Moshe Shenker

CURRICULUM VITAE

Personal Details: Born: 1953, Kibbutz Kabri, Israel; married, three children

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Higher Education

1982-1985 B.Sc. (*cum laude*), The Hebrew University of Jerusalem, Faculty of Agriculture; soil and water sciences.

1986-1989 M.Sc. (*cum laude*), The Hebrew University of Jerusalem, Faculty of Agriculture; soil and water sciences, plant nutrition.

1989-1995 Ph.D., The Hebrew University of Jerusalem, Faculty of Agricultural, Food and Environmental Quality Sciences; soil chemistry and plant nutrition.

1996-1997 Post-doctorate, the Department of Soil and Environmental Sciences, University of California, Riverside, USA. Rhizosphere interactions and trace-element uptake by plants, environmental considerations and soil bioremediation.

Appointments at the Hebrew University and service in other academic and research institutions

1997-2004 Lecturer, Department of Soil and Water Sciences, Robert H. Smith Faculty of Agriculture, Food and Environment, Rehovot.

2004-2005 Visiting researcher - College of Agricultural, Food, and Environmental Sciences, University of Minnesota, St. Paul, Minnesota.

2004-2014 Senior Lecturer, Dept. Soil and Water Sci., Robert H. Smith Faculty of Agriculture, Food and Environment.

2013 Visiting researcher – ETH, Group of Plant Nutrition, Zurich Lindau, Switzerland.

2014 to-date Associate Professor, Dept. Soil and Water Sci., Robert H. Smith Faculty of Agriculture, Food and Environment.

2019 Visiting researcher – China Agricultural University, College of Resources and Environmental Sciences, Department of Plant Nutrition, Beijing, China.

Teaching at the Hebrew University

Supervision of 41 Master students, 12 PhD students, and 7 Post-Doc fellows.

Teaching the following undergraduate courses: “Fertilization and Soil Fertility” (incl. lab); “Lectures on Fertilization and Soil Fertility”; “Agricultural and Municipal Waste Management and Recycling”; “Soilless culture and the rhizosphere”; “Methods of soil analyses”; “Agriculture and environmental quality – selected topics”, and the following graduate courses: “Soil Chemistry”; “Inter-disciplinary workshop of Environmental conflicts”.

Research Scope

My scientific activities and interest fall within the scope of soil chemistry and plant nutrition, related to agriculture and the environment, including:

- Iron (Fe^{+2} and Fe^{3+}) in the soil-plant system, chemical processes and plant nutrition, and the involvement of natural microbial chelates (siderophores) in Fe processes in the soil and Fe availability to plants.
- Interactions and effects of plant natural chelates (phytosiderophores) on heavy metals (Cd, Pb, Zn, Cu) availability and uptake by plants.
- Quantify redox-related states and geochemical processes in soils;
- Processes of indigenous and exogenous phosphorus in soils;
- Effects of redox on phosphorus (P) processes;
- Soil processes by which nutrients become available to plants.
- Combined tools of redox research with a general geochemical approach in studies on effects of treated wastewater (TWW) irrigation on plant nutrition and malfunction.
- Using expertise and methodologies of nutrient uptake and translocation in plants to expand the research to the uptake and in-plant distribution of emerging organic pollutants.

Selected Publications

1. **Shenker, M.**, 1989. Studies on iron deficiency in mango: uptake mechanisms and new approaches to fertilization. M.Sc. thesis. The Hebrew University of Jerusalem.
2. **Shenker, M.**, Y. Chen and S. Gazit. 1991. (1) Iron deficiency in mango trees: I. New approaches to fertilization. pp. 331-338; (2) Iron deficiency in mango trees: II. Iron uptake mechanisms. pp. 339-344. Both *In*: Chen, Y. and Y. Hadar (Eds.), Iron Nutrition and Interactions in Plants. Kluwer Academic Publishers, Dordrecht, The Netherlands.
3. **Shenker, M.**, I. Oliver, M. Helmann, Y. Hadar, and Y. Chen. 1992. Utilization by tomatoes of iron mediated by a siderophore produced by *Rhizopus arrhizus*. J Plant Nutr 15:2173-2182.
4. **Shenker, M.**, Y. Hadar, and Y. Chen. 1995. Rapid method for accurate determination of colorless siderophores and synthetic chelates. Soil Sci Soc Am J 59:1612-1618.
5. **Shenker, M.**, 1996. Chemical characterization of the siderophore produced by *Rhizopus arrhizus* and its properties as Fe carrier for plants. Ph.D. thesis. The Hebrew University of Jerusalem.
6. **Shenker, M.**, Y. Hadar, and Y. Chen. 1996. Stability constants of the fungal siderophore rhizoferrin with various microelements and calcium. Soil Sci Soc Am J 60:1140-1144.
7. Yehuda, Z, **M. Shenker**, V. Römheld, H. Marschner, Y. Hadar, and Y. Chen. 1996. The role of ligand exchange in the uptake of iron from microbial siderophores by graminaceous plants. Plant Physiol 112:1273-1280.
8. **Shenker, M.**, Y. Hadar, and Y. Chen. 1999. Kinetics of Fe complexing and metal exchange in solutions by rhizoferrin – a fungal siderophore. Soil Sci Soc Am J 63:1681-1687.
9. Lahav, N., **M. Shenker** and Y. Chen. 1999. Introduction to Soil Science. The Hebrew University of Jerusalem (in Hebrew). 272 p.
10. **Shenker, M.**, T.W.M. Fan, and D.E. Crowley. 2001. Phytosiderophores influence on cadmium mobilization and uptake by wheat and barley plants. J Environ Qual 30:2091-2098.

11. **Shenker, M.**, A. Ben-Gal, and U. Shani. 2003. Sweet corn response to combined nitrogen and salinity environmental stresses. Plant and Soil 256:139-147.
12. **Shenker, M.**, O.E. Plessner, and E. Tel-Or. 2004. Manganese nutrition effects on tomato growth, chlorophyll content, and superoxide dismutase activity. J Plant Physiol 161:197-202.
13. Huang, X. and **M. Shenker**. 2004. Water-soluble and solid-state speciation of phosphorus in stabilized sewage sludge. J Environ Qual 33:1895-1903.
14. Litaor, M.I., O. Reichmann, K. Auerswald, A. Haim, and **M. Shenker**. 2004. The geochemistry of phosphorus in peat soils of a semi-arid altered wetland. Soil Sci Soc Am J 68:2078-2085.
15. Huang, X., Y. Chen, and **M. Shenker**. 2005. Rapid whole-plant bioassay for phosphorus phytoavailability in soils. Plant and Soil 271:365-376.
16. **Shenker, M.**, S. Seitelbach, S. Brand, A. Haim, and M.I. Litaor. 2005. Redox reactions and phosphorus release from re-flooded soils of an altered wetland. Eur J Soil Sci 56:515-525.
17. **Shenker, M.** and Y. Chen. 2005. Increasing iron availability to crops: fertilizers, organo-fertilizers, and biological approaches. Soil Sci Plant Nutr 51:1-17.
18. **Shenker, M**. and P.R. Bloom. 2005. Comments on "Amounts, forms, and solubility of phosphorus in soils receiving manure". Soil Sci Soc Am J 69:1353-1354.
19. Brand-Klibanski, S., M.I. Litaor, and **M. Shenker**. 2007. Overestimation of P adsorption capacity in reduced soils: an artifact of typical batch adsorption experiments. Soil Sci Soc Am J 71:1128-1136.
20. Chen, Y., Y. Inbar, P. Barak, and M. Shenker. 2008. Methods for Soil Analysis. The Hebrew University of Jerusalem (in Hebrew). 174 p.
21. Huang, X., Y. Chen, and **M. Shenker**. 2008. Chemical Fractionation of Phosphorus in Stabilized Biosolids. J Environ Qual 37:1949-1958.
22. Sade, R., M.I. Litaor, and **M. Shenker**. 2010. Evaluation of groundwater and phosphorus transport in fractured altered wetland soils. J Hydrol 393:133-142.
23. **Shenker, M.**, D. Harush, J. Ben-Ari, and B. Chefetz. 2011. Uptake of carbamazepine by cucumber plants - a case study related to irrigation with reclaimed wastewater. Chemosphere 82:905-910.
24. Tamir G., **M. Shenker**, H. Heller, P.R. Bloom, P. Fine, and A. Bar-Tal. 2011. Can soil carbonate dissolution lead to overestimation of soil respiration? Soil Sci Soc Am J 75:1414-1422.
25. Barnea I., M.I. Litaor, and **M. Shenker**. 2012. Evaluation of phosphorus management practices in East Mediterranean altered wetland soils. Soil Use Manage 28:35-44.
26. Huang, X., Y. Chen, and **M. Shenker**. 2012. Dynamics of phosphorus phytoavailability in soil amended with stabilized sewage sludge materials. Geoderma 170:144-153.
27. Tamir, G., **M. Shenker**, H. Heller, P. R. Bloom, P. Fine, and A. Bar-Tal. 2012. Dissolution and re-crystallization processes of active calcium carbonate in soil developed on tufa. Soil Sci Soc Am J 76:1606-1613.
28. Simhayov, R., M.I. Litaor, and **M. Shenker**. 2013. Catastrophic dieback of Cyperus papyrus in response to geochemical changes in an East Mediterranean altered wetland. Wetlands 33:747-758.
29. Eizenshtadt Y., N. Ben-HaGay, **M. Shenker**, and A. Eizenkot. 2014. Soil test for simultaneous assessment of quantity and intensity indices of potassium availability and the buffer capacity of the soil for determining K-fertilization needs and amounts. The Ministry of Agriculture and Rural Development, Israel, Extension for Agricultural supervision (Shaham), 1-6.

30. Netzer, Y., **M. Shenker**, and A. Schwartz. 2014. Effects of irrigation using treated wastewater on table grape vineyards: dynamics of sodium accumulation in soil and plant. Irrigation Sci 32:283-294.
31. Goldstein M., **M. Shenker**, and B. Chefetz. 2014. Insights into the uptake processes of wastewater-borne pharmaceuticals by vegetables. Environ Sci Technol 48:5593−5600.
32. Malchi, T., Y. Maor, G. Tadmor, **M. Shenker**, and B. Chefetz. 2014. Irrigation of root vegetables with treated wastewater: Evaluating uptake of pharmaceuticals and the associated human health risks. Environ Sci Technol 48:9325-9333.
33. Yalin, D., A. Schwartz, S. Assouline, K. Narkis, A. Eshel, A.G. Levin, A. Lowengart-Aycicegi, J. Tarchitzky, and **M. Shenker**. 2017. Insights from "The Hidden Half": The impact of root-zone oxygen and redox dynamics, on the response of avocado to long-term irrigation with treated wastewater in clayey soil. Israel J Plant Sci 64: 92-109. DOI: 10.1080/07929978.2017.1288478.
34. Eisenkot A, Eisenstadt Y, and Shenker M. 2017. Update method for the quantitative evaluation of potassium. The Ministry of Agriculture and Rural Development (Israel). Agricultural Extension Service – Shaham. Hebrew.
35. Zimerman-Lax, N., D. Tamir-Ariel, **M. Shenker**, and S. Burdman. 2018. Decreased potassium fertilization is associated with increased disease severity caused by *Acidovorax citrulli* in melon foliage and pathogen growth in the leaves. J General Plant Pathol 84:27–34.
36. Huang, C., U. Yermiyahu, **M. Shenker**, and A. Ben-Gal. 2020. Effect of leaching events on the fate of polyhalite nutrient minerals used for crop fertilization. J Plant Nutr 43: 2518–2532.
37. Yalin, D., A. Schwartz, J. Tarchitzky, and **M. Shenker**. 2021. Soil oxygen and water dynamics underlying hypoxic conditions in the root-zone of avocado irrigated with treated wastewater in clay soil. Soil Till Res 212:105039 (1-13).
38. Malchi, T., S. Eyal, H. Czosnek, **M. Shenker**, and B. Chefetz. 2021. Plant Pharmacology: Insights into in-planta kinetic and dynamic processes of xenobiotics. Crit Rev Environ Sci Technol doi.org 10.1080/10643389.2021.1946360.
39. Yalin, D. and **M. Shenker**. 2022. Potentiometric redox measurements in the environment: a novel perspective on method powers and limitations. Biogeochemistry doi.org/10.1007/s10533-022-00901-3.
40. Jindo, K. T.L. Goron, P. Pizarro-Tobı´as, M.A´. Sa´nchez-Monedero, Y. Audette, A.O. Deolu-Ajayi, A. van der Werf, M.G. Teklu, **M. Shenker**, C.P. Sudre´, J.G. Busato, R. Ochoa-Hueso, M. Nocentini, J. Rippen, R. Aroca, S. Mesa, M.J. Delgado, and G. Tortosa. 2022. Application of biostimulants products and biological control agents in sustainable viticulture: A review. Front Plant Sci 13:932311. DOI:10.3389/fpls.2022.932311.
41. Yalin D., A. Eshel, A. Schwartz, J Tarchitzky, and **M. Shenker.** 2022. How does irrigation with treated wastewater affect soil oxygen dynamics in avocado (Persea americana) orchards planted in clayey soils and implications to plant Na homeostasis. Acta Hort 1333:93-98.
42. Simhayov, R., N. Ohana-Levi, **M. Shenker**, and Y. Netzer. 2022. Effect of long-term treated wastewater irrigation on soil sodium levels and table grapevines' health. Agric Water Manage 275:108002.
43. Zhang, Z., Y. Chen, D. Mandler, **M. Shenker**. 2023. Transport of hydroxyapatite nanoparticles coated with polyacrylic acid under unsaturated water flow in soil columns. Soil Sci Plant Nutr doi.org/10.1080/00380768.2022.2163457.