh material of indigenous/traditional African nightshade varieties (*Solanum scabrum*, *Solanum villosum*, *Solanum nigrum*, and *Solanum americanum*) as well as self-produced seeds were taken and investigated. Laboratory analyses to identify viral pathogens in African nightshade comprise mechanical transmission to different indicator plant species and ELISA techniques to test for putative infections with *Cucumber mosaic virus* (CMV), *Tobacco mosaic virus*, *Tomato mosaic virus*, *Tomato spotted wilt virus*, *Tomato yellow leaf curl virus*, and potyviruses, known to be economically important pathogens of a wide range of crops in Africa. Nightshade was sampled and tested from a total of 23 different farms. Plant material of 10 farms was mixed infected with CMV and potyviruses. In sampled material of six farms only potyvirus infection was detected, and of one farm only CMV. Singly in plant material originated from six farms no virus infection was detected. Six seed charges of different farms were tested for germination rate, plant development and potential virus infection. Seeds showed diverse germination rates, ranging from 4-58% 14 days after sowing in the green house and up to 72-92% after 26 days. Plant development was observed for 20 seedlings per seed provenance for a total of seven weeks. Two charges had a weaker performance. Virus typical symptoms were not observed on seedlings, even though CMV was detected in two charges by DAS-ELISA.

<sup>°</sup> Humboldt-Universität zu Berlin, Division Phytomedicine, Lentzeallee 55-57, 14195 Berlin

<sup>+</sup>Humboldt-Universität zu Berlin, Urban Plant Ecophysiology, Lentzeallee 55-57, 14195 Berlin

<sup>\*</sup>Crop production and protection, University of Bangui, Central African Republic,

<sup>\*\*</sup>Biological Sciences Department, Masinde Muliro University of Science and Technology (MMUST), P.O. Box 190 - 50100, KAKAMEGA, Kenya

<sup>\*\*</sup>School of Agriculture and Enterprise Development, Kenyatta University, P.O.Box 43844 – 00100, NAIROBI, KENYA