Vini Garnica

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MISSION

Plant disease epidemiologist with 10+ years of experience developing data-driven solutions to improve plant health and agricultural productivity across the U.S. Specialized in quantitative botanical epidemiology, risk assessment, multi-environment trial analysis, and the development of R Shiny apps. Committed to integrity, respect, and delivering impactful results to advance digital plant disease management.

EDUCATION

Ph.D. in Plant Pathology with a minor in Statistics **Jan 2021 – Dec 2024**
North Carolina State University, Raleigh, NC, USA

FFAR Fellows Program **Aug 2022 – Dec 2024**
Nationally recognized fellowship for agricultural leaders – Link

M.Sc. in Agronomy with a minor in Statistics **May 2017 – May 2019**
University of Nebraska, Lincoln, NE, USA

B.Sc. in Agronomy **Jan 2011 – Jun 2016**
Federal University of Viçosa, MG, Brazil

PROFESSIONAL EXPERIENCE

Postdoctoral Scholar **April 2025 – Present**
The Ohio State University | Columbus, OH, USA
Supervisor: Dr. Horacio Lopez-Nicora, Department of Plant Pathology

Leads research at the intersection of plant pathology, epidemiology, and data science, focusing on soybean disease management. Emphasizes reproducible, data-driven approaches using advanced meta-analytic and spatial statistical methods. Current projects include Bayesian and frequentist meta-analyses of seed treatment and foliar fungicide trials. Actively developing tools, including Shiny applications and dashboards, to streamline lab data management, storage, and reporting. Mentors graduate and undergraduate students in quantitative botanical epidemiology.

Graduate Research Assistant **Jan 2021 – Dec 2024**
North Carolina State University | Raleigh, NC, USA
Advisor: Dr. Peter Ojiambo, Entomology & Plant Pathology Department

Pioneered quantitative Bayesian modeling to predict plant disease epidemics, focusing on Stagonospora nodorum blotch, a fungal disease affecting wheat production globally. Applied mixed models to quantify wheat resistance stability across diverse environments, facilitating selection of disease-resistant cultivars. Developed open-source R algorithms to identify high-dimensional weather variables linked to disease outbreaks, advancing early-warning systems for disease prediction. Conceptualized and developed an R Shiny application to enhance meta-analysis by extracting key data from published

manuscripts excluded due to missing information. Translated complex data from field trials into over 15 scientific presentations, bridging technical insights with practical applications. Trained over 20 students in R programming, strengthening their skills in data analysis and promoting reproducible research practices.

Research Site Coordinator **Aug 2019 – Aug 2020**

Mato Grosso Foundation | Primavera do Leste, MT, Brazil

Led operations at two research stations, including the establishment of one from the ground up. Coordinated over 100 field trials in soybeans, corn, and cotton to evaluate crop protection products. Recruited, trained, and supervised a team of 10 technicians to ensure rigorous data collection. Built strategic partnerships with growers to facilitate on-farm research.

Research Graduate Assistant **May 2017 – May 2019**

University of Nebraska | Lincoln, NE, USA

Advisor: Dr. Loren J. Giesler, Plant Pathology Department

Conducted and analyzed data from field trials to evaluate the effects of cultivar resistance, pre-emergent herbicides, and seed treatments on soybean seedling diseases. Led a statewide survey of *Phytophthora* spp. to characterize pathotypes, revealing a loss in host resistance gene efficacy over time. Developed a standardized protocol for collecting soybean canopy data using a smartphone application, improving phytopathometry under field conditions.

Agronomist Trainee **Aug 2016 – Mar 2017**

Adriana Seeds | Alto Garças, MT, Brazil

Coordinated teams on fertilizer application, cover crop planting, and soybean harvest.

Research Intern **May 2015 – Aug 2015**

DuPont-Pioneer | York, NE, USA

Collected high-quality data from experimental maize inbred lines to support hybrid seed production. Gained skills in project management and large-scale agricultural research.

Research Intern **Oct 2014 – Apr 2015**

University of Nebraska | Lincoln, NE, USA

Evaluated the effects of foliar insecticides on soybean cyst nematode development and reproduction under controlled settings. Obtained skills in nematode detection and science communication.

Research Intern **Apr 2012 – Feb 2014**

Federal University of Viçosa | Viçosa, MG, Brazil

Supported surveys of mango diseases in field trials and in-vitro fungicide sensitivity. Developed laboratory skills in fungal isolation and media preparation.

PUBLICATIONS

Peer-reviewed journal articles

1. **Garnica, V.C.**, Shalizi, N.M., and Ojiambo, P.S. (*in review*). Performance and stability of winter wheat cultivars to *Stagonospora nodorum* blotch epidemics in multi-environment trials. *Phytopathology*.
2. **Garnica, V.C.** and Ojiambo, P.S. (*in review*). Leveraging window-pane analysis with environmental factor loadings of genotype-by-environment interaction to identify high-resolution weather-based variables associated with plant disease. *Frontiers in Plant Science*.
3. **Garnica, V.C.** and Ojiambo, P.S. (*in prep*). Predicting Stagonospora nodorum blotch in winter wheat using a Bayesian hierarchical approach. *Ecological Applications*.

4. **Garnica, V.C.** and Ojiambo, P.S. (*in prep*). Advancing Stagonospora nodorum blotch management in South Atlantic U.S. wheat with uncertainty-aware model validation, yield loss quantification, and risk-based fungicide thresholds. *Plant Disease*.
5. Peart, A., Colet, F., **Garnica, V.C.**, Lindsey, L., and Lopez-Nicora, H.D. (*in prep*) Analysis of yield and economic impact of different foliar fungicide application timings on soybean in Ohio. *Plant Disease*.
6. **Garnica, V.C.** and Lopez-Nicora, H.D. (*in prep*). Accounting for spatial trends improves the assessment of fluopyram and host resistance efficacy against soybean cyst nematode in field trials. *Phytopathology*.
7. **Garnica, V.C.**, Shah, D.A., Esker, P.D., and Ojiambo, P.S. 2024. MSE FindR: A shiny R application to estimate mean square error using treatment means and post-hoc test results. *Plant Disease*, 108(7), 1937–1945. doi: 10.1094/PDIS-11-23-2519-SR.
8. McCoy, A.G., Belanger, R.R., Bradley, C.A., Cerritos-Garcia, D.G., **Garnica, V.C.**, Giesler, L.J., Grijalba, P.E., Guillin, E., Henriquez, M.A., Kim, Y.M., Malvick, D.K., Matthiesen, R.L., Mideros, S.X., Noel, Z.A., Robertson, A.E., Roth, M.G., Schmidt, C.L., Smith, D.L., Sparks, A.H., Telenko, D.E.P., Tremblay, V., and Chilvers, M.I. 2023. A global-temporal meta-analysis perspective on *Phytophthora sojae* resistance-gene efficacy for disease management. *Nature Communications*, 14, 6043. doi: 10.1038/s41467-023-41321-7.
9. **Garnica, V.C.**, Jhala, A.J., Harveson, R.M., and Giesler, L.J. 2022. Impact assessment of residual soil-applied pre-emergence herbicides on the incidence of soybean seedling diseases under field conditions. *Crop Protection*, 158, 105987. doi: 10.1016/j.cropro.2022.105987.
10. Matthiesen, R.L., Schmidt, C., **Garnica, V.C.**, Giesler, L.J., and Robertson, A.E. 2021. Comparison of *Phytophthora sojae* populations in Iowa and Nebraska to identify effective *Rps* genes for Phytophthora stem and root rot management. *Plant Health Progress*, 22:300-308. doi: 10.1094/PHP-02-21-0016-FI.
11. **Garnica, V.C.** and Giesler, L.J. 2019. Soybean canopy coverage, population, and yield responses to seed treatment and cultivar resistance to *Phytophthora sojae* in Nebraska. *Plant Health Progress*, 20(4), 229–237. doi: 10.1094/PHP-05-19-0036-RS.

Abstracts and Oral Presentations in Professional Meetings

1. **Garnica, V.C.** and Ojiambo, P.S. 2024. Risk assessment models for improved fungicide decisions in winter wheat and a digital tool to improve quantitative synthesis of agricultural research. Plant Health 2024, Jul 27–30, 2024, Memphis, TN. (*Oral*)
2. **Garnica, V.C.** 2024. Novel approaches for plant disease prediction: a case with Stagonospora nodorum blotch of wheat. Annual Meeting of the Georgia Association of Plant Pathologists, Mar 6, 2024, Savannah, GA. (*Oral*)
3. **Garnica, V.C.** 2024. Novel weather variables associated with epidemics of Stagonospora nodorum blotch of winter wheat. 13th International Epidemiology Workshop, Apr 9–12, 2024, Foz do Iguaçu, Brazil. (*Oral*)
4. **Garnica, V.C.** and Ojiambo, P.S. 2023. Stability of resistance to Stagonospora nodorum blotch in winter wheat cultivars evaluated in a multi-environmental study in North Carolina. ASA, CSSA, and SSSA International Annual Meetings, Oct 29–Nov 1, 2023, St. Louis, MO. (*Poster*)
5. **Garnica, V.C.**, Shah, D.A., Esker, P., and Ojiambo, P.S. 2022. MSE FindR: an R Shiny app tool for recovering variance in designed experiments using treatment means and post-hoc test results. National FHB Forum, Dec 4–6, 2022, Tampa, FL. (*Poster*)
6. **Garnica, V.C.**, Shah, D.A., Esker, P., and Ojiambo, P.S. 2022. Got Fisher's LSD or Tukey's HSD?: an R Shiny app tool for recovering variance in designed experiments when only mean and post-hoc tests are reported. Plant Health 2022, Aug 6–10, 2022, Pittsburgh, PA. (*Poster*)
7. McCoy, A., Bradley, C.A., Cerritos-Garcia, D., **Garnica, V.C.**, Giesler, L.J., Grijalba, P.E., Guillin, E., Malvick, D.K., Matthiesen, R.L., Mora, S.X., and Noel, Z.A. 2022. Phytophthora stem and root rot of soybean: A global-temporal perspective on resistance-gene efficacy. (Abstr.) Phytopathology 112: S3.50. 2021 APS Annual Meeting Research On-Demand. (*Poster*)

8. Cucak, M., Dalla Lana, F., Olanrewaju, M.S., **Garnica, V.C.**, Ojiambo, P.S., De Wolf, E., Shah, D., Paul, P., and Esker, P.D. 2021. Development and integration of the new-age decision support in crop disease protection. (Abstr.) Phytopathology 111: S2.1. 2021 APS Annual Meeting. (*Poster*)
9. **Garnica, V.C.**, Arneson, N.J., and Giesler, L.J. 2019. Increasing soybean yields in *Phytophthora* infested fields. UNL Spring Research Fair, Apr 15, 2019, Lincoln, NE. (*Poster*)
10. **Garnica, V.C.**, Leef, N., and Giesler, L.J. 2018. Indeterminate cultivars and seed treatment effect on soybean yield components. Nebraska Plant Breeding Symposium, Mar 13, 2018, Lincoln, NE. (*Poster*)
11. **Garnica, V.C.**, Broderick, K.C., Arneson, N., Oser, H., and Giesler, L.J. 2015. Effect of foliar insecticides on soybean cyst nematode (*Heterodera glycines*) reproduction. UNL Spring Research Fair, Apr 14, 2015, Lincoln, NE. (*Poster*)
12. Bucker Moraes, W., Maffia, L.A., **Garnica, V.C.**, Souza, A.G.C., and Santos, G.R. 2014. Spatio-temporal dynamics of Ceratocystis wilt of mango and association of the disease with potential vectors. (Abstr.) Phytopathology 104: S3.20, 2014 APS-CPS Joint Meeting. (*Poster*)
13. Bucker Moraes, W., Maffia, L.A., **Garnica, V.C.**, Souza, A.G.C., and Santos, G.R. 2014. Modeling the progress of Ceratocystis wilt on mango through a Bayesian approach. (Abstr.) Phytopathology 104:S3.82, 2014 APS-CPS Joint Meeting. (*Poster*)
14. Bucker Moraes, W., Maffia, L.A., **Garnica, V.C.**, Souza, A.G.C., and Santos, G.R. 2014. Epidemiological description of the syndromes associated with the Ceratocystis wilt of mango. (Abstr.) Phytopathology 104:S3.83, 2014 APS-CPS Joint Meeting. (*Poster*)
15. **Garnica, V.C.**, Bueno, D.A.S., Silvera, E., Mizubuti, E.S.G., and Maffia, L.A. Sensibilidade a fungicidas de isolados de *Botrytis cinerea* coletados em rosas em Barbacena-MG e Holambra-SP. 46th Brazilian Congress of Plant Pathology, Oct 20–25, 2013, Ouro Preto, MG, Brazil. (*Poster*)

HONORS AND AWARDS

I. E. Melhus Graduate Student Symposium Speaker, Plant Health 2024, Memphis, TN	**Jul 2024**
Professional Development Award, Entomology & Plant Pathology Dept., NC State, Raleigh, NC	**Jun 2024**
2nd place, Advanced Machine Learning Hackathon, NC State, Raleigh, NC	**Oct 2023**
Dr. and Mrs. Robert Goss Memorial Scholarship, UNL, Lincoln, NE	**Jul 2018**
1st place poster competition, Undergraduate Research Fair, UNL, Lincoln, NE	**Apr 2015**

EXTENSION PRESENTATIONS

1. **Garnica, V.C.** Early-season soybean diseases identification and management. Hoke-Robeson-Scotland Corn and Soybean Meeting, Feb 23, 2023, Lumberton, NC.
2. **Garnica, V.C.** Soybean diseases ID and scouting. Piedmont Soybean Field Day. NCDA&CS Piedmont Research Station, Sep 28, 2022, Salisbury, NC.
3. **Garnica, V.C.**, Gomez-Pond, R., Schneider J. Improving yield and quality of inbred lines in hybrid corn seed production. DuPont Pioneer Intern Conference, Jun 6, 2015, Des Moines, IA.

ASSISTANTSHIPS AWARDED

Rockey FFAR Fellowship (2022 – 2024)

Supported by the UPL Limited and Foundation for Food & Agriculture Research ($30,000).

Research and Teaching Graduate Assistantship (2021 – 2024)

Supported by the Entomology & Plant Pathology Department at North Carolina State University in partnership with USDA.

Research Graduate Assistantship (2017 – 2019)

Supported by the Plant Pathology Department at the University of Nebraska-Lincoln in partnership with the North Central Soybean Research Program.

Science Without Borders Program (2014 – 2015)
Supported by CAPES and CNPq.

TEACHING EXPERIENCE

1. Teaching assistant for PP506 - Epidemiology and Plant Disease Control, NCSU, Spring 2022 and 2023.
2. CALS Fall Grad Student Led Workshop. Introduction to R, Data Manipulation, Analysis, and Visualization, Oct 28 and Nov 11, 2022. https://github.com/vcgarnica/NCSU_R_workshop_2022.

ADDITIONAL EXPERIENCES

Professional Development

Leadership: Crucial Conversations® and The Five Behaviors® workshops and possess DISC and Clifton Strengths assessments.
Tech Stack: R, SAS, Shiny Apps, JAGS, GitHub, Inkscape, Unix Shell, ASReml-R, brms.
Languages: English (fluent), Portuguese (native), and Spanish (advanced).

Courses and Technical Certificates

Meta-Analysis Course. Maastricht University, Nov 2–4, 2022. *online*.
NSF Bayesian Short Course. NREL. Colorado State University. Jun 6–16, 2022, Fort Collins, CO.
Multilevel Methods and Applications. The University of Bristol. Oct 2021, *online*.

Search Committees

Research Technologist I. Chair: Dr. Tamra Jackson-Zeims. Plant Pathology Department, UNL, Lincoln, Feb 2018.

Extracurricular Activities

Grand Award Judge **May 2025**
International Science and Engineering Fair, Columbus, OH
Organizer **Fall 2023 – Winter 2024**
NCSU-FFAR seminar series for science communication, NC State, Raleigh, NC
Volunteer **Winter 2023**
Food Shuttle, City of Durham, NC
Outreach Coordinator **Fall 2021 – Fall 2022**
Plant Pathology Graduate Association, NC State, Raleigh, NC
Seminar Chair **Fall 2018 – Spring 2019**
Agronomy and Horticulture Graduate Association, UNL, Lincoln, NE
Social Chair **Fall 2017 – Spring 2019**
Plant Pathology Graduate Association, UNL, Lincoln, NE
Volunteer **Winter 2018**
Snow Angels, City of Lincoln, NE