NCERA-137 Soybean Disease, Pensacola Florida, February 27, 2025

Project No. and Title: NCERA_old137

Period Covered: 10/01/2023 to 09/30/2024

Date of Report: 04/10/2025

Annual Meeting Dates: 02/27/2025

Brief Summary of Minutes of Annual Meeting

The 2025 NCERA-137 meeting, held in Pensacola, Florida, focused on soybean disease research, collaboration, and strategic planning. Key updates included administrative guidance from Dr. Loren Giesler, advancements in Crop Protection Network initiatives, and discussions on disease loss estimates. Participants explored spending options for a $15,000 award, including educational trips. Presentations covered topics like soybean field stressor patterns, best practices for university-industry research collaboration, and standardizing soybean pathology protocols. Updates on red crown rot and fungicide trials were provided, with future research directions proposed. The meeting concluded with the approval of 2024 minutes, election of future secretaries, and a unanimous decision to reconvene in Pensacola for the 2026 meeting.

Accomplishments

Short-term outcomes: Continued collaborative efforts of the NCERA 137 multi-state working group are advancing recommendations for managing soybean diseases.

Outputs: Within participating states, information was shared through multiple platforms including winter meetings, research publications, extension publications, social media, and other web platforms. Coordinated efforts of this multi-state project enabled data exchange for regional and national recommendations for example:

- Soybean Disease Loss Estimates from the United States and Ontario, Canada – 2024. Crop Protection Network. CPN 1018-24. doi.org/10.31274/cpn-20250317-1
- Crop Protection Network recommendations for Fungicide Efficacy for Control of Soybean Foliar Diseases. CPN 1019. doi.org/10.31274/cpn-20190620-014
- Crop Protection Network recommendations for Fungicide Efficacy for Control of Soybean Seedling Diseases. CPN 1020. doi.org/10.31274/cpn-20190620-015

Impacts

1. Objective 1: Foster collaborative research and information exchange on new and emerging soybean diseases among scientists in the North Central Region including soybean breeders and entomologists that will lead to improved disease screening protocols, additional sources of disease resistance genes and ultimately, improved host plant resistance. Project participants work on diverse systems including *Xylaria necrophora*, pathotype diversity of *P. sojae, Cadophora*

gregata, Sclerotinia sclerotiorum, Heterodera glycines, among others. Mapping of *Calonectria ilicicola* has been initiated to track this remerging threat to soybean production

2. Objective 2. Compare findings on the impacts of changing production practices such as earlier planting dates, new sources of host plant resistance, increased use of fungicide seed treatments and foliar fungicides, and other new or improved crop production technologies on soybean diseases that could be adopted for other production areas in the region. Project participants are evaluating several seed-applied nematicides to the southern root-knot nematode, seed treatments for management of sudden death syndrome, red crown rot and soybean cyst nematode, facilitating submission of soil samples for SCN testing in individual states, evaluate the sensitivity of *Cercospora sojina* and *Diaporthe* collected from multiple U.S. states to DMI, MBC, and SDHI fungicides, among others. A consensus fungicide efficacy data is prepared by the NCERA 137 group members at individual institutions in concert with Crop Protection Network to build the foundation for fungicide guidelines published annually for farmers.

3. Objective 3. Compare data from studies of the ecology and epidemiology of soybean diseases important in the North Central Region. Project participants are coordinating efforts to conduct epidemiology trials to understand *Cercospora*-associated diseases in soybean. This includes spore trapping efforts and disease rating efforts among numerous states who participate in coordinated foliar fungicide trials. In addition to *Cercospora*, the project participants are also involved in assessing yield losses associated with soybean diseases in the NC region. As an example, red crown rot was added to the list of soybean diseases as this disease is being found in more states. Yield loss data is compiled to track disease impacts annually by region, nationally and across years.

4. Objective 4. Improve knowledge transfer about soybean diseases and their management in the North Central Region to researchers, Extension faculty, producers and the agribusiness community through the use of web sites, podcasts, social media (X/Twitter and Facebook) and other new technologies as they are developed. Knowledge transfer is being conducted via CPN-TV (recorded webinars), I See Dead Plants podcast, A Penny for your thought podcast, extension meetings, trade shows, field days, webinars, newsletters, podcasts, blog posts, newspaper articles, radio spots, YouTube videos, program webpages, public media interviews, ag media (DTN Progressive Farmer, MoSoy, AgWeek, etc.), leveraged partner media (agrochemical companies), and twitter. Multi-state reports, including yield loss estimates and fungicide efficacy charts are housed with the Crop Protection Network. Many participants are also active in the SCN Coalition.

5. Objective 5. Continue to monitor and share information for any new or reemerging pathogens of soybean in the North Central Region and develop appropriate responses to their emergence as they occur. Participants work with extension agents, stakeholders, farmers, industry, university researchers, and respective diagnostic clinics to monitor for potential new of emerging and re-emerging diseases. Many states are supporting testing of soil for SCN, monitoring for red crown rot, taproot decline, Cercospora leaf blight, Diaporthe-associated diseases, soybean cyst nematode, soybean rust, and spread of fungicide resistant *C. sojina*.

Milestones: In year (10/1/23-9/30/24) of this project, collaborative research projects continue to advance understanding of soybean disease management options and providing management

recommendations to farmers. Annually, the NCERA 137 participants support yield loss estimates associated with soybean diseases in individual states, which are used to develop the CPN disease loss calculator. This group also develops publications to report trends in regional and national disease development to inform evaluations of soybean germplasm and chemical product efficacy screening.

Impacts: Diseases in soybean can greatly impact yield potential. To facilitate data driven management recommendations, NCERA 137 participants performed research to address regionally significant diseases, conducted fungicide efficacy trials, and supported disease forecasting efforts. Research results were shared through extension programming (field days, grower meetings, publications, newsletter, blogs, YouTube videos, radio. and social media) to maximize effectiveness of disease management strategies and improve grower productivity and profitability.

Publications

1. Barro, J. P., Del Ponte, E. M., Kelly, H. M., Bissonnette, K. M., Telenko, D. E. P., Ames, K. A., and Bradley, C. A. 2024. Profitability of foliar fungicides in double crop soybean under low-disease pressure. Plant Health Progress. 25: 4. 418-426. https://doi.org/10.1094/PHP-01-24-0001-RS
2. Batzer, J.C., Shirazi, A., Lawson, M., Mathew, F., Kontz, B., Smith, D.L., and Mueller, D.S. 2024. Impact of foliar fungicide application on the culturable fungal endophyte community of soybean seed in the midwest United States. Plant Disease. 108:647-657. https://doi.org/10.1094/PDIS-06-23-1122-RE
3. Batzer, J. C., Shirazi, A., Gill, D., Platner-Heidt, E., Nicolaus, K., Bray, A., Mohan, K., Mathew, F. M., and Mueller, D. S. 2024. Seed-borne fungal detection differs with seed assay method and fungal diversity and abundance are impacted by fungicide treatment, harvest timing, and storage environment. PhytoFrontiers. https://doi.org/10.1094/PHYTOFR-06-24-0076-R
4. Bissonnette, K.M., Barizon, J., Adee, E., Ames, K.A., Becker, T., Biggs, M., Bradley, C.A., Brown, M., Byamukama, E., Chilvers, M.I., Faske, T.R., Harbach, C.J., Jackson-Ziems, T.A. Kandel, Y.R., Kleczewski, N.M., Koehler, A.M., Markell, S.G., Mueller, D.S., Sjarpe, D.A., Smith, D.L., Telenko, D.E.P., and Tenuta, A.U. 2024. Management of soybean cyst nematode and sudden death syndrome with nematode-protectant seed treatments across multiple environments in soybean. Plant Disease. 108:1729-1739. https://doi.org/10.1094/PDIS-02-23-0292-RE
5. Bonkowski, J., Goodnight, K. M., Grskovich, M. R., Telenko, D. E. P. 2024. First Report of Calonectria ilicicola Causing Red Crown Rot of Soybean in Indiana. Plant Disease. https://doi.org/10.1094/PDIS-10-23-2198-PDN
6. Brown, K., and Faske, T. R. 2024. Sensitivity of Meloidogyne incognita and Rotylenchulus reniformis to cyclobutrifluram. Plant Disease 108:3400-3405. https://doi.org/10.1094/PDIS-04-24-0936-RE
7. Brown, M. T., Oh, S., Rainey, K. M., and Telenko, D. E. P. 2024. Pre-symptomatic leaf reflectance of Fusarium virguliforme infected soybean plants in greenhouse conditions. PhytoFrontiers 4:544-552. https://doi.org/10.1094/PHYTOFR-09-23-0121-R

8. Cai, G., Lopes da Silva, L., PiÃ±eros-Guerrero, N., and Telenko, D. E. P. 2024. Population structure and mating-type distribution of Cercospora sojina from soybean in Indiana, United States. Journal of Fungi. 10: 802. https://doi.org/10.3390/jof10110802
9. Campos, P., D. Miller, J. Copes, M. Netterville, S. Brown, T. Price, D. Moseley, T. Gentimis, P. Egbedi, R. Parvej. 2024. Influence of fungicide on soybean (Glycine max (L.) Merr.) seed quality from delayed harvest and environment. Crop, Forage, and Turfgrass Management.
10. Check J.C., Harkness R., Heger L., Chilvers M.I., Mahaffee W.F., Sakalidis M.L., Miles T.D. 2024. It's a trap! Exploring the application of rotating-arm impaction samplers in plant pathology. Plant Disease. doi: 10.1094/PDIS-10-23-2096-FE. Epub ahead of print. PMID: 38411610. https://doi.org/10.1094/PDIS-10-23-2096-FE
11. Check J.C., Harkness R., Heger L., Chilvers M.I., Mahaffee W.F., Sakalidis M.L., Miles T.D. It's a trap! An approachable guide to constructing and using rotating-arm air samplers. 2024. Plant Disease. doi: 10.1094/PDIS-01-24-0131-SR. Epub ahead of print. PMID: 38537138. https://doi.org/10.1094/PDIS-01-24-0131-SR
12. Chen, J.-Y., Sang, J., Chilvers, M.I., Wu, C.-H., Chang, H.X. 2024 Characterization of soybean chitinase genes induced by rhizobacteria involved in the defense against *Fusarium oxysporum*. Frontiers in Plant Science 15:1341181. https://doi.org/10.3389/fpls.2024.1341181
13. Clevinger, E. M., Biyashev, R., Schmidt, C., Song, Q., Batnini, A., BolaÃ±os-Carriel, C., Robertson, A. E., Dorrance, A. E., and Saghai-Maroof, M.A. 2024. Comparison of Rps loci towards isolates, singly and combined inocula of Phytophthora sojae in soybean PI 407985, PI 408029, PI 408097, and PI 424477. Frontiers in Plant Science 15:1394676. doi: 10.3389/fpls.2024.1394676
14. Debbink, K., Rocco da Silva, C., Silva, E.M., Mueller, B.D., Telenko, D.E.P., and Smith, D.L. 2024. Integrated management of Sclerotinia stem rot of soybean including organically-allowed fungicides in the Midwest. PhytoFrontiers. https://doi.org/10.1094/PHYTOFR-05-24-0053-R
15. Dhakal, R., Chowdhury, I. A., Plaisance, A., and Yan, G. P. 2024. Development of a recombinase polymerase amplification assay for rapid detection of the new root-lesion nematode Pratylenchus dakotaensis on soybean. Plant Disease (First Look), https://doi.org/10.1094/PDIS-05-24-1133-R
16. Dorrance, A.E., Vargas, A., Navarro-Acevedo, K., Wijertatne, S., Myers, J., and Paredes, J. A. 2024. Picarbutrazox effectiveness added to a seed treatment mixture for management of Oomycetes that impact soybean in Ohio. Plant Dis. 108:2330-2340. https://doi.org/10.1094/PDIS-06-23-1223-RE
17. Duncan, E.A., Brand, S.B., and Telenko, D.E.P. 2024. Comparison of fungicides and timing for foliar disease of soybeans in southwestern Indiana, 2023. Plant Disease Management Reports. Vol 18: CF032.
18. Duncan, E.A., Brand, S.B., and Telenko, D.E.P. 2024. Comparison of fungicides for foliar disease of soybeans in central Indiana, 2023. Plant Disease Management Reports. Vol 18: CF033.
19. Emerson, M., Faske, T. R., 2024. Evaluation of foliar fungicides for frogeye leaf spot control and yield protection in soybean in Arkansas. Crop Protection: 173:106572 https://doi.org/10.1016/j.cropro.2023.106572

20. Faske, T. R.â€ , Watson, T., Desaeger, J., Duffeck, M. R., Eisenback, J. D., Floyd, C., Grabau, Z., Hajihassani, A., Kelly, H., Kemerait, R., Lawrence, K., Mueller, D., Smith, M. , Wheeler, T., and Ye, W. 2024. Summarized distribution of the reniform nematode, Rotylenchulus reniformis, in field crops in the United States Plant Health Progress https://doi.org/10.1094/PHP-06-24-0059-BR
21. Grunwald, N. J., Altendorf, K., Bock, C., Chang, J. H., De Souza, A. A., Del Ponte, E. M., du Toit, L. J., Dorrance, A. E., Dung, J., Gent, D., Goss, E. M., Lowe-Power, T. M., Madden, L. V., Martin, F. N., McDowell, J., Naegele, R. P., Potnis, N., Quesada-Ocampo, L. M., Sundin, G. W., Thiessen, L., Vinatzer, B. A. and Zeng Q. 2024. Open access and reproducibility in Plant Pathology research: guidelines and best practices. Phytopathology. 114: 910-916. https://doi.org/10.1094/PHYTO-12-23-0483-IA
22. Hamilton, R., Jacobs, J.L,. McCoy, A.G., Kelly, H.M., Bradley, C.A., Malvick, D.K., Rojas, J.A,. Chilvers, M.I. 2024. Multistate sensitivity monitoring of *Fusarium virguliforme* to the SDHI fungicides fluopyram and pydiflumetofen in the United States. Plant Disease 108:1602-1611 https://doi.org/10.1094/PDIS-11-23-2465-RE
23. Hanna, E. A., C. E. Astete, T. Price, C. Tamez, O. E. Mendez, A. Garcia, F. V. Kewir, J. C. White, and C. M. Sabliov. 2024. Antifungal efficacy of nanodelivered azoxystrobin against Rhizoctonia solani in soybean (Glycine max). Agricultural Science and Technology. https://doi.org/10.1021/acsagscitech.3c00469
24. Hodge, B., Batnini, A., BolaÃ±os-Carriel, C., Van, K., Saghai Maroof, M.A., McHale, L., Dorrance, A. E. 2024. Resistance gene enrichment sequencing for NLR genes for Phytophthora sojae in selected soybean plant introductions and differentials with putative novel known Rps genes. Crop Science (Early View) https://doi.org/10.1002/csc2.21413
25. Irwin L. and Betts A.K. 2024. Evaluation of foliar fungicides for management of soybean diseases in Delaware, 2024. Plant Disease Management Reports. 18:CF088.
26. Lamichhane, J.R., Barbetti, M., Chilvers, M.I., Pandey, A.K., Steinberg, C. 2024. Exploiting root exudates to manage soil-borne disease complexes in a changing climate. Trends in Microbiology 32:27-37 [2279]. https://doi.org/10.1016/j.tim.2023.07.011
27. Lee, G., DiBiase, C.N., Liu, B., Li, T., McCoy, A.G., Chilvers, M.I., Sun, L., Wang, D., Lin, F., Zhao, M. 2024. Transcriptomic and epigenetic responses shed light on soybean resistance to *Phytophthora sansomeana*. The Plant Genome http://doi.org/10.1002/tpg2.20487
28. Lin, F., Salman, M., Zhang, Z., McCoy, A.G., Li, W., Magar, R.J., Mitchell, D., Zhao, M., Gu, C., Chilvers, M.I., Wang, D. 2024. Identification and molecular mapping of a major gene conferring resistance to *Phytophthora sansomeana* in soybean 'Colfax'. TAAG 137:55 https://doi.org/10.1007/s00122-024-04556-6
29. Ma, J., Park, S.-W., Kim, G., Kim, C.S., Chang, H-X., Chilvers, M.I., Sang, H. 2024. Characterization of SsHog1 and Shk1 using efficient gene knockout systems through repeated protoplasting and CRISPR/Cas9 ribonucleoprotein approaches in Sclerotinia sclerotiorum. Journal of Agricultural and Food Chemistry. 72:4237-4245 https://doi.org/10.1021/acs.jafc.3c08093
30. MacGuidwin, A.E., Smith, D.L., Conley, S.P., and Saikai, K.A. 2024. Prevalence of pest nematodes associated with soybean (Glycine max) in Wisconsin from 1998 to 2021. Journal of Nematology. https://doi.org/10.2478/jofnem-2023-0053

31. Mankara Sureshbabu, B., Gillen, A. M., Smith, J. R., Mukaila, T., Markell, S. G., and Mathew, F. M. 2024. Greenhouse results suggest that disease severity in soybean (Glycine max L.), caused by Diaporthe longicolla as both a stem and seed pathogen, may not be correlated. Plant Health Prog. https://doi.org/10.1094/PHP-05-24-0042-RS
32. McCoy, A., Jacobs, J., Chilvers, M.I. 2024. Host range characterization of Phytophthora sansomeana across corn, soybean, wheat, winter cereal rye, dry bean and oats, and an in vitro assessment of seed treatment sensitivity. Plant Disease 108:2710-2721 https://doi.org/10.1094/PDIS-11-23-2303-RE
33. Miranda, I. L., Shim, S., Brand, S. B., and Telenko, D. E. P. 2024. Comparison of planting dates and seed treatments on soybean in central Indiana, 2023. Plant Disease Management Reports. Vol 18: ST004.
34. Mizuno, M.S., Brand, S.B., and Telenko, D.E.P. 2024. Fungicide efficacy and timing for foliar disease of soybean in central Indiana, 2023. Plant Disease Management Reports. Vol 18: CF035.
35. Mohan, K., Barnes, S., Rasuleva, D., Mukaila, T., Allen, T. W., Bergstrom, G. C., Bissonnette, K. M., Bonkowski, J., Bradley, C. A., Buck, J. W., Chilvers, M. I., Dorrance, A. E., Giesler, L. J., Kelly, H. M., Kleczewski, N., Betts, A. K., Lopez-Nicora, H. D., Malvick, D. K., Mangel, D. J. L., Markell, S. G., Mueller, D. S., Shires, M., Sikora, E. J., Smith, D. L., Spurlock, T. N., Telenko, D. E. P., Wise, K. A., Yabwalo, D., and Mathew, F. M. 2024. Sensitivity of soybean (Glycine max L.) pathogens Diaporthe aspalathi, D. caulivora, and D. longicolla to Difenoconazole and Fluopyram fungicides. Plant Health Prog. https://doi.org/10.1094/PHP-08-24-0078-RS
36. Mueller, B. and Smith, D.L. 2024. Evaluation of foliar fungicide treatments for control of Sclerotinia stem rot of soybean in Hancock, Wisconsin, 2023. Plant Disease Management Reports 18:CF005.
37. Mueller, B. and Smith, D.L. 2024. Evaluation of fungicides for control of Sclerotinia stem rot of soybean in Hancock, Wisconsin, 2023. Plant Disease Management Reports 18:CF004.
38. Mueller, B. and Smith, D.L. 2024. Evaluation of an herbicide and fungicides for control of Sclerotinia stem rot of soybean in Hancock, Wisconsin, 2023. Plant Disease Management Reports 18:CF003.
39. Mueller, D.S., Sisson, A.J., Eide, B., Allen, T.W., Bradley, C.A., Faske, T.R., Friskop, A., Lawrence, K., Musser, F., Reisig, D., Tenuta, A.U., and Wise, K.A. 2024. Field crop yield loss calculator for disease and invertebrate pests: an online tool from the Crop Protection Network. PhytoFrontiers. 4:2, 255-258. https://doi.org/10.1094/PHYTOFR-08-23-0109-A
40. Nguyen, N. S., Poelstra, J. W., Stupar, R. M., McHale, L. K., and Dorrance, A. E. 2024. Comparative transcriptomics of soybean genotypes with partial resistance towards Phytophthora sojae, Conrad, and M92-220, to moderately susceptible fast neutron mutant soybeans and Sloan. Phytopathology. First Look https://doi.org/10.1094/PHYTO-11-23-0436-R
41. Nunes, J.J., Arneson, N.J., Smith, D.L., Ruark, M., Conley, S., and Werle, R. 2024. Elucidating waterhemp (Amaranthus tuberculatus) suppression from cereal rye cover crop biomass. Weed Science. https://doi.org/10.1017/wsc.2024.21
42. Olaya, G., Linley, R., Ireland, D., Dorrance, A. and Robertson, A. 2024. Sensitivity of 40 Pythium species to the new fungicide picarbutrazox. J. Plant Dis. Prot. https://doi.org/10.1007/s41348-024-00875-4

43. Patel, J., Allen, T. W., Buckley, B., Chen, P., Clubb, M., Mozzoni, L. A., Orazaly, M., Florez, L., Moseley, D., Rupe, J. C., Shrestha, B. K., Price, III, P. P., Ward, B. M., and Koebernick, J. 2024. Deciphering genetic factors contributing to enhanced resistance against Cercospora leaf blight in soybean (Glycine max L.) using GWAS analysis. Frontiers in Genetics 15:1377223.
44. Patel, J., P. Price, et al. 2024. Deciphering genetic factors contributing to enhanced resistance against Cercospora leaf blight in soybean (Glycine max L.) using GWAS analysis. Frontiers in Genetics. https://doi.org/10.3389/fgene.2024.1377223
45. Poudel, D., Yan, G. P., Miranda, C., Kreutz, G.F., and Chowdhury, I.A. 2024. Copy number variations at the Rhg1 locus and their relationship with resistance to soybean cyst nematode (Heterodera glycines). Frontiers in Plant Science (Front. Plant Sci.) 15:1504932. doi: 10.3389/fpls.2024.1504932
46. Rafi, N., Dominguez, M., Okello, P., and Mathew, F. M.* 2024. No common candidate genes for resistance to Fusarium graminearum, F. proliferatum, F. sporotrichioides, and F. subglutanins in soybean (Glycine max L.) accessions from maturity groups 0 and I: Findings from genome-wide association mapping. Plant Dis. https://doi.org/10.1094/PDIS-02-24-0477-RE
47. Reynolds, C.J., Shim, S., Brand, S.B., and Telenko, D.E.P. 2024. Efficiency comparison of fungicides for soybean foliar diseases in soybean southwestern Indiana, 2023. Plant Disease Management Reports. Vol 18: CF028.
48. Rocco da Silva, C., Brand, S. B., and Telenko, D. E. P. 2024. Evaluation of OMRI (Organic Materials Review Institute) Products for White Mold in Organic Soybean in Northwestern Indiana, 2023. Plant Disease Management Reports. Vol. 18:CF064.
49. Rodriguez-Herrera, K. D., A. Vargas, J. Amie, P. Price, L. D. Salgado, V. P. Doyle, J. K. Richards, D. Moseley, A. Rojas, and S. Thomas-Sharma. 2024. Development of a greenhouse assay to screen soybean varieties for resistance to aerial blight caused by Rhizoctonia solani anastomosis group 1-IA. Phytopathology. 14:1039-1049. https://doi.org/10.1094/PHYTO-10-23-0390-KC
50. Rolling, W. R., Lake, R., Dorrance, A. E., and McHale, L. K. 2024. The effects of genetic distance and genetic diversity on genomic prediction accuracy for soybean quantitative disease resistance to Phytophthora sojae. Phytofrontiers 4:272-276. https://doi.org/10.1094/PHYTOFR-07-23-0093-SC
51. Shrestha, B. K.*, B. M. Ward, T. W. Allen*, E. T. da Silva, H. Zulli, W. Dunford, V. Doyle*, C. A. Bradley, B. Buckley, P. Chen, M. Clubb, H. Kelly, J. Koebernick, B. Padgett, J. C. Rupe, E. J. Sikora, T. N. Spurlock, S. Thomas-Sharma, A. Tolbert, X. Zhou, and P. Price*. 2024. Characterization of QoI-fungicide resistance in Cercospora isolates associated with Cercospora leaf blight of soybean from the southern United States. Plant Dis. 108:149-161. https://doi.org/10.1094/PDIS-03-23-0588-RE
52. Stupar, R. M., Locke, A. M., Allen, D. K., Stacey, M. G., Ma, J., Weiss, J., Nelson, R. T., Hudson, M. E., Joshi, T., Li, Z., Son, Q., Jedlicka, J. R., MacIntosh, G. C., Grant, D., Parrott, W. A., Clemente, T. E., Stacey, G., An, Y. C., Aponte-Rivera, J., Bhattacharyya, M. K., Baxter, I., Bilyeu, K. D., Campbell, J. D., Cannon, S. B., Clough, S. J., Curtin, S. J., Diers, B. W., Dorrance, A. E., Gillman, J. D., Graef, G. L., Hancock, C. N., Hudson, K. A., Hyten, D. L., Kachroo, A., Koebernick, J., Libault, M., Lorenz, A. J., Mahan, A. L., Massman, J. M., McGinn, M.,

Meksem, K., Okamuro, J. K., Pedley, K. F., Rainey, K. M., Scaboo, A. M., Schmutz, J., Song, B., Steinbrenner, A. D., Steward-Brown, B. B., Toth, K., Wang, D., Weaver, L., Zhang, B., Graham, M. A., and Oâ€™Rourke, J. A. 2024. Soybean genomics research community strategic plan: A vision for 2024-2028. The Plant Genome https://DOI:10.1002/tpg2.20516

53. Webster, R.W., Groves, C., Mueller, B., Renfroe-Becton, H., Smith, D.L. 2024. Investigating the Role of Soybean Genetic Resistance on the Production of Sclerotinia sclerotiorum Sclerotia. Plant Disease. DOI: 10.1094/PDIS-10-24-2240-RE
54. Westrick, N.M., Dominguez, E.G., Hull, C.M., Smith, D.L., and Kabbage, M. 2024. A single laccase acts as a key component of environmental sensing in a broad host range fungal pathogen. Communications Biology. https://doi.org/10.1038/s42003-024-06034-7.
55. Yewle N, Shim, S., Brand, S. B., and Telenko, D. E. P. 2024. Foliar fungicide program and timing evaluation for white mold in soybean in Indiana, 2023. Plant Disease Management Reports. Vol 18: CF025.

Extension articles

1. Betts A.K. Scouting for Soybean Cyst Nematode. Delaware Weekly Crop Update. 6.14.24
2. Betts A.K. Soybean Updates. Delaware Weekly Crop Update. 7.11.24
3. Betts A.K. Big Rains and Soybean Disease. Delaware Weekly Crop Update. 7.26.24
4. Betts A.K. Diseases in Soybean. Delaware Weekly Crop Update. 8.16.24
5. Betts A.K. Soil Sampling for nematodes in soybean. Delaware Weekly Crop Update. 9.13.24
6. Chilvers, M. McCoy, A., Ochi, S. 2024. Red crown rot: A new threat to soybean production. MSUE News https://www.canr.msu.edu/news/red-crown-rot-a-new-threat-to-soybean-production Reposted in Morning Ag Clips https://www.morningagclips.com/red-crown-rot-a-new-threat-to-soybean-production/
7. Chilvers, M., McCoy, A. 2024. Soybean disease management in 2024 should start with field notes and variety selectionMichigan Soybean News Spring 2024 Volume 16 issue 1. https://www.misoy.org/msn-winter-2023.html
8. DiFonzo, C., Chilvers, M. Fast Fonz Facts. White mold, phytophthora, tar spot and ear mold. July 18, 2024
9. Faske, T., Watson, T., Wheeler, T., and Grabau, Z. 2024. An overview of reniform nematode. Crop Protection Network. CPN-7002. http://doi.org/10.31274/cpn-20241118-0
10. Hamilton, R., Jacobs, J. L., McCoy, A. G., Kelly, H. M., Bradley, C., Malvick, D., J.A., Rojas, Chilvers, M.I. 2024. Monitoring for resistance to the SDHI fungicide seed treatments ILEVO (fluopyram) and Saltro (pydiflumetofen) for soybean sudden death syndrome (SDS) management. Crop Protection Network. doi.org/10.31274/cpn-20240904-2 https://cropprotectionnetwork.org/publications/monitoring-for-resistance-to-the-sdhi-fungicide-seed-treatments-ilevo-fluopyram-and-saltro-pydiflumetofen-for-soybean-sudden-death-syndrome-sds-management
11. Lopez-Nicora, H.D., Mangel, D., McCoy, A., Webster, R.W., Robertson, A., Chilvers, M., Tenuta, A., Mueller, D., and Wise, K. 2024. An Overview of Phytophthora Root and Stem Rot. Crop Protection Network, CPN-1021. DOI: doi.org/10.31274/cpn-20240503-0"
12. McCoy, A. G., Belanger, R. R., Bradley, C. A., Cerritos-Garcia, D. G., Garnica, V. C., Geisler, 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., Wally, O., Chilvers, M. I. 2024. Loss of Effective Soybean Phytophthora Root and Stem Rot Resistance Genes. Crop Protection Network. CPN-5014. doi.org/10.31274/cpn-20240618-1 https://cropprotectionnetwork.org/publications/loss-of-effective-soybean-phytophthora-root-and-stem-rot-resistance-genes

13. Shim, S. and Telenko, D. E. P. 2024. Applied Research in Field Crop Pathology for Indiana 2023. Purdue Extension. https://indianafieldcroppathology.com/wp-content/uploads/2024/03/BP-Extension-Applied-Research-on-Field-Crop-Disease-2023_Final.pdf
14. Smith, D.L. 2024. Wisconsin field crop disease update â€“ August 10, 2024. Badger Crop Doc Blog, August 10. https://badgercropdoc.com/2024/08/10/wisconsin-field-crop-disease-update-august-10-2024/.
15. Smith, D.L. 2024. Mid-season corn and soybean disease update and new corn fungicide ROI calculator. Badger Crop Doc Blog, July 22. https://badgercropdoc.com/2024/07/22/mid-season-corn-and-soybean-disease-update-and-new-corn-fungicide-roi-calculator/.
16. Smith, D.L. 2024. It's that time of year again: What to do about white mold of soybean? Badger Crop Doc Blog, July 8. https://badgercropdoc.com/2024/07/08/its-that-time-of-year-again-what-to-do-about-white-mold-of-soybean/
17. Telenko, D. 2024. Field Crop Disease Monitoring Resources for Indiana. Pest and Crop. Issue 2024.3
18. Telenko, D. 2024. Foliar Disease Update In Indiana Corn And Soybean. Pest and Crop. Issue 2024.16
19. Telenko, D. and Bonkowski, J. 2024. Red Crown Rot of Soybean: What to do if you suspect it is in your field Pest and Crop. Issue 2024.18
20. Telenko, D., Casteel, S., Bonkowski, J. and Creswell, T. 2024. Black Soybeans In Indiana. What Is Causing It And The Potential For Reduced Soybean Seed Quality. Pest and Crop. Issue 2024.29
21. Telenko, D. and Bonkowski, J. 2024. Field Crop Disease Samples Needed In Indiana. Pest and Crop. 2024.12
22. Telenko, D. 2024. Evaluation Of New Technology For Foliar Disease Management In Indiana Soybean And Corn. Pest and Crop. 2024.8.
23. Webster, R.W., Becton, H., and Mathew, F. Cercospora Leaf Blight and Purple Seed Stain of Soybean. NDSU Extension Publication.
24. Webster, R.W., Becton, H., Mathew, F., and Baldwin, S.A. Phytophthora Root and Stem Rot of Soybean. NDSU Extension Publication.
25. Webster, R.W., Becton, H., Mathew, F., and Baldwin, S.A. Sudden Death Syndrome of Soybean. NDSU Extension Publication.
26. Webster, R.W., NDSU Crop and Pest Report. 17 articles.

27. Webster, R. W., Roth, M., Mueller, B., Mueller, D., Chilvers, M., Telenko, D., Wilbur, J., Mourtzinis, S., Conley, S., and Smith, D. 2024. Modern Integrated Management Practices for Controlling White Mold of Soybean. Crop Protection Network. CPN-5009. doi.org/10.31274/cpn-20220314-1
28. Yan, G. P. 2024. Resistance of soybean varieties to Pratylenchus dakotaensis, a new root-lesion nematode species that is infecting soybeans, North Dakota Soybean Council, 2024 Research Report, Teamwork in Action â€“ Advancing Soybean Production through Research, Page 5.
29. Yan, G. P. 2024. Evaluation of soybean varieties and breeding lines for resistance to soybean cyst nematode and their copy number variation at Rhg1 locus, North Dakota Soybean Council, 2024 Research Report, Teamwork in Action. Advancing Soybean Production through Research, Page 8
30. Fungicide Efficacy for Control of Soybean Seedling Diseases. Alabama Crops Newsletter
31. Aerial Web Blight of Soybeans. Alabama Crops Newsletter 7/12/24
32. Aerial web blight continues to appear in soybean fields. Alabama Crops Newsletter 8/22/24
33. Frogeye Leaf Spot on Soybeans Alabama Crops Newsletter 9/25/24
34. Soybean Vein Necrosis Virus Common in Alabama. Alabama Crops Newsletter 9/25/24
35. Cercospora Leaf Blight on Soybeans. Alabama Crops Newsletter 10/23/24
36. Purdue Crop & Weather Update - https://www.youtube.com/watch?v=hWchWhJc0cI