

2019 MCCC Michigan State Report

Contact Information

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RESEARCH- On-going cover crop research (by primary discipline)	
Name(s)	Project title/objective
COMMODITY SPECIFIC	
Baas, D. and B. Wilke	Management of Rye Cover Crops and Influence on Weed Control, Soybean Cyst Nematode and Soybean Production. Michigan Soybean Checkoff (2020)
Bird, G., M. Quintanilla, Phil Kaatz and Ned Berkey	Trap crop development for soybean cyst nematode management (2018-2021)
Bird, G., M. Quintanilla	Impact of cover crops in seed potato production systems (2018-2020)
Bird, G., N. Rothwell, D. Baas, B. Klein, and K. Powers	Impact of cover-crops/mulch/compost on tart cherry orchard development/productivity and soil health. Michigan Cherry Council supported (2009-2019)
Brainard, D.C., M. Hausbeck, Z. Hayden and Z. Szendrei.	Integrated insect, disease, and groundcover management in asparagus. USDA-MDARD-SCBG 2017-2019
Cassida, K.A., and J.J. Paling.	Cover Crop Variety Test. Funded by public entries.
Hayden, Z.D. and M. Quintanilla	Investigation of <i>Brassica</i> cover crops for nutrient cycling and nematode suppression in muck celery production. MI Celery Research, Inc., 2018-2021
Jean, M., J. DeDecker, C. Kapp and M. Quintanilla	Evaluating Millet Cover Crop in a Potato Rotation. Michigan Potato Industry Commission. 2017-2019
Kravchenko, Renner, Guber, Miller, Tiemann and Baas.	Transition to organic row-crop systems: enhancing sustainability in topographically diverse midwest landscapes. USDA – Organic Transitions. 2018-2021. \$500,000.
Quintanilla, M., Baas, D., Brainard, D., Conner. J.	Developing cultural practices to manage critical pests in carrots. SCBG. 2019-2021.
Renner, K	Shading Influences Weeds and Cover Crop Growth and Photosynthesis WSSA Undergraduate Student Research Grant. 2018 \$2000.
Renner, Baas, Kravchenko, and Tiemann.	The Role of Cover Crop Mixtures across Varying Field Topography. Project GREEN. 2019-2021 \$45,000
Renner, Tiemann, Basso and Sprague.	Early interseeding of cover crops in corn: Crop productivity and soil health. USDA-Agriculture & Food Research Initiative. 2017-2020 \$500,000
Renner and Sprague.	What Herbicides can be used with Interseeded Cover Crops in Corn? Project GREEN. 2018-2019. \$11,000.
Renner and Sprague.	Interseeded Cover crop tolerance to soil-applied and postemergence herbicides in corn. Corn Marketing Program of Michigan. 2018-2019. \$12,000.

Sprague and Renner.	Glyphosate-resistant horseweed (marestalk) management in soybean. Michigan Soybean Promotion Committee . 2018-2019 \$26,500.
Sprague and Renner.	Integrating fall-planted cereal cover crops to aid in the management of glyphosate-resistant horseweed. Project GREEN 2017-2019. \$50,000
Szendrei, Z., D.C. Brainard, M. Hausbeck, Z. Hayden et al.	Integrating organic cucurbit science and production in the Midwest. USDA-NIFA-OREI 2016-2019
FORAGES/FEEED	
Burns, E., K. Cassida, M. Singh	Identifying agronomic and weed control practices to optimize establishment of alfalfa interseeded in corn. Project GREEN 2019-2021.
Cassida, K.A., R. A. Ehrhardt, J.A. Schwehofer, and E Recktenwald.	Integrating Lamb Grazing Systems with Crop Production for Michigan. Michigan Alliance for Animal Agriculture, 2019-2021.
Renz, M., W.R. Osterholz, J.H. Grabber, K. Cassida, E. Burns, J. Williamson, and D. Bjorneberg	Identifying factors to optimize establishment of alfalfa interseeded in corn. NIFA Alfalfa & Forage Research Program, 2017-2019.
Wilke, B., H. Straub III	Integrating annual forages into a perennial grazing systems
PEST/DISEASE MANAGEMENT	
Bird, G., J. Shoemaker (M.S. Student)	Assessing the trap crop potential of cover crops for control of Soybean Cyst Nematode
Quintanilla, M, D. Baas, J. Conner and B. Werling	Genomic identification of oilseed radish cover crop cultivars for nematode host resistance/susceptibility screening. Project GREEN 2019 - 2020.
SOIL FERTILITY	
Baas, D., K. Renner, B. Wilke, and K. Ortner	Designing a better cover crop interseeding system including evaluation of corn row spacing, interseeding equipment, tillage, manure and cover crop species.
Edwards, Naim, and D. Baas.	Urban Soil Management Project: Cover Crop Mixture and varying tillage intensity Evaluation
Hayden, Z.D. and D.C. Brainard	Optimizing fall cover crop fertility management for vegetable production systems. USDA/MDARD, MI Vegetable Council, 2017-2019.
Jean, M., D. Baas, J. DeDecker and C. Kapp	Demonstrating Soil Health Management Systems in Northern Michigan to Promote Greater On-farm Adoption of Conservation Practices. USDA Conservation Innovation Grant. 2019-2021
Renner, K. C. Sprague, B. Basso, L. Tiemann, and A. Brooker.	Early interseeding of cover crops in corn: Crop productivity and soil health. USDA-NIFA 2017-2020.

SOIL SCIENCE/ HEALTH/ BIOLOGY- OTHER	
Hayden, Z.D., L.K. Tiemann, D.C. Brainard, and E.L. Bunting	Soil health for intensive production: Understanding and addressing key constraints for vegetable systems on sandy soils. USDA NIFA, 2019-2022
Kravchenko, A., K. Renner, A. Guber, M. Thelen, D. Baas, S. Miller, N. Millar and L. Tiemann	Topographically diverse landscape influences on cover crop establishment and ecosystem services in corn and wheat cropping systems. Project GREEN 2016, CRDF Global 2017-2019, USDA-Org Transition 2019 - 2021
Rangarajan, A., D.C. Brainard, E. Gallandt, Z. Szendrei, L. Rodriguez, V. Morrone et al.	Farmer-Designed Systems to Reduce Tillage on Organic Vegetable Farms. USDA-NIFA-OREI 2014-2018
K. Renner, D. Baas, A. Kravchenko, Lisa Tiemann and K. Ortner	Organic Transition Systems: The Role of Cover Crop Mixtures across Varying Field Topography. Project GREEN 2019 - 2021
Snapp, S. et al.	Long Term Ecological Research with some rotations including cover crops
Snapp, S. and V. Morrone	Linking plant traits with soil health to determine optimal cover crop mixtures on organic farms USDA-Org Transitions (lead Univ Mich J Blesh)

PUBLICATIONS, EXTENSION/OUTREACH

Bulletins and Factsheets

- Cassida, K., and J. Lindquist. 2018. *Frost-Seeding – an Effective Forage Establishment Practice for Michigan*. MSUE #E2125, 8 pp. <https://forage.msu.edu/wp-content/uploads/2018/08/E2185-FrostSeedingAnEffectiveForageEstablishmentPracticeForMichigan-2018.pdf>
- Cassida, K., J. Paling, and C. Kapp. 2019. *2018 Michigan Forage Variety Test Report*. MSU Forage Factsheet 19-01, 37 pages. Published Feb. 1, 2019. Online. <https://forage.msu.edu/wp-content/uploads/2019/02/2018-MichiganStateUniversityVarietyTrialReport-WebVersion.pdf>
- Cassida, K., and P. Kaatz. 2019. *Recommended Hay and Pasture Forages for Michigan*. MSUE Bulletin #E-3309. Published online Nov.11, 2019. <https://forage.msu.edu/wp-content/uploads/2019/11/E3309-RecommendedHayPastureForagesForMichigan-2019.pdf>
- Baas, D., C. Curell, P. Gross, M. Jean, P. Kaatz and E. Schultheis. 2019. *Michigan Cover Crop Recipe - Post Corn, Going to Soybean: Use Cereal Rye*. Published online Aug. 23, 2019. https://www.canr.msu.edu/cover_crops/uploads/files/mccc-109,%20cc-03,%20mi%20post%20corn.pdf
- Baas, D., C. Curell, P. Gross, M. Jean, P. Kaatz and E. Schultheis. 2019. *Michigan Cover Crop Recipe - Post Soybean, Going to Corn: Use Cereal Rye*. Published online Aug. 23, 2019. https://www.canr.msu.edu/cover_crops/uploads/files/mccc-110,%20cc-04,%20mi%20post%20soybean.pdf
- Baas, D., C. Curell, P. Gross, M. Jean, P. Kaatz and E. Schultheis. 2019. *Michigan Cover Crop Recipe - Post Wheat, Going to Soybean or Corn: Use Oats and Radish Mix*. Published online Aug. 23, 2019. https://www.canr.msu.edu/cover_crops/uploads/files/MCCC-111CC-05MIpostwheat.pdf
- Baas, D., C. Curell, P. Gross, M. Jean and P. Kaatz. 2019. *Cover Crops for Prevented Planting*. Published online June 26, 2019. https://www.canr.msu.edu/cover_crops/uploads/files/Prevented_Planting_Cover_Crops.pdf

MSU Extension News Articles

- Cassida, K.A. 2019. March is Frost-Seeding Month in Michigan. Published Mar. 21, 2019. *MSUE Ag News*, https://www.canr.msu.edu/news/march_is_frost_seeding_month_in_michigan.
- Baas, D. 2019. Michigan cover crop acreage increases 54 percent in five years. *MSUE Ag News*. Published April 25, 2019. <https://www.canr.msu.edu/news/michigan-cover-crop-acreage-increases-54-percent-in-five-years>
- Baas, D., K. Renner and E. Schultheis. 2019. MSU Cover Crop Team Webinar Series: Cover Crops in Michigan - Interseeding Cover Crops. *MSUE Ag News*. Published May 16, 2019. <https://www.canr.msu.edu/news/msu-cover-crop-team-webinar-series-cover-crops-in-michigan-interseeding-cover-crops>
- Baas, D., A. Brooker and E. Schultheis. 2019. MSU Cover Crop Team Webinar Series: Interseeding cover crops in corn in Michigan. *MSUE Ag News*. Published May 21, 2019. <https://www.canr.msu.edu/news/msu-cover-crop-team-webinar-series-interseeding-cover-crops-in-corn-in-michigan>
- Baas, D., E. Hill, C. Sprague and E. Schultheis. 2019. MSU Cover Crop Team Webinar Series: Planting green – Cereal rye and soybean. *MSUE Ag News*. Published May 28, 2019. <https://www.canr.msu.edu/news/msu-cover-crop-team-webinar-series-planting-green-cereal-rye-and-soybean>
- Curtright, A, D. Baas, D. and E. Schultheis. 2019. *MSU Cover Crop Team Webinar Series: Soil biology benefits of cover crops*. *MSUE Ag News*. Published June 11, 2019. <https://www.canr.msu.edu/news/msu-cover-crop-team-webinar-series-soil-biology-benefits-of-cover-crops>
- Baas, D., C. Sprague and E. Schultheis. 2019. *MSU Cover Crop Team Webinar Series: Managing weeds when seeding cover crops*. *MSUE Ag News*. Published June 17, 2019. <https://www.canr.msu.edu/news/msu-cover-crop-team-webinar-series-managing-weeds-when-seeding-cover-crops>
- Baas, D. 2019. *Research and demonstration projects to be highlighted at cover crops and crop innovations field day*. *MSUE Ag News*. Published Sept. 23, 2019. <https://www.canr.msu.edu/news/research-and-demonstration-projects-to-be-highlighted-at-cover-crops-and-crop-innovations-field-day>
- **Cassida, K.**, and P. Kaatz. 2019. Recommendations for selecting hay and pasture forages for Michigan. *MSUE Ag News*, Published online Nov. 12, 2019. <https://www.canr.msu.edu/news/recommendations-for-selecting-hay-and-pasture-forages-for-michigan>

Other News Articles

- Cassida, K.A. 2019. Building Value from Cover Crops. MSUE Field Crops Webinar. Published online 3/11/19. <https://www.canr.msu.edu/resources/cover-crop-profitability> Accessed 7 Oct 2019.
- Cassida, K.A. 2019. Interseeding Alfalfa into Corn. MABA Annual Conference, January 16, 2019, Lansing, MI. Published online 6/29/19. <https://www.youtube.com/watch?v=Yc4rl3VJoww&feature=youtu.be> Accessed 7 Oct 2019, 13 views.
- Cassida, K.A. 2019. MSU Cover Crop Variety Trials. MABA Annual Conference, January 16, 2019, Lansing, MI. Published online 6/29/19. <https://www.youtube.com/watch?v=y6-M3r25sUU&feature=youtu.be>

- Hill, E. 2019. “Planting Green”: Cereal rye and soybean. MSU Cover Crop Team Webinar Series. May 15, 2019. Available online at: https://www.youtube.com/watch?time_continue=4&v=1FuDHq1bmKQ
- Sprague, C. 2019. Managing Weeds When Seeding Cover Crops. MSU Cover Crop Team Webinar Series. May 5, 2019. Available online at: https://www.youtube.com/watch?time_continue=2&v=VD_F2yEyGQE&feature=emb_logo
- Brooker, A. 2019. Interseeding Cover Crops in Corn: 2015 - 2018. MSU Cover Crop Team Webinar Series. May 5, 2019. Available online at: https://www.youtube.com/watch?v=kv_e7uqStrA&feature=emb_logo
- Renner, K. 2019. Cover Crops in Michigan - Interseeding Cover Crops. MSU Cover Crop Team Webinar Series. May 5, 2019. Available online at: https://www.youtube.com/watch?time_continue=8&v=HREcmTCSnPI&feature=emb_logo
- Curtright, A. 2019. Soil Biology Benefits of Cover Crops. MSU Cover Crop Team Webinar Series. May 5, 2019. Available online at: https://www.youtube.com/watch?time_continue=3&v=HDvimgip2qU&feature=emb_logo
- Wilke, B.J. 2019. Monthly contribution to “Grazing in Michiana” column in *The Farmer’s Exchange* newspaper, including cover crop topics.
- Wilke, B.J. 2019. Grazing annual forages webinar. Penn State University Grazing Webinar Series, February 20, 2019.
- Brainard, D.C. and Z.D. Hayden. 2019. Tillage, cover crops’ long-term effects studied. *Vegetable Growers News*. January 2019. p24-25.
- Hayden, Z.D. 2019. Nitrogen boosts late-summer cover crops. *Vegetable Growers News*. July 2019. <https://vegetablegrowersnews.com/article/nitrogen-boosts-late-summer-cover-crops>

PUBLICATIONS, REFEREED

- Blesh, J., E. VanDusen and D.C. Brainard. 2019. Managing ecosystem services with cover crop mixtures on organic farms. *Agronomy Journal* 111: 826-840.
- Brooker, A., K. Renner and C. Sprague. 2020. Interseeding cover crops in corn. *Agron J.* 2020 1-9.
- Frost, M.D, E.R. Haramoto, K.A. Renner and D.C. Brainard. 2019. Tillage and cover crop effects on weed seed persistence: Do light-exposure or fungal pathogens play a role? *Weed Science* 67: 103-113.
- Fry, J.E., and A.K. Guber. 2020. Temporal stability of field-scale patterns in soil water content across topographically diverse agricultural landscapes. *Journal of Hydrology* 580:124260.
- Lowry, C.J. and D.C. Brainard. 2019. Strip-intercropping of rye-vetch mixtures: Effects on weed growth and competition in strip-tilled sweet corn. *Weed Science* 67: 114-125.
- Lund, M, D.C. Brainard and Z. Szendrei. 2019. Cue hierarchy for host plant selection in *Pieris rapae* (Lepidoptera: Pieridae). *Entomologia Experimentalis et Applicata* 167: 330-340.
- Mpeketula, Placid M.G., and S.S. Snapp. 2019. Structural Stability Conditions Soil Carbon Gains from Compost Management and Rotational Diversity. *Soil Sci. Soc. America J.* 83:203-211.
- Rutan, J., and K. Steinke. 2019. Corn nitrogen management following Daikon radish and forage oat cover crops. *Soil Science Society of America Journal* 83:181-189.

THESES and DISSERTATIONS

- Tarrant, A.R. 2019. Crop production and soil health tradeoffs of between-row weed and soil management strategies in organic plasticulture vegetable production. MS Thesis. Michigan State University. (Major Advisor: Z.D. Hayden)

PRESENTATIONS, EXTENSION

Grower Field Days

- February 26, 2019. State of the Lake: A Tri-State Water Quality. Hillsdale, Michigan, organizer: R. Costa. (35 participants)
- July 31, 2019. Forage Field Day. East Lansing, Michigan, organizer: K. Cassida. (35 participants)
- August 26, 2019. Kick Your Soil Health Up A Notch: A Twilight Meeting. Monroe, Michigan, organizers: R. Costa, S. Fronczak. (35 Participants)
- Sept. 19, 2019. Cover Crop Field Day, organizer: V. Morrone. (25 participants)
- Sept. 24, 2019. Cover Crop & Forage field day, Organizer: P. Kaatz. (120 participants)
- Sept. 27, 2019. KBS Crop Innovation and Cover Crop Field Day, Organizer: D. Baas, B. Wilke (40 Participants)

Grower Meetings

- January 16, 2019. Cassida, K. Interseeding Alfalfa into Corn. MABA Annual Conference, Lansing, MI. (50 participants)
- January 16, 2019. Cassida, K. MSU Cover Crop Variety Trials. MABA Annual Conference, Lansing, MI. (50 participants)
- January 16, 2018. Hill, E. and C. Sprague. "Planting green": Cereal rye and soybean. Michigan Agri-Business Association Winter Conference. Lansing, MI.
- January 16, 2018. Sprague, C., E. Burns, A. Brooker, and E. Hill. Managing weeds when interseeding. Michigan Agri-Business Association Winter Conference.
- January 18, 2109. Baas, D. Implementing Cover Crops...How, Why, Economics. 2019 Corn-Soybean Day (Ohio). Archbold, OH (305 Participants)
- Feb. 7, 2019. Cassida, K. The Value of Cover Crops. Crop Update, Richland, MI (25 participants)
- Feb. 8, 2019. Cassida, K. The Value of Cover Crops. Crop Update, Shepherd, MI (35 participants)
- March 5, 2019. MSU Forage Research Update. Great Lakes Forage & Grazing Conference, St. Johns, MI. (100 participants)
- March 12, 2019. Hayden, Z.D. 2019. Notes on cover crops for soil health and fertility. Southeast Vegetable Extension Meeting. Dundee, MI. (25 participants)
- March 14, 2019. Werling, B., D.C. Brainard, Z.D. Hayden, and J. Bakker. 2019. Impact of mustard cover crop on asparagus yield after two years. Oceana Asparagus Day. New Era, MI. (140 participants)
- June 27, 2019. Value of Cover Crops. General Mills grower meeting, Shepherd, MI. (Invited, 17 participants)
- Sep. 18, 2019. Soil Carbon Discussion at KBS LTER, Hickory Corners, MI. Organizer: J. Doll. (15 Participants)
- Brainard, D.C. and S.H. Tilton. 2019. Mechanical cultivation and cover crops for weed control in carrots. Carrot Session. Great Lakes Fruit, Vegetable, and Farm Market Expo. Grand Rapids, MI. December.

- Brainard, D.C. and B. Werling. 2019. Impact of rye cover crops and asparagus varieties on timing of spear emergence. Asparagus Session. Great Lakes Fruit, Vegetable, and Farm Market Expo. Grand Rapids, MI. December.
- Brainard, D.C. and Z. Hayden. 2019. Long term effects of tillage and cover crops on vegetables. Soil Health Session. Great Lakes Fruit, Vegetable, and Farm Market Expo. Grand Rapids, MI. December.

Conservation Districts/NRCS/Drain Commission Field Days/Meetings

- Aug. 22, 2019. Hillsdale County's 2019 Nutrient Management Field Day. Waldron, MI. S. Fronczak, D. Baas and R. Costa (100 Participants)
- Aug. 27, 2019. Making Dollars and Sense Field Day. Charlotte, MI. D. Baas (56 Participants)
- Aug. 28, 2019. Focus on Livestock Field Day. Niles, MI. D. Baas and B. Wilke (54 Participants)
- Sep. 11, 2019. KBS Soil health Educator Field Day. Hickory Corners. Organizer: Kara Haas and B. Wilke (20 Participants)
- Sep. 25, 2019. Homer Cover Crop Field Meeting. Homer, MI. C. Curell, D. Baas and E. Anderson (24 Participants)
- Dec. 9, 2019. MAEAP Technician Training and Tours at KBS. Hickory Corners. Organizer B. Wilke with MAEAP Staff (25 Participants)

PRESENTATIONS, SCIENTIFIC/SOCIETY

- Brainard, D.C., M.M. Benzle, Z. Szendrei and L.R. Appenfeller. 2019. Tillage and cover crops influence weed-insect interactions in winter squash. Abstract 359. Annual Meeting of the Weed Science Society of America. New Orleans, LA. February.
- Brainard, D.C. and Z.D. Hayden. 2019. Winter cover cropping for wind protection and pest suppression in vegetable production systems of western Michigan, USA. First International Cover Crops Conference. Lanzhou, China. September 20-26.
- Brooker, A. B. Basso and K. Renner. 2019. Using Remote Sensing to Assess Interseeded Cover Crop Establishment and Competitiveness in Maize. ASA meeting San Antonio.
- Brooker, A., K. Renner, K., C. Sprague, and L. Tiemann. 2019. Ecosystem Services Provided by Cover Crops Interseeded in Corn. WSSA meeting.
- Brooker, A., C. Sprague, and K. Renner. 2018. Herbicide selection for interseeding cover crops in corn. North Central Weed Science Society Annual Meeting. Dec. 3-6, 2018. Milwaukee, WI.
- Brooker, A., L. Tiemann, K. Renner, and C. Sprague. 2018. Early interseeding of cover crops in corn alters subsequent year's nitrogen dynamics. ASA-CSSA International Meeting. Nov. 4-7, 2018. Baltimore, MD.
- Brooker, A., K. Renner, C. Sprague, and L. Tiemann. 2018. Interseeded cover crops competitiveness in grain corn. Weed Science Society of America Annual Meeting. Jan. 29 – Feb. 1. Arlington, VA.
- Cassida, K.A. 2019. Yield, nutritive value, and nitrogen replacement value of annual legumes. Proc. American Forage & Grassl. Conf., Jan. 5-7, 2019, St. Louis MO. Online: https://www.afgc.org/i4a/doctr/library/getfile.cfm?doc_id=674
- Drumm S. A. and E. E. Burns. 2019. Does corn silage leaf angle modify the critical period of weed control in alfalfa interseeded with corn? North Central Weed Science Society Annual Meeting. 74:131. <https://ncwss.org/wp-content/uploads/2019-NCWSS-Unofficial-Proceedings.pdf>

- Hayden Z.D. and C.J. Phillippo. 2019. Nitrogen availability from winter-killed and overwintering fall cover crops impacts fresh market tomato production. ASA-CSSA-SSSA Annual Meeting. San Antonio, TX. November 10-13.
- Hayden, Z.D., C.J. Phillippo, and D.C. Brainard. 2019. Fall cover crop response to N fertilization on a low fertility soil. Soil Science Society of America Annual Conference. San Diego, CA. January 6-9.

MICHIGAN STATE UNIVERSITY COURSES THAT DISCUSS COVER CROPS

CSS 101- Introduction to Crop Science	ENT 205H- Pests Society and the Environment
CSS101L- Introduction to Crop Science Lab	ENT 479- Organic Pest Management
CSS 126- Introduction to Weed Management	HRT 251- Organic Farming Principles & Practices
CSS 201- Forage Crops	HRT 341- Vegetable Production & Management
CSS 212- Advanced Crop Production	
CSS 326- Weed Science	
CSS 360- Soil Biology	
CSS 442 Agricultural Ecology	
CSS/BSE/FOR 467- BioEnergy Feedstock Production	
CSS480- Soil Fertility and Nutrient Management	
CSS 488- Agricultural Cropping Systems: Integration & Problem Solving	