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Universiteit Leiden



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Author: Silva Lourenço, Késia

Title: Linking soil microbial community dynamics to N₂O emission after bioenergy residue amendments

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Curriculum Vitae

Publications

Késia Silva Lourenço was born on 23th March 1988 in Ponte Alta (Santa Catarina), Brazil. In 2010, she completed her BSc degree in Agronomic Engineering at the University of Santa Catarina (UDESC), Brazil. During her bachelor, she worked on soil fertility and plant nutrition. After that, she continued her education. In 2011, she started her MSc studies in soil management at the University of Santa Catarina, Brazil. During her MSc thesis at the group of Chemical and Soil Fertility, she studied the reactions of N in the soil after application of organic and inorganic fertilizers in the presence or absence of urease inhibitors under the supervision of Prof. dr. Paulo Roberto Ernani. For this work, she received a grant from "Coordination for the Improvement of Higher Education Personnel (CAPES)". In 2013, she started her PhD project in collaboration with Agronomic Institute of Campinas (IAC) and Netherlands Institute of Ecology (NIOO/KNAW) under the supervision of Prof. dr. J.A. van Veen, Dr. E. Kuramae and Dr. Heitor Cantarella. In 2013, she moved to Campinas, Brazil and started her PhD research under the supervision of Dr Heitor Cantarella (IAC), where she did the experimental work. In 2015 she moved to the Netherlands and continued her PhD under supervision of Dr. Eiko E. Kuramae (NIOO-KNAW) and Prof. dr. J.A. van Veen (NIOO-KNAW and Leiden University). The findings of her PhD research are described in this thesis.



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List of publications

Publications unrelated to this thesis:

- Lourenço, K.S.**, Corrêa, J.C., Ernani, P.R., Lopes, L.D.S., and Nicoloso, R.D.S. (2013). Nutrient uptake and yield of common bean fertilized with poultry litters and mineral nutrients. *Brazilian Journal of Soil Science* 37, 462-471. doi:10.1590/s0100-06832013000200017
- Knoblauch, R., Ernani, P. R., Gatiboni, L. C., Albuquerque, J. A., **Lourenço, K. S.**, Martins, A. A. (2013). Nitrogen dynamics in flooded soil resulting from the application of urea and poultry litter in the presence and absence of rice plants. *Agropecuária Catarinense* 26, 79-84.
- Knoblauch, R., Ernani, P.R., Deschamps, F.C., Gatiboni, L.C., Walker, T.W., **Lourenço, K.S.**, Martins, A.A., and Pegoraro, A. (2014). Rice straw incorporated just before soil flooding increases acetic acid formation and decreases available nitrogen. *Brazilian Journal of Soil Science* 38, 177-184. doi:10.1590/s0100-06832014000100017
- Rogeri, D.A., Ernani, P.R., **Lourenço, K.S.**, Cassol, P.C., and Gatiboni, L.C. (2015). Mineralization and nitrification of nitrogen from poultry litter applied to soil. *Revista Brasileira de Engenharia Agrícola e Ambiental* 19, 534-540. doi:10.1590/1807-1929/agriambi.v19n6p534-540
- Lourenço, K.S.**, Ernani, P.R., Corrêa, J.C., Molin, S.J.D., and Lourenço, L.S. (2016). Addition of urease inhibitor has no effect on ammonia volatilization following soil application of poultry litter or organomineral fertilizer, unlike urea. *Brazilian Journal of Soil Science* 40. doi:10.1590/18069657rbcs20150031
- Corrêa, J.C., Grohskopf, M.A., Nicoloso, R.D.S., **Lourenço, K.S.**, and Martini, R. (2016). Organic, organomineral, and mineral fertilizers with urease and nitrification inhibitors for wheat and corn under no-tillage. *Pesquisa Agropecuária Brasileira* 51, 916-924. doi:10.1590/s0100-204x2016000800003
- Rogeri, D.A., Ernani, P.R., Mantovani, A., and **Lourenço, K.S.** (2016). Composition of Poultry Litter in Southern Brazil. *Brazilian Journal of Soil Science* 40. doi:10.1590/18069657rbcs20140697
- Soares, J.R., Cassman, N.A., Kielak, A.M., Pijl, A., Carmo, J.B., **Lourenço, K.S.**, Laanbroek, H.J., Cantarella, H., and Kuramae, E.E. (2016). Nitrous oxide emission related to ammonia-oxidizing bacteria and mitigation options from N fertilization in a tropical soil. *Scientific Reports* 6, 30349. doi:10.1038/srep30349
- Cassman, N.A., **Lourenço, K.S.**, Do Carmo, J.B., Cantarella, H., and Kuramae, E.E. (2018). Genome-resolved metagenomics of sugarcane vinasse bacteria. *Biotechnology for Biofuels* 11,48. doi:10.1186/s13068-018-1036-9
- Lourenço, K.S.**, Sousa, R.M., Montezano, Z.F., Soares, J.R., Carmo, J.B., Vitti, A.C., Rossetto, R., Kuramae, E.E. and Cantarella, H. Anticipated or postponed vinasse application related to mineral nitrogen in sugarcane crop reduce the N₂O and CO₂ emissions. (to be submitted).
- Lourenço, K.S.**, Soares, J.R., Menegale, P.L.C., Gonzaga, L.C. and Cantarella, H. Nitrification inhibitor mitigates N₂O emission from organic residue combined with N fertilizer. (to be submitted).

Publications related to this thesis:

- Lourenço, K.S.***, Suleiman, A.K.A.*, Pitombo, L.M., Mendes, L.W., Roesch, L.F.W., Pijl, A., Carmo, J.B., Cantarella, H., and Kuramae, E.E. (2018). Recycling organic residues in agriculture impacts soil-borne microbial community structure, function and N₂O emissions. *Science of The Total Environment* 631-632, 1089-1099. doi:10.1016/j.scitotenv.2018.03.116
- Lourenço, K.S.**, Suleiman, A.K.A., Pijl, A., van Veen, J.A., Cantarella, H., Kuramae, E.E. (2018) Resilience of the resident soil microbial community to organic and inorganic amendment disturbances and to temporary bacterial invasion. (Chapter 3, submitted)
- Lourenço, K.S.**, Dimitrov, M.R., Pijl, A., Soares, J.R., Carmo, J.B., Van Veen, J.A., et al. (2018). Dominance of bacterial ammonium-oxidizer and fungal denitrifier in the complex pathway of Nitrogen cycle. (Chapter 4, submitted).
- Lourenço, K.S.**, Cassman, N.A., Pijl, A., van Veen, J.A., Cantarella, H., Kuramae, E.E. (2018). *Nitrosospira* sp. govern nitrous oxide production in a tropical soil amended with residues of bioenergy crop. (Chapter 5, submitted).

The reaserch described in this thesis was performed in the Paulista Agency for Agribusiness Technology, Polo Regional Centro Sul (APTA), Laboratory of chemical and soil fertility of Agronomic Institute of Campinas (IAC), and the Department of Microbial Ecology at the Netherlands Institute of Ecology (NIOO/KNAW). This research was financially supported by the São Paulo Research Foundation (FAPESP) and The Netherlands Organization for Scientific Research (NWO).

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Cover: Picture of experiment field area with sugarcane in Brazil.
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