

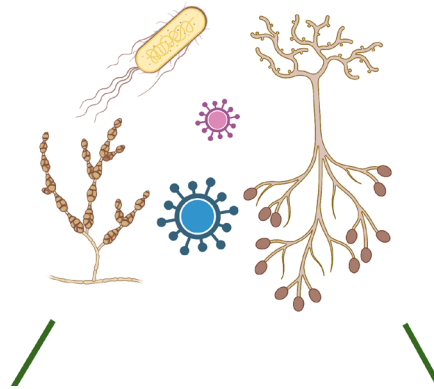
Plant Pathology & Epidemiology Program

Yuan Zeng

Assistant Professor of Plant Pathology

Extension Specialist

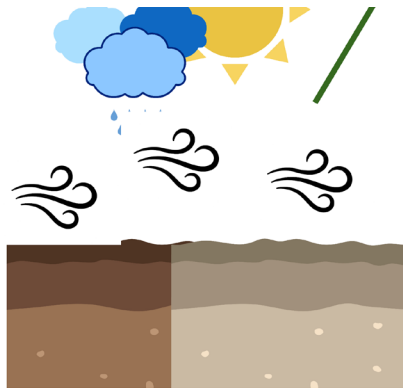
PATHOGEN



Pathogen Biology

My lab integrates the latest technologies to address applied and basic questions in plant pathology to help growers optimize their profits while maintaining a sustainable agriculture

Microenvironment



CONDUCTIVE ENVIRONMENT



Host resistance

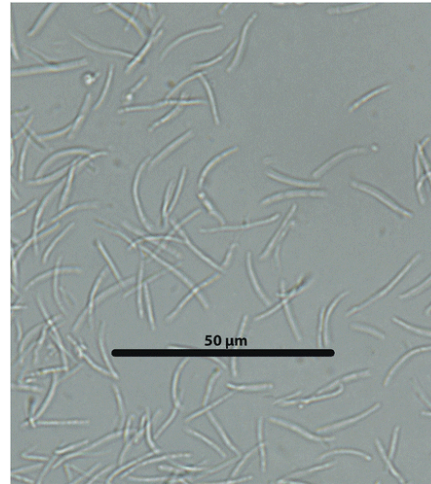
HOST

Tar spot

- Caused by the obligate fungal pathogen *Phyllachora maydis*
- Host: corn only
- Symptoms: “stromata” – dark brown to black glossy structures
“fisheye lesions” – brown, elliptical necrotic halos around stromata
- Corn grain yield losses: up to 50% (Latin America); 25 to 30% (Midwest U.S.)
can be 100% (susceptible hybrid + conducive environment)



P. maydis sexual spores



P. maydis asexual spores

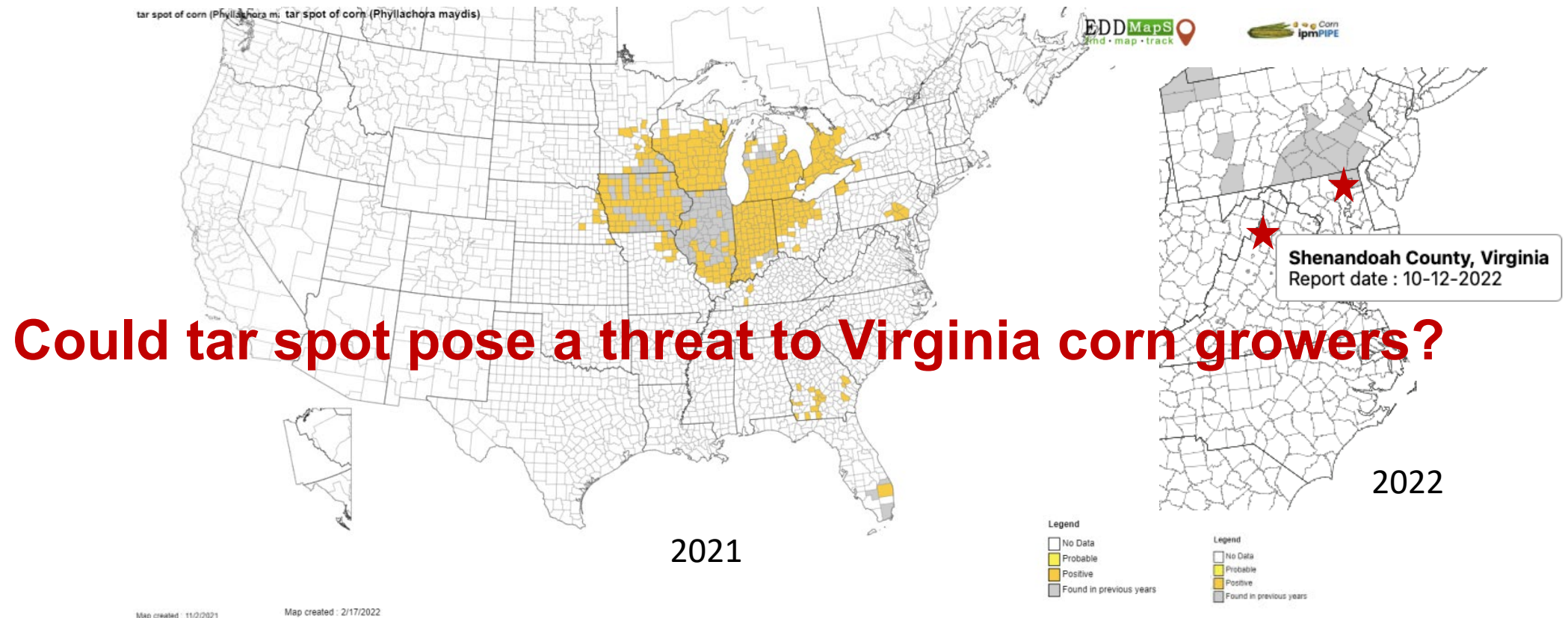


Semicircular “stromata”



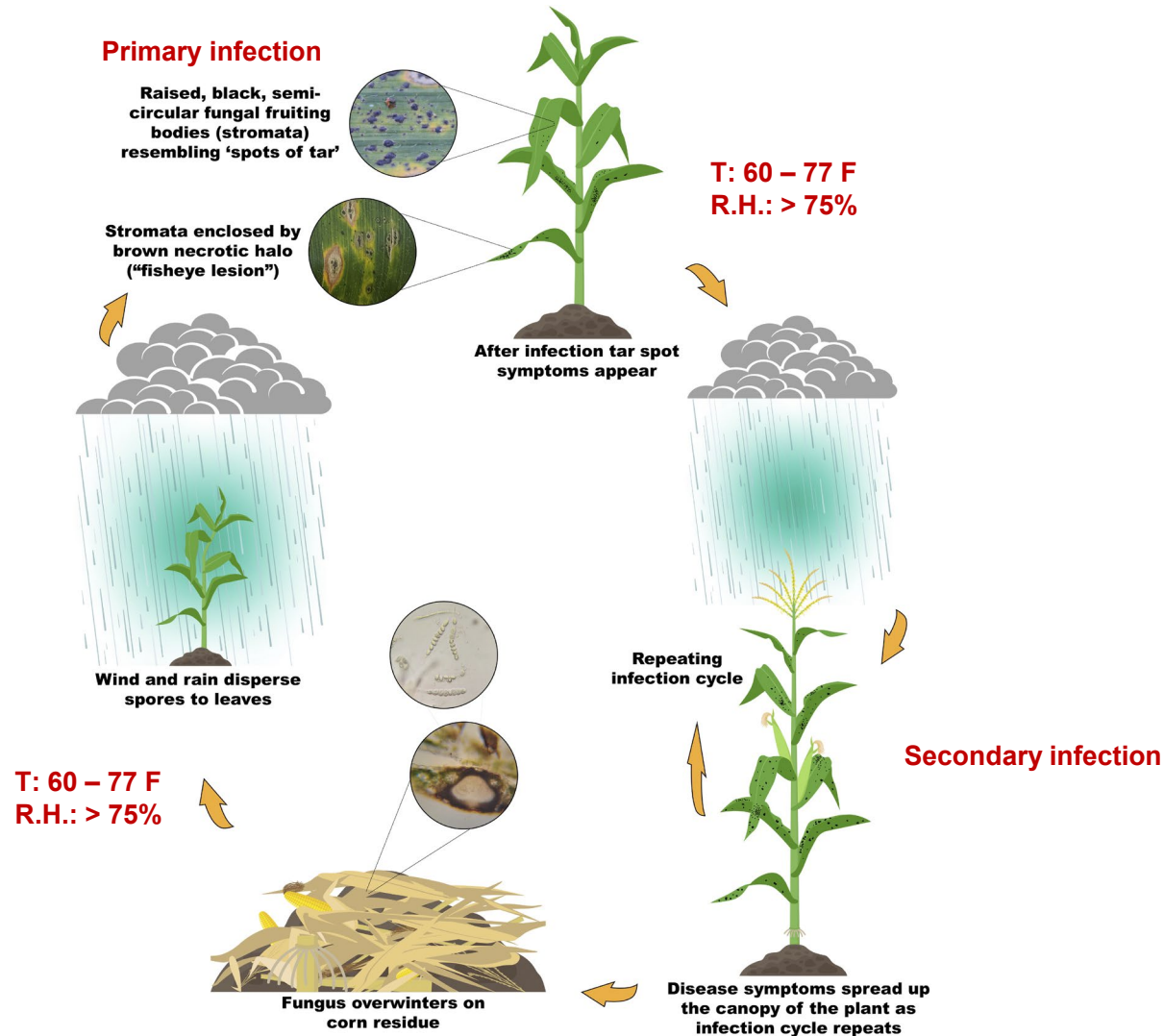
Fisheye lesions

Tar spot



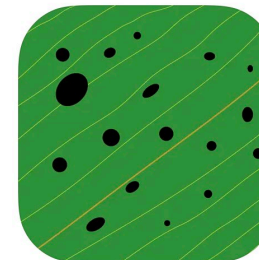
“every 1 % increase in tar spot severity resulted in an estimated 21.5 to 91.5 kg/ha loss”

Tar spot – disease cycle



Valle-Torres et al. 2020, Plant Disease

- Overwinter in plant debris.
- Ascospores germinate when the temperature is 60 – 70 F and the relative humidity is > 75% (**primary inoculum**).
- Wind, rain and irrigation water disperse spores and help them locate a "live" host (**primary infection occurs**).
- New ascospores are produced in stromata (**secondary inoculum**). When there is a conducive environment, the disease will continue spreading.



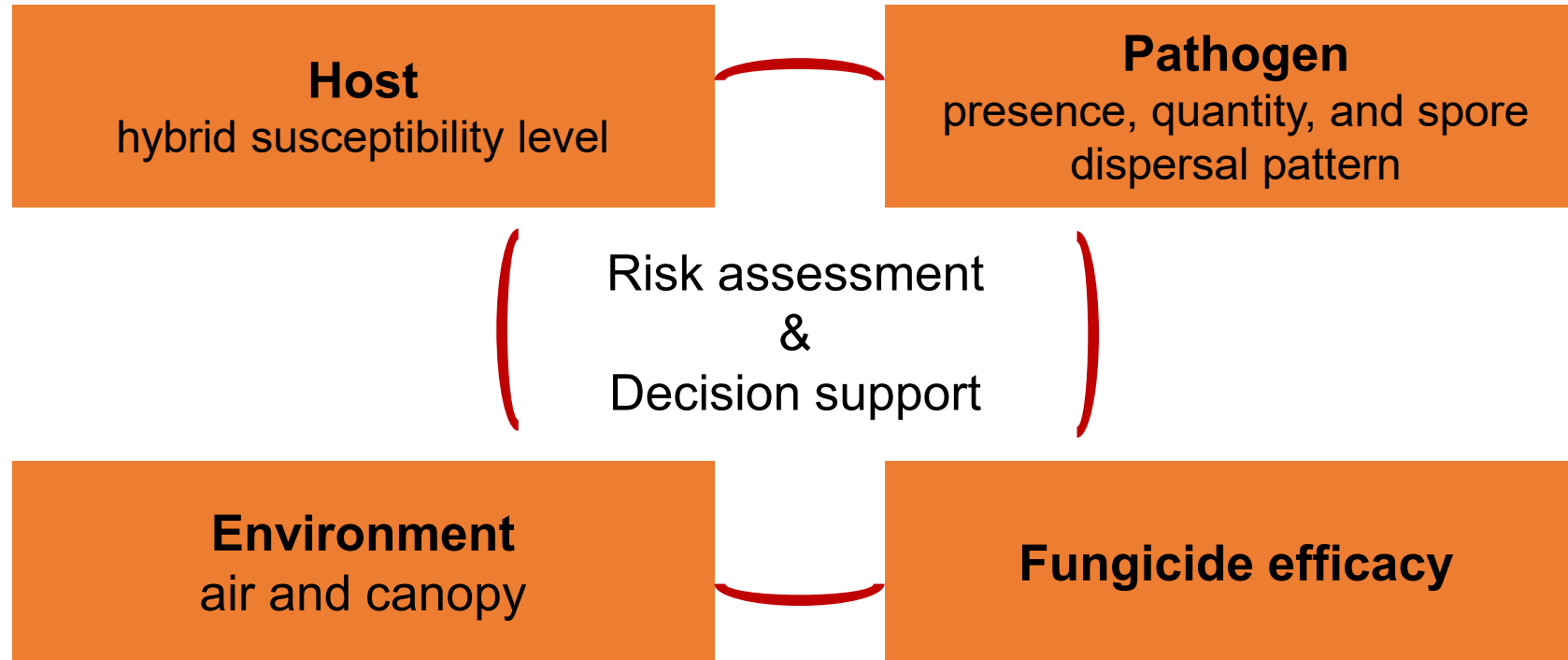
Tarspotter 4+
Tar spot of Corn Forecas
University of Wisconsin I
Free



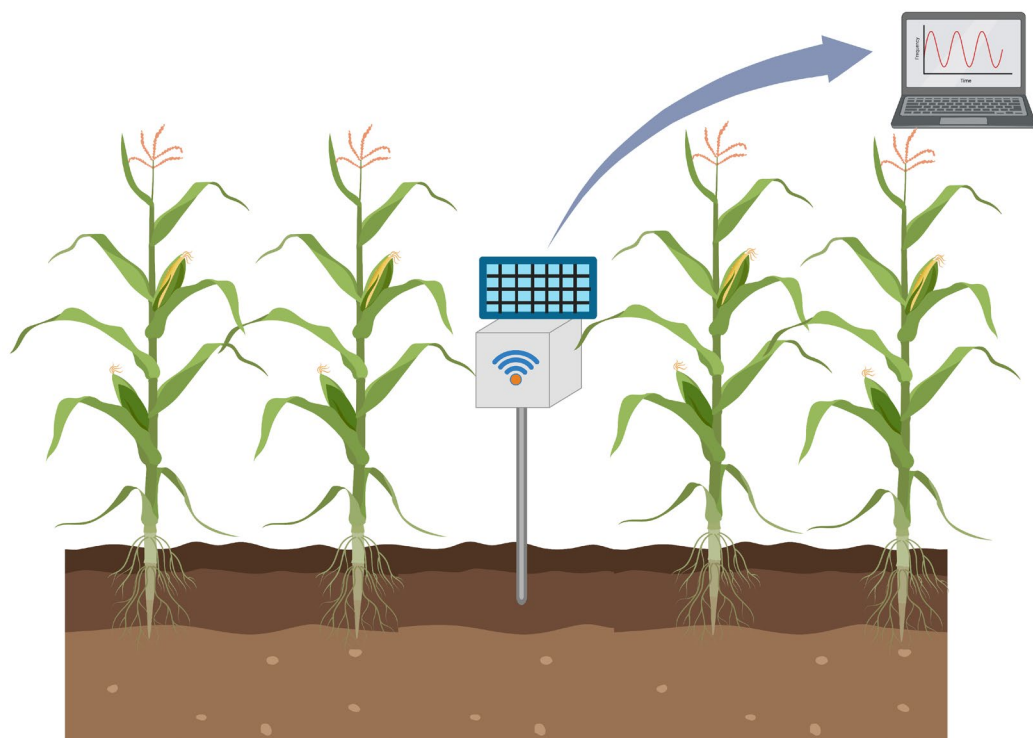
Only consider air T & R.H.



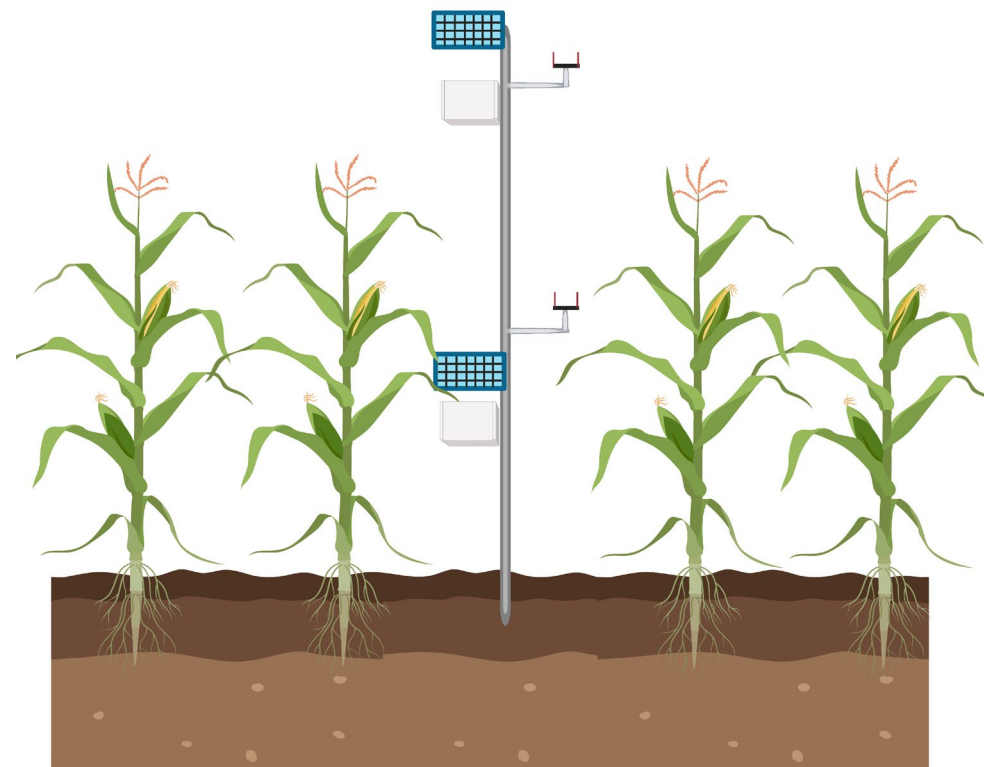
Project goal: develop a fungicide application decision support tool



“every 1 % increase in tar spot severity resulted in an estimated 21.5 to 91.5 kg/ha loss”



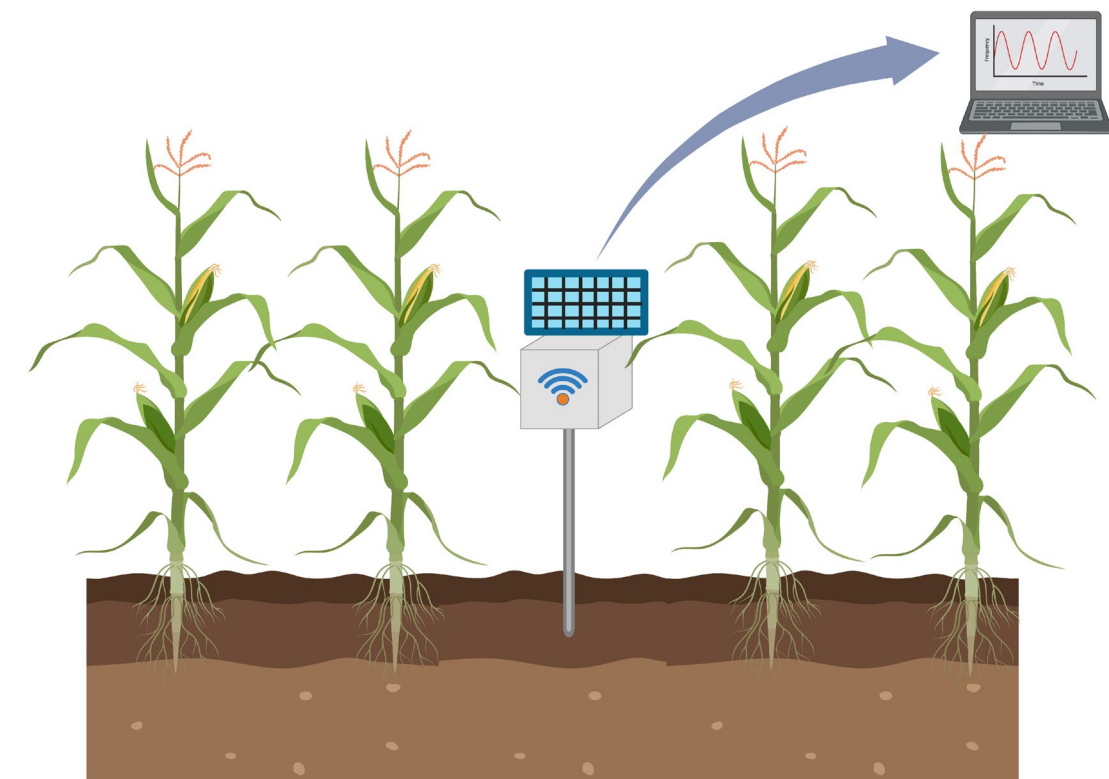
Real-time environmental sensing



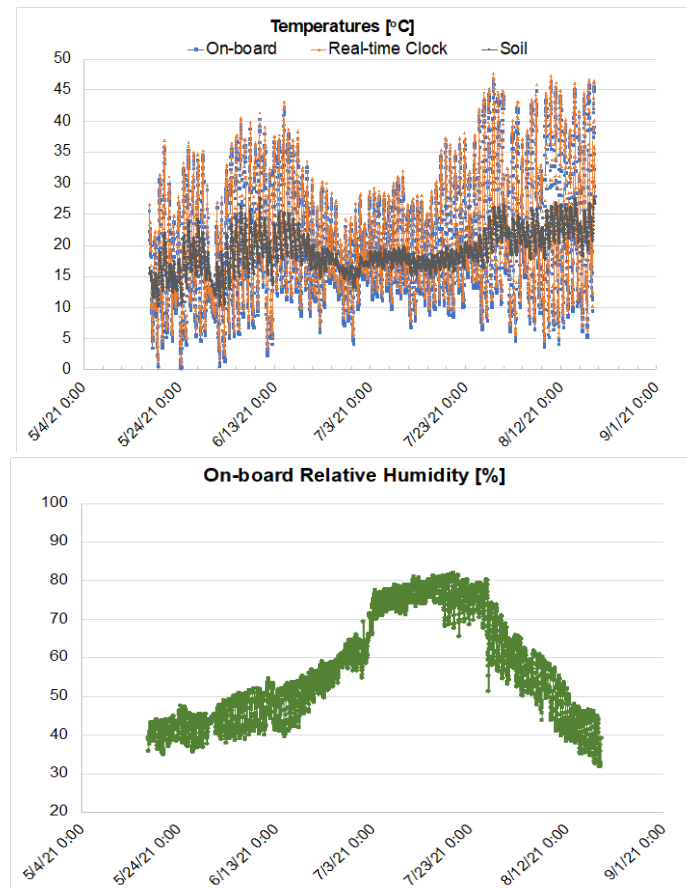
Spore-trapping



Fungicide application alert

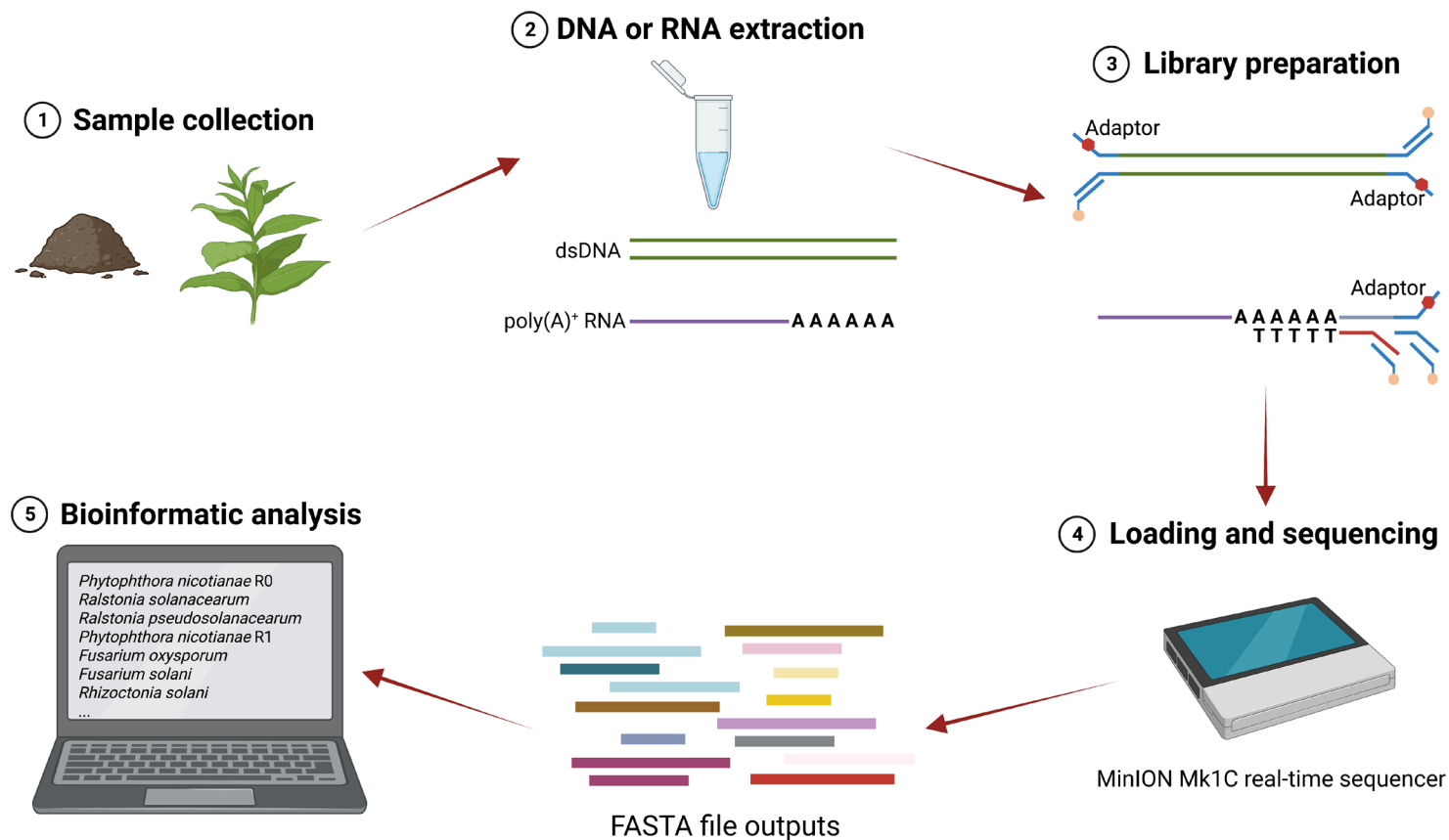


Real-time environmental sensing



A Metagenomic Approach to Link Soilborne Pathogens and Plant Diseases in Tobacco Fields

Real-time, low-cost metagenomic sequencing approach
for the identification and quantification of **multiple pathogens** in a **SINGLE** run



Results can be reported to growers within 3-4 days

Contact



Dr. Yuan Zeng



2375 Darvills Rd,
Blackstone, VA 23824



yuanzeng@vt.edu

Lab website: <https://www.zenglab-pdepmi.com>



Twitter: @yuanzeng3

Cell: (970)372-8935