



The State of Soybean in Africa: Soybean Pests

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USAID's Feed the Future Lab for Soybean Value Chain Research, aka the Soybean Innovation Lab (SIL), is a research for development project begun in 2013. The team of 45 US researchers work in 17 countries, most of which are in Sub-Saharan Africa. The University of Illinois is the lead institution, accompanied by the University of Missouri and Mississippi State University. Recently, farmdoc asked SIL to provide a series of articles describing the state of soybean development in Sub-Saharan Africa. This series of articles describes the current state of soybean in Africa from the multiple disciplines that comprise the Soybean Innovation Lab. Peter Goldsmith is the Principal Investigator at the Soybean Innovation Lab. Feel free to reach out to Amy Karagiannakis at the Soybean Innovation Lab at soybeaninnovationlab@illinois.edu for more information on any of the topics, or if you would like to collaborate with the team.

A list of all articles published in the series can be found at:
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Soybean pests attack at any growth stage from the seedling through to harvest and can be especially severe from flowering to plant maturity. The pests reduce quality and yields of soybean. Soybean pests cause damage through direct feeding thereby exposing plants to attack by other pathogens and indirectly by transmission of viruses and other pathogens (Heinrichs and Muniappan, 2018).

The expected increase in soybean production in Africa will likely lead to increase in occurrence of soybean pests. Soybean pests are likely to be introduced through trade of grain, exchange of breeding materials across the globe, and by natural means like water and wind. Although soybean pests have not been sufficiently investigated in Africa, a few common pests have been identified. Of the soybean pests occurring in Africa, pod borers are among the major pests due to their wide host range. For instance, in cowpea the lima bean pod borer (*Maruca vitrata*) and the pod borer (*Helicoverpa armigera*) feed on the

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flower buds, flowers and pods resulting to yield losses of between 20 and 80% (Sharma, 1998). Biological control of *Maruca vitrata* has been successful in controlling the damage it causes on cowpea (Tamo et al., 1997).

Soybean stem flies also known as soybean stem miner (*Melanagromyza sojae*) is a common pest in Africa especially in Egypt (Arnemann et al., 2016, Abdallah et al., 2014). Ovipositioning occurs on the undersides of leaves after which yellow maggots emerge and mine through the leaf extending towards the leaf petiole into the stem. This damages the vascular tissues leading to plant wilting and reduced soybean yield (Heinrichs and Muniappan, 2018).

Stink bugs feed on pods and seeds affecting seed germination, quality and may lead to pod distortion. The pods eventually detach from the plant. The southern green stinkbug (*Nezara viridula*) is native to Ethiopia and apart from soybean, the pest is known to cause damage to more than 50 host plants (Heinrichs and Muniappan, 2018). Yield losses ranging from 25% to 60% have been recorded in Nigeria (Jacaki et al., 1988). The bugs inject toxins into pods and seeds leading to necrosis. The affected pods are shriveled and the seeds are discolored. Damage by this pest can cause low seed oil content (Heinrichs and Muniappan, 2018).

Green semilooper (*Thysanoplusia orichalcea*) larvae that has a distinct looping pattern, feeds on the underside of the leaves causing widow like feeding patterns. The larvae prefer feeding on the lower canopy. Severe infestation causes defoliation of the whole plant (Gau and Mogalapu, 2018).

The groundnut leaf miner (*Aproaerema modicella*) is a fairly new important pest of soybeans in Uganda. The pest, also known as webworm was first observed on soybean in Uganda in 2011 (Namara et al., 2019). The pest was earlier observed on soybean in South Africa in 2001 (du Plessis, 2002). The larvae mine the leaf midrib (Fig. 1), the leaves become brown, roll down (Fig. 1) and eventually drop off. Losses of more than 50% have been reported on groundnut (Cugala et al., 2010). Yield losses on soybean range from 37 to 65% in Uganda (Namara et al., 2019). Moderately resistant exotic varieties and two commercial lines have been identified among the 160 genotypes that were tested in Uganda (Namara, 2015).

Bruchid beetles (*Callosobruchus* spp.) are the most common storage pests of legumes. The pest lays eggs on pods before harvest and carry over into storage. The larva feeds within a single seed excavating chambers as it grows. The damage affects seed quality and germination. Damage on soybean seeds by adzuki bean weevil (*Callosobruchus chinensis*) has been reported in Uganda (Msiska et al., 2018).

Plant parasitic nematodes have been identified as important pests of soybean in Africa (Fourie et al., 2015). More than 48 nematode species comprising about 18 genera have been associated with soybeans in South Africa. The root-knot nematodes on soybean cause the most damage resulting to yield losses ranging from 25-70% (Fourie et al., 2015). Nematodes produce numerous galls on soybean roots due to feeding and laying of eggs. The infected plants become stunted, yellowish and wilt (Lima et al., 2017). More studies are required to investigate the effect of the nematodes on the other soybean growing areas in Africa.

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