

Salvaging Tomato Production in Kenya from the Menace of Pest and Diseases. The case of– Tuta Absoluta and Fusarium wilt root-knot nematode complex.

Why tomato?

Tomato is one of the most important vegetables grown in Kenya. It plays a critical role in income generation and creation of employment for both rural and urban populations, in addition to meeting food nutritional requirements. Tomato is a nutritious vegetable that provides good quantities of vitamins A and C. Tomatoes are used in many cooking recipes or as a fresh item in combination with salads. Tomatoes are grown for the domestic market under both rain-fed and irrigated conditions. Due to the high demand for tomato, farmers have extensively adopted high yielding varieties and modern technologies like greenhouse production to ensure year round increased production. Commercial farming of this important crop is however under immense threat from pests and disease, mainly Fusarium wilt, Nematode complex and the Tuta absoluta (tomato leafminer). Some farmers have reported yield losses of up-to 80-100 % per growing season.

Tuta absoluta



*Plate 1: Tuta absoluta pest; Image II: Tuta absoluta destruction on crop
Images courtesy of Koppert*

Tuta absoluta commonly known as the tomato leaf-miner, is a very harmful leaf mining moth with a strong preference for tomatoes. Measuring a mere 7mm, this invasive pest is considered a serious threat to tomato production worldwide. It also occurs on eggplants, sweet peppers as well as potatoes and various other cultivated plants. Tuta absoluta can cause 50-100% yield reduction on tomato crops and its presence may also limit the export of the product to several destinations. Prevention and proper management of the pest is crucial. Chemical control often fails due to the resistance of the pest against many pesticides, but also because a big part of its development takes place inside the plant or the soil, out of reach of pesticides.

Fusarium wilt



Plate I. Images of tomato plant affected by fusarium wilt

Fusarium wilt is one of the major diseases of tomato in Kenya. Fusarium wilt in tomatoes is caused by a fungus which is soil borne and can survive indefinitely without any host. Most occurrences are associated with infected tomato debris left in the soil. An infected tomato will begin yellowing on the bottom leaves. The yellowing will begin on one side of the leaf, shoot, or branch and then slowly spread out and up the vine. The vines will brown along the veins and eventually wilt permanently, resulting in a stunted plant. If the plant does not die, it will be weak and produce low quality tomatoes. Fusarium wilt can survive for years in the soil and is spread by water, insects and garden equipment. It develops during hot weather and is most destructive when soil temperatures approach 27°C. Dry weather and low soil moisture encourage this plant disease. In spite of the high tomato losses associated with Fusarium wilt its control is limited to use of fungicides which are unaffordable by the many poor resource Kenyan farmers. There is therefore need to seek alternative control measures that can be attractive to a poor resource farmer.

Root-knot nematodes



*Plate II. Image of root nematodes
Image courtesy of Infonet Biovision*

In Kenya root-knot nematodes are widely spread in all tomato growing areas and hence are a major concern to both smallholder farmers and commercial producers. Losses in yields range from 28% to 68%. The small-scale farmers fail to recognize nematodes because they are found in the soil and their above ground symptoms can be mistaken for nutrient deficiencies and climatic changes especially drought. Root knot nematodes survive by feeding directly off nutrients pumped through tomato roots. They form galls that can reach up to an inch wide where they hide and reproduce, causing a number of symptoms on the plant. Yellowing plants, stunted growth and general decline are early symptoms of the disease. Their microscopic size make it difficult to identify them and farmers are required to dig up the crop to check on the presence of root-knots which is not a common practice. Prevention against nematodes is difficult because nematodes cannot be eradicated completely from the field.

“As new trends emerge, Kenyan farmers in the future will have to innovate continuously in order to remain competitive; the farmers will need to respond to the permanent pressure on margins, professionalism, increase demand and face growers in abroad countries with excellent farming techniques (Koppert).”

It is against this backdrop that *Dr. George M. Kariuki, a senior lecturer in the Department of Agriculture Science and Technology, Kenyatta University* partnered with Koppert Biological Systems Kenya and Koppert BV Netherlands in a project to tackle the two greatest threats to tomato farming - Tuta absoluta and Fusarium wilt-Nematode complex. The project titled Development, Validation and Dissemination of Integrated Pest Management Packages for Tomato Leafminer (Tuta absoluta) and Fusarium Wilt-root Knot Nematode Complex affecting Tomato Production in Kenya, aims to improve tomato production in the peri-urban tropics through development, validation and dissemination of IPM strategies that are effective, sustainable and adoptable to combat these menaces for tomato within smallholder farms in Kenya. The project seeks to enhance and facilitate knowledge exchange and dissemination whilst building the capacity of farmers, agricultural extension officers and other stakeholders. The projects expected outputs are to publish catalogues and papers on diversity and identity of Tuta absoluta and Fusarium wilt-Nematode complex, develop sustainable management of Tuta absoluta and Fusarium wilt-Nematode complex within smallholder farms, increase capacity and knowledge for agricultural practitioners in integrated pest management which will improve the overall production of tomatoes in Kenya.



Plate IV: Dr. George Kariuki, a Senior Lecturer and current Chairman, Department of Agricultural Science and Technology addressing the participants during the project inception workshop held on 11th September 2015 at Jacaranda Hotel Westlands.

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