A first survey on plant viruses in African Nightshade of small farms in Western Kenya

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Introduction

Among biotic disease factors, viral infections of vegetables gain considerable negative economic impact by compromising plant health, thereby affecting both yield and quality. In Kenya, African Nightshade (*Solanum scabrum*, *Solanum villosum*, *Solanum nigrum*, and *Solanum americanum*) is one of various indigenous vegetables increasingly becoming a popular staple food in the diet of local people.

Fig. A: *Solanum nigrum*; B: *Solanum americanum* ; C: *Solanum scabrum*

Different levels of crop management

Main issue

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, contributing to sustainable production of healthy vegetables. Detection of viral pathogens at initial stages of infection is a critical element in local disease management. Furthermore, routine diagnosis is an important tool in large scale virus testing and also in the production of virus-free planting and propagation material.

Objective of this study

A first survey on the potential incidence of virus infections in African Nightshade was carried out in 28 small farms in Uasin Gishu, Bungoma and Kakamega counties in Western Kenya. These regions represent the major African nightshade producing areas.

After visual inspection of Nightshade crops, fresh material of the predominant variety *Solanum villosum* as well as self-produced seeds were sampled and investigated. Diagnostic tools to identify viral pathogens comprised mechanical transmission to different indicator plant species and ELISA techniques to detect putative infections with *Cucumber mosaic virus* (CMV), *Tobacco mosaic virus* (TMV), *Tomato mosaic virus* (ToMV), *Tomato spotted wilt virus* (TSWV), *Tomato yellow leaf curl virus* (TYLCV), and potyviruses, known to be of economic impact in a wide range of crops in Africa.

Active discussions and interviews with Kenyan farmers about crop management and plant protection.

Main conclusion: there is only little knowledge and notion about plant viruses and their control

Different Nightshade varieties with virus-suspected symptoms. Incidence of virus-symptomatic crops was generally high in most farms.

Farm No.	CMV	ToMV	TMV	TSWV	TYLCV	Potyvirus
1						
3						
5						
6						
6						
7						
8						
8						
9						
11						
11						
14						
15						
15						
16						
16						
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26						
27						
28						
28						

Tab.1 (left)**:** From a total of 23 different farms, one or two representative samples of Nightshade plants with and without virus-suspected symptoms were taken and tested for putative virus infections by DAS-ELISA (CMV, ToMV), TAS-ELISA (TSWV, TYLCV) and ACP-ELISA (potyvirus).

Tab.2 (below)**:** From a total of six different farms, self-grown seed samples were taken and tested for putative virus infections (CMV, ToMV, TSWV, TYLCV, potyviruses) and germination performance.

Seed provenance	Average germination rate in % (d after sowing) 2 replications with 25 seeds		Plant development	Virus detection by ELISA
	14 d	26 d		
Farm 5	40	82	vigorous	CMV
Farm 7	58	92	vigorous	
Farm 8	36	90	moderate	
Farm 9	4	72	good	
Farm 10	18	82	good	CMV
Farm 16	48	74	moderate	

Most farmers use self-produced uncertified seed. Some plant viruses are seed-borne, like CMV which was detected in two out of six tested seed provenances from surveyes farms (Tab. 2).

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