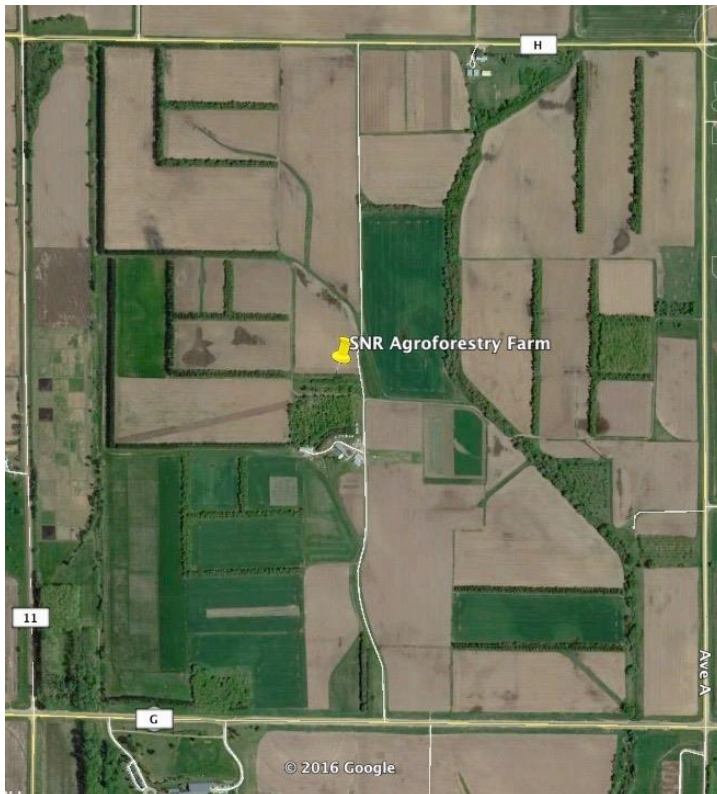


**ARDC Agroforestry Farm
(School of Natural Resources, IANR/UNL)
Accomplishments 1995-2015**

**Director: Dr. James Brandle (retired), Dr. David Wedin (Interim)
Staff: Bruce Bolander (manager), Mike Ceislick (retired), Doug Watson**

Current and Recent Projects:

- *Long-term replicated windbreak study (established 1966)
- *Long-term crop yield study (wheat-soybean-corn rotation, est. 1966)
- *Genotype tree trials (est. 1965-1990; bur oak, silver maple, green ash, honey locust, sycamore)
- *Mowing/burning experimental prairie plots (est. 1980).
- *Organic farms systems research (certified organic in 2008)
- *Cover crop research (est. 2010, organic vs conventional cropping)
- *Avian habitat quality of agricultural landscapes (est. 2009)
- *Pollinator enhancement demonstration planting (est. 2015)



Theses and Dissertations:

Katja Koehler Cole. 2015. *Introducing green manures in an organic soybean -- winter wheat -- corn rotation: Effects on crop yields, soil nitrate, and weeds.* Ph.D. UNL.

William Ballesteros Possu. 2015. *Carbon storage potential of windbreaks on agricultural lands of the continental United States.* PhD UNL.

Jianru Shi. 2013. *Decomposition and Nutrient Release of Different Cover Crops in Organic Farm Systems.* MS UNL.

John E. Quinn. 2010. *Assessment and Communication of the Value of Biodiversity in Agroecosystems.* PhD UNL.

Jeremy Hiller. 2004. *Woody Plant Recruitment in Planted Windbreaks: Saunders*

County, Nebraska. MS UNL.

James C. Kriz. 2003. *Predaceous insect abundance as affected by landscape structure and temporal distribution in alfalfa fields in east-central Nebraska.* MS UNL.

Mark L. Marsh. 1999. *The Value of Shelterbelts to Agricultural Production in the Northern Great Plains: An Economic Assessment in a Changing Climate.* MS UNL.

XinHua Zhou. 1999. *On the Three Dimensional Aerodynamic Structure of Shelterbelts.* PhD UNL.

- Qingjiang Hou. 1999. *Soil Moisture Within the Windbreak/Crop Interface and a Comparison of Three Types of Sensors for Measuring Soil Water Content*. MS UNL
- Lori A. Hoagland. 1997. *Analysis of Integrated Farming Systems in Eastern Nebraska*. MS UNL.
- Mohd Nazip Suratman. 1996. *Growth and yield of snap beans (*Phaseolus vulgaris* L.) as affected by shelterbelts and planting dates*. MS UNL.
- Hehui Zhang. 1993. *Windbreak shelter and physiological responses of corn*. PhD UNL.
- Teresa K. Boes. 1989. *Reproductive biology of *Pinus sylvestris* L: seed yield, flower phenology, the response of young seedlings to GA_{4/7} and developmental anatomy*. PhD UNL.
- Jonathan Davis. 1988. *Physiological response of green ash (*Fraxinus pennsylvanica* Marsh.) to drought*. PhD UNL
- Thomas Hans. 1987. *Effect of shelterbelts on growth, yield and quality of alfalfa (*Medicago sativa* L.)*. MS UNL
- Patricia Boehner. 1986. *Effect of pre-burn artificial litter and prescribed burning on smooth brome (*Bromus inermis* Leyss.)*. MS UNL.
- Kendra Angle. 1985. *Variation in drought resistance of four provenances of bur oak*. MS UNL.
- George Riggs. 1985. *Changes in photosynthetic rate in *Pinus sylvestris* L. and *Pinus banksiana* Lamb. seedlings subjected to drought stress*. MS UNL.
- Catherine Wiederspan. 1983. *Effects of season of burning on seeded switchgrass (*Panicum virgatum* L.)*. MS UNL
- Mark Coleman. 1982. *Source variation in water relations of *Populus deltoides* Bartr. var. *deltoides* inoculated with vesicular-arbuscular mycorrhizal fungi*. MS UNL.
- Sunday Ogbuehi. 1980. *Influence of windbreak-shelter on soybeans [*Glycine max* (L) Merrill]*. PhD UNL

Publications / Book Chapters

2016

Possu, W.B., et al. 2016. Estimating carbon storage in windbreak trees on U.S. agricultural lands. *Agroforestry Systems*. DOI 10.1007/s10457-016-9896-0.

Ziegler, J., et. al. 2016. A model for estimating windbreak carbon within COMET-Farm. *Agroforestry Systems*. DOI 10.1007/s10457-016-9977-0.

2015

Oden, A., J. Brandle, M. Burbach, M.B. Brown, J.E. Quinn. 2015. Variation in avian vocalizations during the non-breeding season in response to traffic noise. *Ethology*. 121(5):472-479.

Zhou, X., Schoeneberger, M., Brandle, J. R., Awada, T. N., Martin, D. L., Li, J., Chu, J., Mize, C.. 2015. Analyzing the uncertainties in use of forest derived biomass equations for open-grown trees in agricultural land. *Forest Science*, 61: 144-161.

2014

Brandle, J. R., Schoeneberger, M. M. 2014. Working Trees: Supporting agriculture and healthy landscapes. *Journal of Tropical Forest Science*, 26(3), 305-308.

Quinn, J.E., J. Brandle, R. Johnson. 2014. Identifying opportunities for conservation embedded in cropland anthromes. *Landscape Ecology*. 29(10):1811-1819.

2013

Quinn, J., Brandle, J. R., Johnson, R. J. 2013. A farm-scale biodiversity and ecosystem services assessment tool: the healthy farm index. *International Journal of Agricultural Sustainability*, 11, 176-192.

Quinn, J., Oden, A., Brandle, J. R. 2013. The influence of different cover types on American Robin nest success in organic agroecosystems. *Sustainability*, 5, 3502-3512.

2012

Quinn, J., Brandle, J. R., Johnson, R. J., Tyre, A. J. 2012. Application of detectability in the use of indicator species: A case with birds. *Ecological Indicators*, 11, 1413-1418.

Quinn, J.E., J. Brandle, and R. Johnson. 2012. The effects of land sparing and wildlife-friendly practices on grassland bird abundance within organic farmlands. *Agriculture Ecosystems, & Environment*. 161:10-16.

Schoeneberger, M.M., G. Bentrup, H. deGooijer, R. Soolanayakanahally, T. Sauer, J. Brandle, X. Zhou, and D. Current. 2012. Agroforestry as a climate change mitigation and adaptation tool for agriculture. *Journal of Soil and Water Conservation* 67: 128A- 136A. doi:10.2489/jswc.67.5.128A

Zhou, X., Brandle, J. R., Awada, T. N., Schoeneberger, M., Martin, D. L., Tang, Z. 2012. The use of forest-derived specific gravity for the conversion of volume to biomass for open grown trees on agricultural land. *Biomass and Bioenergy*, 35, 1721-1731.

2011

Hernandez-Ramirez, G., T. J. Sauer, C. Cambardella, J. R. Brandle, and D. E. James. 2011. Carbon sources and dynamics in afforested and cultivated Corn Belt soils. *Soil Sci. Soc. Am. J.* 75:216-225.

Hou, Q., L.J. Young, J.R. Brandle, and M.M. Schoeneberger. 2011. A spatial model approach for assessing windbreak growth and carbon stocks. *J. Environ. Quality* 40:842-852.

Quinn, J.E., J. Brandle, R. Johnson, and A. Tyre. 2011. Accounting for detectability in the use and application of indicator species: A case study with birds. *Ecological Indicators*. 11:1413-1418.

Zhou, X.H., J.R. Brandle, T.N. Awada, M.M. Schoeneberger, D.L. Martin, Z.H. Tang. (2011) The use of forest-derived specific gravity for the conversion of volume to biomass for open grown trees on agricultural land. *Biomass and Bioenergy* 35:1721-1731.

2010

Hoagland, L., L. Hodges, G.A. Helmers, J.R. Brandle, and C.A. Francis. 2010. Labor availability in an integrated agricultural system. *J. Sustain. Agric.* 34:532-548.

2009

Brandle, J.R., J. Tyndal, R.A. Sudmeyer, and L. Hodges (2009) Windbreak Practices. In: Garrett, H.E., W.J. Rietveld, and R.F. Fisher (eds.) *North American Agroforestry: An Integrated Science and Practice*, 2nd edition, American Society of Agronomy, Madison, WI.

Perry, M.E.L., W.H. Schacht, G.A. Ruark, and J.R. Brandle (2009) Tree canopy effect on grass and grass/legume mixtures in eastern Nebraska. *Agroforestry Systems* 77:23-35.

Prueger, J. H., T. J. Sauer, and J. L. Hatfield. 1999. Turbulence flux estimates of sensible and latent heat near shelterbelts during low wind conditions. *Trans. ASAE*. 41:1643-1650.

Puckett, H.L, J.R. Brandle, R.J. Johnson, and E.E. Blankenship (2009) Avian foraging patterns in crop field edges adjacent to woody habitat. *Agriculture Ecosystems and Environment* 131:9-15.

Quinn, J.E., J.R. Brandle, and R.J. Johnson. 2009. Development of a Healthy Farm Index to assess ecological, economic, and social function on organic and sustainable farms in Nebraska's four agroecoregions. Pages 156-170 In: Franzluebbbers, A.J., ed. 2009. *Farming with Grass: Achieving Sustainable Mixed Agricultural Landscapes*. Ankeny, IA: Soil and Water Conservation Society.

Sauer, T. J., C. A. Cambardella, and J. R. Brandle. 2007. Soil carbon and tree litter dynamics in a red cedar-scotch pine shelterbelt. *Agroforestry Systems* 71:163-174.

2008

Mize, C., J.R. Brandle, M. Schoeneberger, and G. Bentrup (2008) Ecological function, development, and design of shelterbelt systems in North America. In: Jose, S. and A.M. Gordeon (eds) *Toward Agroforestry Design – An Ecological Approach*. Springer, NY. p. 27-54.

Mize, C, J. Colletti, W. Batchelor, J.S. Kim, E.S. Takle, and J.R. Brandle. 2008. Modeling a field shelterbelt system with the shelterbelt agroforestry modeling system. In Batish, D. R., R. K. Kohi, S. Jose, and H. P. Singh, eds., 2008: *Ecological Basis of Agroforestry*. CRC Press. Pp 287-299.

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2006

Zhang, D.S., A. Samal, and J.R. Brandle. (2006) A Method for estimating fractal dimension of tree crowns from digital images. *International Journal of Pattern Recognition and Artificial Intelligence* 20:1-11.

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Kriz, J., S.D. Danielson, J.R. Brandle, E.E. Blankenship and G. Henebry (2006) Effects of aphid (Homoptera) abundance and surrounding vegetation on the encounter rate of Coccinellidae (Coleoptera), Chrysopidae (Neuroptera) and Nabidae (Hemiptera) in alfalfa. *Journal of Entomological Science* 41: 211-220.

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Dosskey, M.G., D.E. Eisenhauer, and M.J. Helmers. 2005. Establishing conservation buffers using precision information. *J. Soil and Water Conservation* 60: 349-354.

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Brandle, J.R., L. Hodges, and X.H. Zhou. 2004. Windbreaks in North American agricultural systems. *Agroforestry Systems* 61-2: 65-78.

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Hodges, L., M.N. Suratman, J.R. Brandle, et al. 2004. Growth and yield of snap beans as affected by wind protection and microclimate changes due to shelterbelts and planting dates. *Hortscience*, 39:996-1004.

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Takle, E. S., W. J. Massman, J. R. Brandle, R. A. Schmidt, R. Garcia, I. V. Litvina, X. Zhou, G. Doyle, and C. W. Rice, 2004: Influence of high-frequency ambient pressure pumping on carbon dioxide efflux from soil. *Agric. and Forest Meteor.* 124, 193-206.

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Zhou, X. H., J. R. Brandle, C. W. Mize, and E. S. Takle, 2004: Three-dimensional aerodynamic structure of a tree shelterbelt: Definition, characterization and working models. *Agroforestry Systems* **63**, 133-147.

2003

Dosskey, M.G., M. Helmers, D. Eisenhauer, T. Franti, and K. Hoagland. 2003. Hydrologic routing of farm runoff and implications for riparian buffers. In: J.D. Williams and D. Kolpin (eds.) *Agricultural Hydrology and Water Quality*. Am. Water Resources Assoc., Middleburg, VA. CD-ROM

Hou, Q.J., J. Brandle, K. Hubbard, M. Schoeneberger, C. Nieto and C. Francis. 2003. Alteration of soil water content subsequent to root-pruning at a windbreak / crop interface in Nebraska, USA. *Agroforestry Systems* **57**:137-147.

Takle, E. S., J. R. Brandle, R. A. Schmidt, R. Garcia, I. V. Litvina, W. J. Massman, X. Zhou, G. Doyle, and C. W. Rice, 2003: High-frequency pressure variations in the vicinity of a surface CO₂ flux chamber. *Agric. Forest Meteor.* **114**, 245-250.

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Mize, C., W. Batchelor, E. Takle, J. Brandle, M. Egeh, and G. Horvath. 2002. Progress on modeling crop production under shelter. In: W. Schoeder and J. Kort (eds) *Temperate agroforestry: Adaptive and mitigative roles in a changing physical and socio-economic climate. Proceedings, Seventh Biennial Conference on Agroforestry in North America*, June 12-15, 2001, Regina, Saskatchewan. p. 221.

Zhou, X., J. R. Brandle, E. S. Takle, and C. W. Mize, 2002: Estimation of the 3-dimensional aerodynamic structure of a green ash shelterbelt. *Agric. For. Meteor.*, **111**, 93-108.

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Easterling, W.E., J.R. Brandle, C.J. Hays, et al. 2001. Simulating the impact of human land use change on forest composition in the Great Plains agroecosystems with the Seedscape model. *Ecological Modelling* **140**:163-176.

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Guo, Q. 2000. Climate change and biodiversity conservation in Great Plain agroecosystems. *Global Environmental Change* **10**:289-298.

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Zhang, D.S., J.R. Brandle, L. Hodges, et al. 1999. The response of muskmelon growth and development to microclimate modifications by shelterbelts. *Hortscience* **34**:64-68

Schmitt, T.J., M.G. Dosskey, and K.D. Hoagland. 1999. Filter strip performance and processes for different vegetation, widths, and contaminants. *J. Environmental Quality* **28**:1479-1489.

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1997

- Easterling, W.E., C. J. Hayes, M.M. Easterling, et al. 1997. Modelling the effect of shelterbelts on maize productivity under climate change: An application of the EPIC model. *Agricultural Ecosystems & Environment*. 61:163-176.
- Dix, M.E., L. Hodges, J.R. Brandle, et al. 1997. Effects of shelterbelts on the aerial distribution of insect pests in muskmelon. *Journal of Sustainable Agriculture* 9:5-24.
- Guertin, D.S., W.E. Easterling, and J. R. Brandle. 1997. Climate change and forests in the Great Plains - Issues in modeling fragmented woodlands in intensively managed landscapes. *Bioscience* 47:287-295.
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Extension Publications

- Hodges, L. and J. Brandle 2006. *Windbreaks for fruit and vegetable production*. EC-06-1779.
- Brandle, J., X. Zhou, and L. Hodges. 2002. *How windbreaks work*, EC-02-1763
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- Stange, C., J. Wilson, J. Brandle, and M. Kuhns. 1998. *Windbreak renovation*. EC-98-1777.
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- Quam, V.C., L. Johnson, B. Wight, and J.R. Brandle. 1994. *Windbreaks for livestock operations*. EC-91-1766.
- Wight, B., T.K. Boes, and J.R. Brandle. 1993. *Windbreaks for rural living*. EC-91-1767.
- Johnson, R.J., M.M. Beck and J.R. Brandle. 1992. *Windbreaks and wildlife*. EC-91-1771.

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Boehner, P., J.R. Brandle and S. Finch. 1991. *Windbreak establishment*. EC-91-1764.

Grants (total \$3,255,000)

2012-2017. PI J. R. Brandle (D. Wedin after 2015). *The role of woody systems in sustainable agriculture*. USDA McIntire-Stennis (NEB-38-095, ACC#0230910). \$360,000

2012-2016. PI T.H. Sauer. *Great Plains agroforestry: evaluating bioenergy feedstock and carbon sequestration as potential long-term revenue streams to diversify landowner income*. North Central Sustainable Agriculture, Research and Education (NCR-SARE, ACC#0423017). \$191,212

2011-2015. PI J. Brandle, *Temperate Agroforestry in Greenhouse Gas Mitigation*, USDA Forest Service, \$50,000.

2011-2013; P.I. J.E. Quinn. *Building Capacity to Conserve the Bell's Vireo in Nebraska's Agroecosystems*. Nebraska Bird Partnership. \$25,000

2009-2014; P.I. C.A. Shapiro, Co-PIs: J.E. Quinn, J. Brandle, C. Francis, R. Wright, S. Knezevic, et al. *Improving Organic Farming Systems and Assessing their Environmental Impacts*. USDA Organic Agriculture Research and Extension Initiative (ACC#0218824). \$1.41 million. Individual project allocation \$ 244,085

2006-2012; PI J.R. Brandle. Shelterbelts in today's agricultural production systems. USDA McIntire-Stennis (NEB-38-050, ACC#0208774), approx \$400,000

2010-2012 PIs J. Brandle and X. Zhou. Brandle, J. *Carbon Inventory of Woody Plants*. Sponsored USDA Forest Service \$17,000.

2009-2010; P.I. C. Francis, Co-PIs: J.E. Quinn, C. Quinn, J. Van Wort, K. Kohler-Cole, M. Burbach, G. Matkin. *Development of an Urban Food Leadership Coop in Support of a Local Food System*. US EPA P3 Awards: A National Student Design Competition for Sustainability Focusing on People, Prosperity and the Planet. \$9945.

2009; P.I. J.E. Quinn. *Communicating the importance and challenges organic certification*. OCIA Research & Education. \$1500.

2008; P.I. J.E. Quinn. *Assessing the health of Nebraska's organic farmers by measuring farmer satisfaction*. OCIA Research & Education. \$1150.

2007; P.I. J.E. Quinn. *Optimizing Ecosystem Services in Healthy Organic Agroecosystems*. Center for Great Plains Studies Research Grant-in-Aid. \$432.

2000-2006; PIs J.R. Brandle, L. Hodges, and J. Josiah. *Windbreak Shelter Effects*. USDA McIntire-Stennis (NEB-40-011, ACC#0187739).

2003-2005; PI: Eisenhauer; *Improved Methods for Assessing Infiltration in Riparian Buffers*. US Forest Service. \$31,373

1999-2005; PIs S.J. Josiah and J.R. Brandle. *Linking special forest products, markets and sustainable agroforestry systems*. USDA McIntire-Stennis (NEB-40-006, ACC#0184434)

2002-2004; PIs: Dosskey (USFS), Hoagland and Brandle (UNL). *Change in Filter Strip Performance of Over Time*. USDA-CSREES (ACC#0193096). \$75,000.

1997-2002; PIs: Eisenhauer, Franti; *Water Quality Functions of Vegetative Buffers*. US Forest Service. \$50,000.

1999-2001. PI Takle, E. S. *Pilot study of influences of atmospheric pressure fluctuations on fluxes of trace gases from soils*. Great Plains Regional Center, National Institute for Global Environmental Change (NIGEC/USDOE) \$31,517.

2000. PIs: Mize, C. W., W. D. Batchelor, E. S. Takle, and J.A. Hallam, *Modeling corn and soybean production in a sheltered field*. USDA NRI \$523,745.

1998-1999; PIs: Dosskey (USFS), Eisenhauer, Franti, and Hoagland (UNL). *Development of Field Techniques for Estimating the Effectiveness of Filter Strips*. Nebraska Corn Board, \$21,000

1996-1999; PIs Mize, C. W., W. D. Batchelor, J. A. Hallam, P. H. Wray, E. S. Takle, J. R. Brandle, R. Cruse, and M. Ghaffarzadeh, *Modeling a shelterbelt agroforestry system*. USDA National Research Initiative Competitive Grants Program. \$330,000.

1993-1998; PI: Hoagland; *Riparian Buffers for Non Point Source Pollution Abatement in Agroecosystems*. US Forest Service. \$29,500.

1993-1998; PI: Wardle. *Efficacy of Alternative Riparian Buffer Designs for Pollution Abatement*. US Forest Service. \$57,000.

1993-1997. Takle, E. S., R. A. Schmidt, and J. R. Brandle. *Microclimate impacts of shelterbelts in agroforestry ecosystems*. US Department of Agriculture - CSRS. \$295,016.

1994-1996; PIs: Dosskey (USFS), Hoagland and Brandle (UNL). *Demonstrating Riparian Buffers for Nonpoint Source Pollution Abatement in an Agricultural Watershed*. Nebraska DEQ, \$157,920.

1993-1995. Brandle, J. R., W. E. Easterling, E. S. Takle, M. M. Schoenberger, and R. A. Schmidt. *Assessment of climate change on a mixed agricultural landscape on the North American Great Plains*. US Department of Energy, NIGEC. \$362,100