

Steve Crittenden – Curriculum Vitae

Postdoctoral Associate
Nutrient Management Spear Program
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My focus in the Nutrient Management Spear Program has been on improving the economic and environmental sustainability of agriculture, specifically dairy farms, through the New York Phosphorus Index (NYPI) which is a tool for improving water quality through better manure management. I'm also currently working on whole-farm nutrient mass balances which allow farmers to identify inefficiencies in their practices and where opportunities for improvement may lie. From my Cornell experience I've also been exposed to precision agriculture, double cropping, P based management of corn-alfalfa rotations, acid-whey applications to soil, and greenhouse gas emissions from alfalfa.

Education

2009 - 2013, Ph.D. Soil Quality, Wageningen University, The Netherlands

Biophysical soil quality of tillage systems under conventional and organic farming.

2002 - 2005, M.Sc. Soil Science, University of Guelph, Canada

Effect of Manure Management Practice on *E. coli*, Nitrogen, and Phosphorous Loss in Agricultural Water.

1998 - 2002, B.Sc. (Honours) Environmental Science, University of Guelph, Canada

Earth and Atmosphere Science Major. Area of emphasis in Environmental Impact Assessment.

Research Experience

Jul. 2015 - present, Postdoctoral Associate, Cornell University, U.S.A. Improving economic and environmental sustainability of dairy farms through whole-farm nutrient mass balances and the New York State Phosphorus Index. Farmer, student, planner, and government consultations and analyses will result in peer-reviewed journal articles, extension documents, and a revised New York State Phosphorus Index that includes a range of best management practices. (<http://nmsp.cals.cornell.edu/>)

Nov. 2013 - Dec. 2015, Guest Researcher, Wageningen University, The Netherlands
Scientific journal article and PhD thesis writing are the main tasks. Participation in SUSTAIN project meetings.

Aug. 2009 - Oct. 2013, Ph.D. Candidate, Wageningen University, The Netherlands
Thesis covers soil quality in reduced tillage systems in conventional and organic farming. International collaborations were initiated, students were successfully supervised, and multiple field campaigns were organized simultaneously.

Mar. 2008 - Sep. 2008, Research and Development Coordinator, Western Ag Innovations, Canada

Soil nutrient bioavailability. Created and sustained a strong network in the scientific community, supported collaborative research projects with new and existing clients and developed potential markets.

Aug. 2007 - Feb. 2008, Assistant Engineer, Cemagref (IRSTEA), France

Assessed agri-food and dairy industry effluents for phosphorus recycling potential in Brittany through bibliographical searches and industry surveys.

May 2006 - Dec. 2006, Research Associate, University of Guelph, Canada

Project and team management included organization and construction of a field research project to investigate environmental impacts of agricultural management.

Sep. 2005 - Mar. 2006, Research Assistant, Global Forum on Agricultural Research, Italy

GFAR is a stakeholder-led initiative that fosters cost effective collaborative partnerships among stakeholders involved in agricultural research for development. I updated and further developed GFARs Civil Society Organizations database, edited and proof read the Newsletter, and assisted and participated in workshops and meetings.

Sep. 2002 - Sep. 2005, M.Sc. Candidate, University of Guelph, Canada

Focus was on transport of nutrients and bacteria through soil. Tasks included design, construction, and implementation of soil water collection and monitoring system.

Jan. 2003 - Apr. 2004, Teaching Assistant, University of Guelph, Canada

Two advanced level courses (Groundwater 3060 and Soil Management 4090) were assisted upon. Conducted weekly seminars, graded assignments and exams, and provided student consultations.

Sep. 2000 - Aug. 2002, Student Assistant, University of Guelph, Canada

Part-time lab duties were soil and corn analysis. Summer full-time duties included soil and plant sampling, and assisting on various research projects.

May 2000 - Sep. 2000, Summer Assistant, Ontario Ministry of Agriculture, Food, and Rural Affairs, Canada

Field work included soil sampling, collecting physiological data on corn plants, and GPS mapping.

Teaching Experience

Whole-Farm Nutrient Management (ANSC 4120), Cornell University, 2016 and 2017

Work with students on their whole-farm nutrient mass balances.

Soil Management (ENVS 4090), University of Guelph, 2003 and 2004

Teaching assistant, marking of assignments and exams, student consultation.

Groundwater (ENVS 3060), University of Guelph, 2003

Teaching assistant, gave weekly lectures.

Student Supervision

The role of anecic earthworms in affecting soil physical properties and greenhouse gas emissions

Marta Manrubia Freixa (B.Sc. thesis)

Effects of inversion and non-inversion tillage on earthworm population dynamics and species diversity in organic and conventional arable farming systems

Tamilarasi Eswaramurthy (M.Sc. thesis)

Effect of non-inversion tillage on soil structural and hydraulic properties in a marine loam soil in the Netherlands

Natasja Poot (M.Sc. thesis)

Non-inversion system promotes soil physical factors and earthworm community

Tian Li and Yu Guan (B.Sc. thesis)

Does non-inversion tillage positively affect earthworm communities and soil structure in crop rotations including root crops?

Bas Oudshoorn (M.Sc. thesis)

Grants and awards

Cornell Postdoc Travel Grant

To attend ASA, CSSA, and SSSA meetings in Phoenix, USA (2016)

SUSTAIN: Soil Functional Biodiversity and Ecosystem Services, a Transdisciplinary Approach

Participated in proposal writing, execution, and dissemination.

http://snowmannetwork.com/?page_id=283.

COST Short-term Scientific Mission

Influence of cover crops on soil properties in vineyards and olive groves, Madrid, Spain (2014).

Young Professionals International

Funding was through the Canadian Federation of Agriculture to work at the Global Forum on Agricultural Research, housed at the Food and Agriculture Organization of the United Nations in Rome, Italy (2005-2006).

Morwick Scholarship

School of Environmental Sciences, University of Guelph, Canada (2004).

Taffy Davison Travel Award

Ontario Agricultural College, University of Guelph, Canada (2003).

Publications

Soil phosphorus saturation ratio sets comparable manure application cutoffs across states differing in agronomic soil test

S.J. Crittenden, Q.M. Ketterings, J. Knight, and K. Czymmek (2017). *Soil Sci.* 182 : 36-44.

Restructuring the P Index to better address P management in New York

Q.M. Ketterings, S. Cela, A. Collick, S.J. Crittenden, and K. Czymmek (2017). *J. of Env. Qual.* DOI: 10.2134/jeq2013.02.0067

Integrating soil physical and biological properties in contrasting tillage systems in organic and conventional farming

S.J. Crittenden and R. de Goede (2016). *Europ. J. Soil Biol.* 77:26-33.

Sustainable Land Management Practices for Dryland Restoration. A Review.

Maria Jose Marques, Gudrun Schwilch, Stephen Crittenden, Nina Lauteburg, Tesfai Mehreteab, Jannes Stolte, Eshetu Yirdaw, Nikia Evelpidou, Thorunn Petusdottir, Thomas Panagopoulos, Annab Karkani, Yaseman AsliYilmazqi, Jose Luis Rubio, Claudio Zucca, Ute Schmiedel, Markku Kanninen, Adrian Doko (2016). *Journal of*

Environmental Planning and Management. Sustainability 8 (177).
<http://doi.org/10.3390/su8020177>

Effect of tillage on earthworms over short- and medium-term in conventional and organic farming

Crittenden, S. J., Eswaramurthy, T., de Goede, R. G., Brussaard, L., and Pulleman, M. M. (2014). Applied Soil Ecology 83: 140-148.

Earthworm assemblages as affected by field margin strips and tillage intensity: An on-farm approach

S.J. Crittenden, E. Huerta, R.G.M. de Goede, M.M. Pulleman (2015). European Journal of Soil Biology 66: 49-56.

Soil physical quality of reduced tillage systems in conventional and organic farming

S.J. Crittenden, N. Poot, M. Heinen, M.M. Pulleman (2015). Soil & Tillage Research 154:136-144.

Conferences and Presentations

New York Phosphorus Index Project Update

Northeast Region Certified Crop Adviser Training, Syracuse, U.S.A., 2016

Linking New York Phosphorus Index and Whole-Farm Nutrient Mass Balances

Agriculture, Food and Environmental Systems In-Service, Ithaca, U.S.A., 2016.

Soil Phosphorus Saturation Ratio Sets Comparable Manure Application Cutoffs for New York and Pennsylvania

Soil Science Society of America annual meeting, Phoenix, U.S.A., 2015.

A New and More Intuitive Structure for the New York Phosphorus Index

Soil Science Society of America annual meeting, Minneapolis, U.S.A., 2015.

Developing a New Phosphorus Index for New York with Stakeholder Input

The Northeastern Plant Health and Pest Conference, Philadelphia, U.S.A., 2015.

Nutrient mass balances and drivers for change on NY State dairy farms

Dairy Environmental Systems and Climate Adaptation Conference and Tours, Ithaca, New York, 2015.

Summary of Soil Phosphorus Projects

Certified Crop Adviser Agriculture and Food System In-service, Ithaca, New York, 2015.

Nutrient mass balances and drivers for change on NY State dairy farms

Presented by S.J. Crittenden at Dairy Environmental Systems and Climate Adaptation Conference, 29-31 July, 2015, Ithaca, NY, U.S.A.

Biological and physical soil quality of reduced tillage in conventional and organic farming in

The Netherlands

Presented by S.J. Crittenden, at COST Short-term Scientific Mission, 12- 16 May, 2014, Madrid, Spain.

Integrated soil quality of reduced tillage systems

Presented poster by S.J. Crittenden and M.M. Pulleman, Wageningen UR, The Netherlands at the First International Conference on Global Food Security, 29th September - 2nd October, 2013. Noordwijkerhout, The Netherlands.

Diversiteit van regenwormen effecten van grondbewerking en akkerranden

Vakgroep Bodemkwaliteit, Wageningen, The Netherlands, 2013.

Effect of tillage on earthworms over short- and medium-term in conventional and organic farming

Oral presentation at SUSTAIN update meeting, 25-27 Feb. 2013, Kasteel Hoekelum, The Netherlands.

Integrated soil quality of reduced tillage systems

First International Conference on Global Food Security, Wageningen, The Netherlands, 2013.

Can reduced disturbance improve soil physical quality through earth- worms?

Eurosoil, Bari, Italy, 2012.

Can reduced disturbance improve soil physical quality through earth- worms

International Symposium on Managing Soils for Food Security and Climate Change Adaptation and Mitigation (FAO/IAEA), Vienna, Austria, 2012.

SUSTAIN project, a SNOWMAN network collaboration

ELN-FAB European Seminar: Applying functional agrobiodiversity in the Mediterranean 14 - 15 June 2012, Avignon, France.

Spatial distribution and dispersal of earthworms in a complex landscape implications for ecosystem services

XVI International Colloquium on Soil Zoology, Coimbra, Portugal, 2012.

Effect of Reduced Soil Disturbance on Soil Physical Quality and Earthworm Density

Presented poster at Soil Science in a Changing World, 18-22 September 2011, Wageningen, The Netherlands.

Can reduced tillage and field margins improve soil water dynamics through stimulation of earthworms?

The 9th International Symposium on Earthworm Ecology, Jalapa, Mexico, 2009.

Ion Exchange Membranes are an Important Tool in Forestry Research Fifty Years After Their Initial Use

North American Forest Soils Conference, Blacksburg, U.S.A., 2008.

PRS-Probes Functionally Measure the Soil Supply Rate of N and P In Cranberry Bogs

Annual meeting of ASA/CSSA/SSSA, Houston, U.S.A., 2008.

The Impact of Simulated Climate Change on Soil Nutrient Supply Rates in Transition Mixedwood Boreal Forest Ecosystems of Quebec

Canadian Society of Soil Science meeting, Prince George, Canada, 2008.

Traitement et valorization du phosphore issu des effluents agro-alimentaires, en particulier laitiers

Reunion BBA, Cemagref, Rennes, France, 2008.

Insights from a Review on Research Partnerships

Learning and Review Workshop on Global Partnership Programmes, Global Forum on Agricultural Research, Rome, Italy, 2006.

Effect of Management Practice on Agricultural Drainage Water Quality

Integrated Systems in Manure Management, London, Canada, 2004.

Effect of Management Practice on Agricultural Drainage Water Quality

Nitrogen Forum, Niagara Falls, Canada, 2004.

Effect of Management Practice on Agricultural Drainage Water Quality

Soil Science Society of America annual meeting, Seattle, U.S.A., 2004.

Sampling Methods for Measuring Nutrients and Bacteria in Subsurface Water

Canadian Society of Soil Science, Montreal, Canada, 2003.