Kaique dos Santos Alves

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SUMMARY

- Agronomist with a Master's degree in Plant Pathology and currently a Doctorate candidate in Plant pathology at Universidade Federal de Viçosa.
- Research intern at Cornell University at Dr. Sarah Pethybridge's program. The projects I am involved in focus on the epidemiology of several vegetable diseases applying modern approaches of digital agriculture to improve disease management strategies.
- 7 years of experience in plant disease epidemiology, developing projects on simulation of plant disease epidemics, disease prediction using weather and climate variables, machine learning, digital agriculture, plant disease quantification, data analysis, and software development.
- Experience in programming in R, in which two packages were developed for assisting data analysis in plant pathology: epifitter and ec50estimator. Also has experience in developing interactive web applications using R-Shiny.
- Advanced knowledge in statistical analysis: Linear and non-linear modeling, multivariate analysis, survival analysis, spatial modeling, machine learning, and Bayesian statistics.
- Experience working with the weather and climate effects on the epidemiology of soybean rust and citrus huanglongbing.
- Experience in teaching data analysis and visualization, experimental statistics, fruit farming, and scientific research.

EDUCATION

2019-Currently	*Doctor of Science in Plant Pathology* **Universidade Federal de Viçosa**, Viçosa-MG, Brazil
2018-2019	*Master of Science in Plant Pathology* **Universidade Federal de Viçosa**, Viçosa-MG, Brazil
2013-2017	*Bachelor of Science in Agronomy* **Universidade Federal do Espírito Santo**, Alegre-ES, Brazil

2010-2012 *Technician for Agriculture and Livestock*
Instituto Federal do Espírito Santo, Campus Itapina, Colatina-ES, Brazil

RESEARCH EXPERIENCE

Plant Pathology, Cornell University
Research Intern

- Epidemiology of sweet corn rust: Temporal dynamics across canopy sections and hierarchical modeling between disease and pathogen sporulation.
- Effect of weather and climate-related variables on white mold prevalence in snap bean fields in New York using machine learning.
- Development of interactive interface for a weather-based forecasting model (BSPcast) for Stemphylium leaf blight of onion.

Plant Pathology, Universidade Federal de Viçosa
Doctor degree

- Modeling Soybean rust risk in Brazil using weather and climate variables.
- Studying spatiotemporal dynamics of citrus Huanglongbing in Minas Gerais.
- Development of an R-package for fitting epidemic data in R.
- Stochastic simulation aiming to estimate the profitability of fungicides applications for soybean rust management.
- Validation of standard area diagram using a stochastic simulation approach to estimate statistical power.
- Machine learning for plant disease quantification.
- Data analysis for comparative epidemiology of biological control experiments.

Master degree

- Estimation of time-varying apparent infection rate in plant disease progress curves: a Particle Filter approach.
- Use and development of mechanistic models to simulate the temporal dynamics of plant diseases for improving management.

Agronomy, Universidade Federal do Espírito Santo
Bachelor degree

- Modeling papaya sticky disease epidemics.
- Simulating viral epidemics in papaya to improve management by roguing: analyzing the frequency of surveys and apparent infection rate.
- Using Particle Filter for parameter estimation in papaya ringspot epidemics.
- Modeling and simulation of coffee drying.
- Using Particle Filter for improving the estimation of state-space variables in the coffee drying process.
- Development of an interactive app to simulate coffee drying using MatLab.

INTERESTS

- Plant disease Epidemiology
- Mathematical modeling
- Spatial modeling and mapping of plant diseases
- Climatology
- Meteorology
- Stochastic simulations
- Statistics
- Machine learning
- Bayesian statistics
- Integrated disease management
- R
- Programming
- Plant disease and yield-loss assessment methods
- Huanglongbing
- Soybean rust
- Fusarium Head blight in Wheat
- Open science

LANGUAGES

Portuguese (Native)

English: reading (proficient), writing (proficient), speaking (proficient)

PUBLICATIONS

* Shared first authorship

Alves KS, Rothmann LA, Del Ponte EM (2022) Linking climate variables to large-scale spatial pattern and risk of citrus Huanglongbing: a hierarchical Bayesian modeling approach. **Phytopathology**™, 112: 189-196. https://doi.org/10.1094/PHYTO-05-21-0219-FI.

Del Ponte EM, Cazón LI, **Alves KS**, Pethybridge SJ, Bock CH (2022) How much do standard area diagrams improve accuracy of visual estimates of the percentage area diseased? A systematic review and meta-analysis. **Tropical Plant Pathology**. 47: 43–57. https://doi.org/10.1007/s40858-021-00479-5.

Del Ponte EM, Moreira GM, Ward TJ, O'Donnel K, Nicolli CP, Machado FJ, Duffeck MR, **Alves KS**, et al. (2022) *Fusarium graminearum* species complex: A bibliographic analysis and web-accessible database for global mapping of species and trichothecene toxin chemotypes. **Phytopathology**™. First look. https://doi.org/10.1094/PHYTO-06-21-0277-RVW

Lehner MS, **Alves KS**, Del Ponte EM, Pethybridge SJ (2022) Comparing the Fungicide Sensitivity of *Sclerotinia sclerotiorum* Using Mycelial Growth and Ascospore Germination Assays. **Plant Disease**. 106: 360-363. https://doi.org/10.1094/PDIS-06-21-1234-SC.

Alves KS, Del Ponte EM (2021) Analysis and simulation of plant disease progress curves in R: introducing the epifitter package. **Phytopathology Research**. 3: 22. https://doi.org/10.1186/s42483-021-00098-7.

Alves KS, Guimarães M, Ascari JP, Queiroz MF, Alfenas RF, Mizubuti ESG, Del Ponte EM (2021) RGB-based phenotyping of foliar disease severity under controlled conditions. **Tropical Plant Pathology**. Early view. https://doi.org/10.1007/s40858-021-00448-y.

Ascari JP, Barro JP, Santana FM, Pádua JM, Maciel JLN, [...], **Alves KS**, Del Ponte EM (2021) Sequential Post-heading Applications for Controlling Wheat Blast: A Nine-year Summary of Fungicide Performance in Brazil. **Plant Disease**, 105: 4051-4059. https://doi.org/10.1094/PDIS-06-21-1183-RE.

Barro JP, **Alves KS**, Godoy CV, Dias AR, Forcelini CA, Utiamada CM, de Andrade Júnior ER, et al., (2021), Performance of dual and triple fungicide premixes for managing soybean rust across years and regions in Brazil: a meta-analysis. **Plant Pathology**, 70: 1920-1935. https://doi.org/10.1111/ppa.13418.

Alves KS, Barro JP, Guimarães M, Del Ponte EM (2021) Profitability of fungicide applications for managing soybean rust in scenarios of variable efficacy and costs: a stochastic simulation. **Plant Pathology**, 70: 1354-1363. https://doi.org/10.1111/ppa.13396.

da Silva HAO, Teixeira WD, Borges ÁV, Silva Junior AL, **Alves KS**, Rodrigues Junior OM, de Abreu LM (2021) Biocontrol of potato early blight and suppression of Alternaria grandis sporulation by Clonostachys spp.. **Plant Pathology**, 70: 1677-1685. https://doi.org/10.1111/ppa.13402.

Alves KS, do Carmo LHM, Del Ponte EM (2020) Spatiotemporal spread of huanglongbing in commercial citrus orchards of Minas Gerais, Brazil. **Tropical Plant Pathology**, 45: 668-679. https://doi.org/10.1007/s40858-020-00398-x.

*Franceschi VT, **Alves KS**, Mazaro SM, Godoy CV, Duarte HS, Del Ponte EM (2020). A new standard area diagram set for assessment of severity of soybean rust improves accuracy of estimates and optimizes resource use. **Plant Pathology**, 69(3): 495-505.

Duffeck MR, **Alves KS**, Machado FJ, Esker PD, Del Ponte EM (2020) Modeling yield losses and fungicide profitability for managing Fusarium head blight in Brazilian spring wheat. **Phytopathology™**, 110(2): 370-378.

Alves KS, Da Rocha, MR, Alves CHA, Polastreli JL. Camara G R, Silva WB, Moraes WB (2018) Modelagem da eficiência do roguing sob diferentes frequências de vistorias e taxas de infecção em epidemias virais do mamoeiro. **Scientia Agraria**, 19: 180-185.

Cosmi FC, **Alves KS**, Moraes WB, Ventura JA, Moraes SPCB, Moraes WB, Jesus Júnior WC (2017) Análise epidemiológica da evolução temporal da meleira do mamoeiro. **Summa Phytopathologica**, 43(4): 303-309. https://dx.doi.org/10.1590/0100-5405/169330.

Book chapter

Camara GR, Dos Anjos BB, **Alves K.S** ; Garcia IR, Moraes, SPCB, Jesus Junior WC, Alves F R, Moraes WB. ***Meloidogynose do cafeeiro : aspectos econômicos e fitossanitários***. In: Catariny Fontana Nicoli; Cledenilson Monhol; Edilson Marques Junior; Hiago Zambão Falqueto; Ingrid Fioresi Sartori; Isadora Rodrigues Garcia; Joicy Lemos Polastreli; Jorge Tadeu Fim Rosas; Kaique dos Santos Alves; Kleyton Albino Brandão; Lucas Mareto; Mar. (Org.). AGRONOMIA: Colhendo as Safras do Conhecimento. 1ed.Alegre, ES: UFES, CAUFES, 2017, v. 1, p. 194-211

Preprints (Not peer-reviewed)

Alves KS, Del Ponte EM (2021) El Niño fuels the spread of soybean rust in Southern Brazil. osf.io/rz4uh.

Sparks AH, Del Ponte EM, **Alves KS,** Foster ZSL, Grünwald NJ (2021) Reproducibility in plant pathology: where do we stand and a way forward. DOI: 10.31220/agriRxiv.2021.00082.

Alves KS, Moraes WB , da Silva WB, Del Ponte EM (2019) Estimation of a Time-varying Apparent Infection Rate from Plant Disease Progress Curves: A Particle Filter Approach. DOI: 10.1101/625822.

SOFTWARE DEVELOPMENT

R packages

- **Alves KS**, Del Ponte EM (2020). **epifitter**: Analysis and Simulation of Plant Disease Progress Curves. R package version 0.3.0. https://CRAN.R-project.org/package=epifitter
- **Alves KS** (2020). **ec50estimator**: An Automated Way to Estimate EC50 for Stratified Datasets. R package version 0.1.0. https://CRAN.R-project.org/package=ec50estimator

Shiny apps

- **BSPcast:** A Shiny web app application for calculating risk for *Stemphylium vesicarium* infection in onion. https://alvesks.shinyapps.io/BSPcast/
- **rusty profits**. A Shiny web app application for estimating the profitability of fungicide applications. https://alvesks.shinyapps.io/rusty-profits/
- **FGSCdb**. An interactive dashboard for accessing the information on characterized fungal strains of *Fusarium graminearum* species complex. https://edelponte.shinyapps.io/FGSCdb/
- **EpidemioBR**. An online repository of Brazilian epidemiologists. https://alvesks.shinyapps.io/epidemioBR/

- **SACC-DFP**. A Shiny web app for scheduling growth chambers of the plant pathology department of the Universidade Federal de Viçosa - Brazil. https://dfpufv.shinyapps.io/sacc-dfp-ufv/

TEACHING ACTIVITIES

Teaching assistant

January 2022-Currently	**Teaching Assistant in a Graduate Course** PLPPM5020 - Systems Epidemiology for Plant Pathology Plant Pathology & Plant-Microbe Biology Section Coordinator: Dr. Sarah Jane Pethybridge Institution: Cornell University
March 2019-July 2021	**Teaching Assistant in a Graduate Course** Course: FIP 606 - Analysis and Data Visualization in Plant Pathology Department of Plant Pathology Coordinator: Dr. Emerson Medeiros Del Ponte Institution: Universidade Federal de Viçosa
September 2017-March 2018	**Teaching Assistant in an Undergraduate Course** Course: Experimental statistics Department of Rural Engineering Coordinator: Dr. Juliana Di Giorgio Giannotti Institution: Universidade federal do Espírito Santo
March 2013 - May 2013	**Teaching Assistant in a Technical Course** Course: Fruit farming Coordinator: Dr. Patrícia Soares Furno Fontes Institution: Instituto Federal do Espírito Santo: Campus Itapina

Teaching assistant internship

October 2020 - February 2021	**Teaching internship in a Technical Course** Course: Introduction to scientific research Department of Plant Pathology Coordinator: Dr. Jorge Luis Badel Pacheco Institution: Universidade Federal de Viçosa

Workshops

Alves KS. Data visualization using ggplot2 in R. **Simpósio sobre atualidades em fitopatologia**. Online. October, 2021.

Alves KS & Del Ponte EM. Data visualization using ggplot2 in R. 51º **Congresso Brasileiro de Fitopatologia**, Recife, PE, Brazil. August 2019.

Alves KS. Basic experimental Statistics Using R. **Grupo de estudos Avançados em Fitopatologia**, Viçosa, MG, Brazil. November 2019.

Alves KS, Del Ponte, Sparks AH. Impressive graphs with R. **Simpósio sobre atualidades em fitopatologia**, Viçosa, MG, Brazil. November 2018.

Online teaching

Alves KS. YouTube Channel: Epidemio Fora da Curva. **YouTube**. https://www.youtube.com/channel/UCl5H4LMBYJB1Hu3HgCmgyCg

EDITORIAL ROLES

Manuscript review

2021 - Current	Phytopathology
2021 - Current	Plant Disease
2021 - Current	Crop Protection
2021 - Current	Tropical Plant Pathology

PRESENTATIONS*

52nd Congresso Brasileiro de Fitopatologia, Online *Agosto 2021*
Phenotyping foliar disease severity under controlled conditions based on RGB indices
Alves KS, Guimarães M, Ascari JP, Queiroz MF, Alfenas F, Mizubuti ESG, Del Ponte EM.

52nd Congresso Brasileiro de Fitopatologia, Online *Agosto 2021*
The epifitter package: analysis and simulation of plant disease progress curves
Alves KS, Del Ponte EM.

49th Congresso Brasileiro de Fitopatologia, Maceió, Alagoas August 2016
Epidemiology of papaya mosaic: temporal dynamics of infection rate of the logistic mathematical model.
Alves KS, Moraes WB, Cosmi FC, Jesus Junior WC, Ventura JA, Belan LL, Dutra JCS, Da Silva WB.

**Obs.: Only oral presentations were included*

EXTENSION ARTICLES

Del Ponte EM , **Alves KS**, Godoy CV (2021) Ferrugem da Soja: Descuidar Nunca (*Soybean Rust: Never neglect*) **Cultivar Grandes Culturas**, Ano XXI, N 266, ISSN - 1516-358X.

REFERENCES

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