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From the root of variation: A metabolomics perspective to plant soil-feedback

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Acknowledgments

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Curriculum vitae

Martine was born on the 27 of November in Ettelbrück, Luxembourg. She finished school with an apprenticeship as medical technical technician in Luxembourg city and then decided that she wanted to understand natural processes better. She started to study biology in Tübingen (Germany) in 2009 and focused on plant ecology in her bachelor thesis. Inspired by her work during the bachelor she decided to pursue a master in ecology and evolution also at the University of Tübingen. In her master thesis she explored the chemical defences of a range expanding plant and tested different invasion theories. Although she really enjoyed working with this established hypothesis, she wanted to get a broader answer to research questions in ecology and understand the role of soil in above belowground interactions. Furthermore, she wanted to explore the whole picture of chemistry of plants and learn about metabolomics. Therefore, she moved to the Netherlands and started a PhD, in 2016, on the effect of plant soil feedbacks on metabolomics of plants. In the Netherlands she accomplished her work for the PhD at the NIOO-KNAW in Wageningen and at the Institute of Biology (IBL) of Leiden University.



Publications

Huberty, M*, B. Martis, J. van Kampen, Y.H. Choi, K. Vrieling, P.G.L. Klinkhamer, T.M. Bezemer (2020) Soil inoculation alters leaf metabolic profiles in genetically identical plants, *Journal of Chemical Ecology*, <https://doi.org/10.1007/s10886-020-01156-8>

Huberty, M*, Choi, Y.H., Heinen, R., Bezemer, T.M., (2020) Above-ground plant metabolomic responses to plant-soil feedbacks and herbivory, *Journal of Ecology* 00:1–10, <https://10.1111/1365-2745.13394>

Huberty, M., Tielbörger, K., Harvey, J.A., Müller, C., Macel, M.*, (2014) Chemical Defenses (Glucosinolates) of Native and Invasive Populations of the Range Expanding Invasive Plant *Rorippa austriaca*, *Journal of Chemical Ecology* 40:363–370, [10.1007/s10886-014-0425-1](https://doi.org/10.1007/s10886-014-0425-1)

De Long, J.R.*, Heinen, R., Steinauer, K., Hannula, S.E., **Huberty, M.**, Jongen, R., Vandenbrande, S., Wang, M., Zhu, F. and Bezemer T.M., (2019) Taking plant-soil feedbacks to the field in a temperate grassland. *Basic and Applied Ecology* 40: 30-42, <https://doi.org/10.1016/j.baae.2019.08.001>

Hannula, S.E.*, Kielak, A., Steinauer, K., **Huberty, M.**, Jongen, R., De Long, J.R., Heinen, R., Bezemer, T. M., (2019) Time after time: temporal variation in the effects of grass and forb species on soil bacterial and fungal communities. *mBio*, 10:e02635-19. <https://doi.org/10.1128/mBio.02635-19>

Heinen, R.*, Hannula, S.E., De Long, J.R., **Huberty, M.**, Jongen, R., Kielak, A., Steinauer, K.*, Zhu, F., Bezemer, T.M., (2020) Plant community composition steers grassland vegetation via soil legacy effects. *Ecology Letters* 23: 973-982, <https://doi.org/10.1111/ele.13497>

De Long, J.R., Heinen, R., Jongen, R., Hannula, S.E., **Huberty, M.**, Kielak, A.M., Steinauer, K., & Bezemer, T.M.*, (2020) How plant-soil feedback maternal effects influence the next generation of plants. *Ecological Research*, <https://doi.org/10.1111/1440-1703.12165>

Steinauer, K.*, Heinen, R., Hannula, SE, DeLong, JR, **Huberty, M**, Jongen, R, Wang, M., Bezemer, TM (2020) Above-belowground linkages of functionally dissimilar plant communities and soil properties in a grassland experiment. *Ecosphere* 11(9):e03246, <https://doi.org/10.1002/ecs2.3246>

PE&RC Training and education statement

With the training and education activities listed below the PhD candidate has complied with the requirements set by the C.T. de Wit Graduate School for Production Ecology and Resource Conservation (PE&RC) which comprises of a minimum total of 32 ECTS (= 22 weeks of activities)



Review of literature (4.5 ECTS)

- Belowground plant interactions in a plant soil feedback context

Writing of project proposal (4.5 ECTS)

- From soil legacies to chemical legacies-understanding plant-microbe interactions belowground

Post-graduate courses (7.7 ECTS)

- Introduction to statistics in R; PE&RC (2016)
- Metabolomics for ecologist; iDiv, Leipzig (2017)
- General research skills for PhDs and R/RStudio course; R/RStudio (2017)
- Multivariate analysis of ecological data Canoco; University of South Bohemia (2018)

Competence strengthening / skills courses (7.3 ECTS)

- Time management, self-management; HRM Learning and Development Leiden University (2017)
- Effective communication; HRM Learning and Development Leiden University (2017)
- Scientific communication; HRM Learning and Development Leiden University (2018)
- Communication in science, writing skills; HRM Learning and Development Leiden University (2018)
- Improve your memory for PhD's; HRM Learning and Development Leiden University (2018)
- Job orientation for PhDs; HRM Learning and Development Leiden University (2020)

Scientific integrity / ethics in science activity (0.6 ECTS)

- Workshop: the Netherlands code of conduct for academic practice and principles of good academic research; NIOO Research Integrity Board (2016)
- Scientific conduct; HRM Learning and Development Leiden University (2017)

PE&RC Annual meetings, seminars and the PE&RC weekend (1.2 ECTS)

- Plant-soil-microbe interaction workshop (2016)
- PE&RC First year weekend (2017)

Discussion groups / local seminars / other scientific meetings (8.4 ECTS)

- 11th Plant insect interactions; EPS, Leiden (2016)
- Plant-soil -microbe interactions for crop & pest management; Wageningen (2016)
- Metabolomics workshop; Leiden University (2017)
- Discussion group: spectrometric identification of organic compounds; Leiden (2017)
- One health symposium; Bern, Switzerland (2019)

International symposia, workshops and conferences (9.6 ECTS)

- Workshop COST-Action: plant mediated communication between above and belowground foodwebs; poster presentation; Leipzig, Germany (2016)
- Workshop metabolomics in chemical ecology; oral presentation; Wageningen, the Netherlands (2016)
- Joint annual meeting BES, GFÖ, NECOV and EEF: ecology across borders poster presentation; Gent, Belgium (2017)
- ISCE 35th International society of Chemical Ecology; oral presentation; Atlanta, USA (2019)

Lecturing / supervision of practicals / tutorials (0.3 ECTS)

- Exploitation of natural products (2018)

Supervision of students (9 ECTS)

- The effect of spatial dispersion in the plant-soil legacies on *Senecio* within four different ex-agricultural grassland fields
- Disentangling the effect of root and soil exudates on plant-soil feedback in *Chrysanthemum indicum*
- Metabolomic analysis of plant-soil feedbacks in *Senecio Jacobaea* with 1H-NMR spectroscopy
- The influence of different depths in the soil in relation to plant soil feedback
- The influence of plant root extracts on the growth of bacteria
- Effects of plant extracts on bacterial growth rates