

IsDB scholars' information

- **IsDB scholar:**
 - Name: Inoussa SANANE
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- **Home institute:**
 - Name: Direction of plant protection of the Agriculture Ministry of Burkina Faso
 - Address:
- **Host institute:**
 - Name: University of Paris-Saclay
 - Address: Espace Technologique Bat. Discovery - RD 128, 2e ét, 91190 Saint-Aubin
- **IsDB scholarship :**
 - Type of IsDB scholarship: PhD
 - Year awarded: 2017
 - Year ended: 2020
- **Research work**
 - **Title:** Components of the dynamics of interaction between maize and Lepidoptera stem borers
 - **Summary:**

Damages caused by maize stem borers like the corn borer *Ostrinia nubilalis* Hbn can engender considerable yield reductions. A way to reduce the damages is to select resistant or tolerant maize varieties. I set-up an original high-throughput and non-destructive method to screen maize varieties for the feeding of young insect larvae. It consists of monitoring the feeding of single larvae on fresh maize leaf disks and using the consumption speed as a proxy for the level of plant defenses. I showed that larvae exhibit variable feeding behaviours, and developed a statistical method to establish a typology of feeding behaviours, with graduation between the fast and full consumption of the leaf disk and the absence of consumption. Each maize variety can be reproductively characterized by the frequency of each feeding behaviour. The method was validated by studying the variations of feeding behaviours in response to different concentrations of a known antifeedant molecule and applied on different datasets. First, I compared early and late maize genotypes resulting from a divergent selection experiment for flowering time. I showed that the genotypes that differed the most for flowering time and that descended, through selection and selfing, from the inbred line MBS, also showed important differences concerning both feeding behaviours, larvae prevalence in the field, and the quality of plant cell walls. Early MBS genotypes are consumed faster in the feeding test, show a higher larvae prevalence in the field, and exhibit softer

green parts than late genotypes from the same ancestor line. Those results strongly suggest the existence of a trade-off between growth and defense. Finally, the consumption test was applied to a diversity panel of 18 maize inbred lines, already described for a series of traits linked to plant physiology and metabolism. I showed that the panel lines exhibited a large genetic variability for the feeding behaviour of corn-borer larvae and identified metabolic characteristics of the inbred lines that correlate with the variation of feeding behaviours. Altogether, those results open the way for a better-understanding of plant-insect relationships.

- Scientific significance:
The new device for larvae feeding bioassays test (<https://doi.org/10.1101/2020.08.02.232256>) can be used to characterize larvae feeding behaviour or to identify plants resistant to insects.
- Economic and development significance for your country and IsDB member countries: This new tool can be useful in selection programs.

- **Suggestions for improving IsDB-postdoctoral fellowships programme**

- **Future plan**

Provide us with your professional plan when you return to your country

- First return in Direction of plant protection of the Agriculture Ministry
- Look for lecturer or researcher position in Burkina Faso.

- **Photos**

The photos file are available until 5 November 2020 on this link:

<https://transfert.u-psud.fr/jve2b>:

- **Short Video clip**

Summarize your research work and its significance ...to be included in our TV channel