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Invasive alien species threat to Kenya

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Anoplolepis gracilipes (yellow crazy ant) adults—just one species the scientists say should be monitored. Credit: John Tann/via wikipedia—CC BY 2.0

CABI has led research which prioritizes 120 potential Invasive Alien Species (IAS) that could pose a threat to agriculture and biodiversity in Kenya.

From the initial assessment, the study, published in the journal *Biological Invasions*, drew up a list of 21 arthropods, nine nematodes and 20 pathogenetic species which the scientists say should be risk assessed and monitored to help minimize their impact on key crops.

The scientists ranked the IAS in order of likelihood of entry, magnitude of socio-economic impact and impact on biodiversity.

In the last decade, Kenya has been particularly affected by new introductions of invasive plant pests which damage cultivated crops. In 2011, for example, a new disease of maize—later identified as Maize Lethal Necrosis Disease (MLND), was reported in the Bomet and Naivasha districts of the country.

Other destructive invasive plant pests include the tomato leaf miner (Pthorimaea absoluta), potato cyst nematodes, the fall armyworm (Spodoptera frugiperda) and papaya mealybug (Paracoccus marginatus).

De Groote et al. (2020), for example, demonstrated that fall armyworm caused losses of about a third of the annual maize production in Kenya.

Invasive ants are also considered to have a serious effect on biodiversity worldwide. Two ants in the assessment had a high score for their potential impact on biodiversity, yellow crazy ant (Anoplolepis gracilipes) and Argentine ant (Linepithema humile).

The research, which used the premium version of the horizon scanning tool included in CABI's Crop Protection Compendium (CPC), suggests that the IAS are most likely to arrive in a variety of ways.

This includes natural dispersal especially for many arthropods, arrival on a commodity in case of seed-borne pests, with vectors which can disperse naturally in case of viruses and viroids, and as hitchhikers in

case of soil-borne pests which could be intentionally or unintentionally introduced with soil.

In respect of the top three prioritized arthropods, the scientists say that silverleaf whitefly (Bemisia tabaci (MEAM1)), peace fruit fly (Bactrocera zonata) and the yellow crazy ant pose the greatest risk and require further mitigating action. This includes further molecular analysis for B. tabaci, a full pest risk analysis and surveillance for B. zonata and a prevention and early detection program for A. gracilipes.

In terms of nematode species, groundnut testa nematode (Aphelenchoides arachidis), peanut pod nematode (Ditylenchus africanus) and potato tuber nematode (Ditylenchus destructor) present the highest threat and, in all cases, a full pest risk analysis and surveillance is recommended.

Finally, regarding pathogenic species, citrus canker (Xanthomonas citri), Ceratocystis blight (Ceratocystis fimbriata) and bacterial stalk rot of maize (Dickeya zeae) are the three main risks that require either a survey and/or full pest risk assessment.

Dr. Joseph Mulema, Senior Scientist, Research, based at CABI's Regional Center for Africa, is lead author of the research. He said, "Kenya has prioritized a number of value chains under the Agricultural Sector Transformation and Growth Strategy, 2019–2029 as key to improving livelihoods and supporting economic growth.

"Therefore, species which could affect the prioritized value chains are appropriate targets for conducting a full pest risk analysis. The outcome of the analysis will advise implementation of import controls and the preparation of contingency plans.

"By prioritizing risks, horizon scanning guides resource allocation to

interventions that are most likely to reduce risk and is very useful to National Plant Protection Organizations and other relevant stakeholders."

Since the research was conducted in 2018, four pest species have since been found to be present in Kenya. These include two arthropods (red gum lerp psyllid and the spotted wing drosophila) and two pathogenic organisms (the bacterial species, P. parmentieri and the viroid, potato spindle tuber viroid).

The scientists say that the results in their latest research should, therefore, be reviewed regularly in light of new information that may arise. They suggest that part of the outcome of a horizon scanning process could be the systematic monitoring of information sources to detect possible changes to risk, which can be recorded in a plant health risk register.

"Given the practicality of the approach and the widespread lack of pest prioritization in SSA, we propose that the approach reported here could benefit many other countries on the continent if adopted," Dr. Mulema added.