

## HAFL Master's Thesis Abstract

Year: 2018

Student's Name: Timon Bässler

English Title:

Interactions between the invasive fall armyworm *Spodoptera frugiperda* (J. E. Smith) and important maize and sorghum pests in eastern Uganda

English Summary:

The fall armyworm *Spodoptera frugiperda* (J.E. Smith) is known from North and South America as one of the most devastating maize pests, and it also causes damage to other economically important crops. Although the fall armyworm is endemic to the tropical and subtropical regions of the Americas, it invaded Africa in the spring of 2016 and is already infesting Gramineae plants such as maize and sorghum in 44 African countries.

The fall armyworm was first sighted in Uganda in 2017. Prior to its arrival, stem borers (*Busseola fusca*, *Chilo partellus*) and the weed *Striga hermontica* were the main causes of large crop losses in maize. In sorghum, this pest complex is supplemented by the shoot fly (*Atherigona soccata*). The fall armyworm and stem borers, which both prefer maize to sorghum, compete for the same ecological niche.

This study investigates the new interactions in the pest complex of maize and sorghum caused by the recent arrival of the fall armyworm. For this purpose, three sorghum and three maize fields were cultivated in each of five districts in eastern Uganda during the short rain season (Sept to Nov). The plants were examined for damage by the three insects, as well as for signs of parasitisation by *Striga*, at three points in time: their vegetative phase (after 6 weeks), at the beginning of the reproductive phase (after 9 weeks), and at harvest (after 16 weeks).

It was found that the fall armyworm caused the most damage during the vegetative phase and infested significantly more maize than sorghum plants. Conversely, damage by stem borers increased over time and was focused significantly more on sorghum. Interestingly, both insects preferred to infest plants parasitised by *Striga*, possibly because parasitisation suppresses certain mechanisms that the plant employs to defend itself against insect attacks. It was also shown that fall armyworm and stem borers avoid sorghum plants injured by the shoot fly, but if these plants produce large tillers in response to shoot fly damage, this has an attractive effect on the fall armyworm and stem borers. With regard to the yield, no conclusive explanation could be formulated as to which of the various pests provokes the most yield-effective damage.

These findings show that the fall armyworm brings new dynamics to the pest composition of maize and sorghum, and displaces stem borers from their preferred maize to sorghum.

Original Title:

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*Keywords:*

Fall armyworm, maize, sorghum, pest complex, Uganda, insect-plant interactions, competitive displacement

*Principal advisor:*

Dr Christoph Studer