Jeffry J. Fuhrmann

Professor, Soil Microbiology
Department of Plant and Soil Sciences
University of Delaware, Newark, DE 19717-1303
302-831-1371; fuhrmann@udel.edu

EDUCATION

- Ph.D. Soil Science. NC State University. 1985.
- M.S. Forestry. NC State University. 1982.
- B.S. Forest Science. Humboldt State University (CA). 1979.

PROFESSIONAL POSITIONS

Professor – Dept of Plant and Soil Sciences, Univ of Delaware, 1999-present.
Associate Professor – Dept of Plant and Soil Sciences, Univ of Delaware, 1992-1999.
Assistant Professor – Dept of Plant and Soil Sciences, Univ of Delaware, 1985-1992.

PROFESSIONAL SOCIETY MEMBERSHIPS

- American Society for Microbiology
- American Society for the Advancement of Science
- Soil Science Society of America

AREAS OF SPECIALIZATION

- Ecology and diversity of soybean bradyrhizobia (symbiotic nitrogen-fixing bacteria)
- Bacteriophages (viruses) of soybean bradyrhizobia
- General ecology of soil and the plant rhizosphere

SCHOLARSHIP

Google Scholar: 3624 total citations, h-index = 24 as of August 22, 2018
LINK: https://scholar.google.com/citations?hl=en&user=nTdTPt8AAAAJ
Scholarly publications (64), including books and book chapters for career (1985-2018).

Teaching contributions:

1. Sylvia, D.M., J.J. Fuhrmann, P.G. Hartel, and D.A. Zuberer (ed). 2005. Principles and applications of soil microbiology. 2nd. Ed. Prentice-Hall, Upper Saddle River, New Jersey. (textbook; 3rd edition in progress)
2. Fuhrmann, J.J. 2005. Microbial metabolism, p.54-84. In: D.M. Sylvia et al. (ed.), Principles and applications of soil microbiology. 2nd. Ed. Prentice-Hall, Upper Saddle River, New Jersey. (textbook chapter)

Selected book chapters:

1. Fuhrmann, J. J. 1994. Isolation of soil microorganisms producing antibiotic compounds. pp. 379-405. IN: R. W. Weaver et al. (eds.), Methods of Soil Analysis, Part 2, Microbiological and Biochemical Properties. Soil Science Society of America, Madison, Wisconsin.
2. Fuhrmann, J. J. 1993. Population diversity groupings of soybean bradyrhizobia. Adv. Agron. 50:67-105.
3. van Berkum, P., Fuhrmann, J.J., and Eardly, B.D. 2000. Phylogeny of rhizobia. In: Nitrogen fixation: from molecules to crop productivity. Eds. F.O. Pedrosa, M. Hungria, G. Yates, and W.E. Newton. Kluwer Academic Publishers, Dordrecht. pp. 165-169.

Selected journal articles:

1. Cattelan, A.J., P.G. Hartel, and J.J. Fuhrmann 1998. Bacterial composition in the rhizosphere of nodulating and non-nodulating soybean. Soil Sci. Soc. Am. J. 62:1549-1555.
2. Cattelan, A.J., P.G. Hartel, and J.J. Fuhrmann. 1999. Screening of plant growth promoting rhizobacteria (PGPR) to promote early soybean growth. Soil Sci. Soc. Am. J. 63:1670-1680.
3. Chen J, Li S, Liang C, Xu Q, Li Y, Qin H, Fuhrmann JJ. 2017. Response of microbial community structure and function to short-term biochar amendment in an intensively managed bamboo (Phyllostachys praecox) plantation soil: Effect of particle size and addition rate. Sci Total Environ 574:24-33.
4. Entry, J.A., J.J. Fuhrmann, R.E. Sojka, and G.E. Shewmaker. 2004. Influence of irrigated agriculture on soil carbon and microbial community structure. Environ. Manage. 33:S363-S373.
5. Entry, J.A., R.K. Hubbard, J.E. Thies, and J.J. Fuhrmann. 2000. The influence of vegetation in riparian filterstrips on coliform bacteria. II. Survival in soils. J. Environ. Qual. 29:1215-1224.
6. Fang, C., M. Radosevich, J.J. Fuhrmann. 2001. Atrazine and phenanthrene degradation in grass rhizosphere soil. Soil Biol. Biochem. 33:671-678.
7. Fang, C., M. Radosevich, J.J. Fuhrmann. 2001. Characterization of rhizosphere microbial community structure in five similar grass species using FAME and BIOLOG analyses. Soil Biol. Biochem. 33:679-682.
8. Franzluebbers, A.J. , N. Nazih , J.A. Stuedemann , J.J. Fuhrmann , H.H. Schomberg , P.G. Hartel. 1999. Soil carbon and nitrogen pools under low- and high-endophyte-infected tall fescue. Soil Sci. Soc. Am. J. 63:1687-1694.
9. Fuhrmann, J. 1990. Symbiotic effectiveness of indigenous soybean bradyrhizobia as related to serological, morphological, rhizobitoxine, and hydrogenase phenotypes. Appl. Environ. Microbiol. 56:224-229.
10. Fuhrmann, J., and A.G. Wollum, II. 1989. Nodulation competition among *Bradyrhizobium japonicum* strains as influenced by rhizosphere bacteria and iron availability. Biol. Fert. Soils 7:108-112.
11. Fuhrmann, J., and A.G. Wollum, II. 1989. Symbiotic interactions between soybean and competing strains of *Bradyrhizobium japonicum*. Plant Soil 119:139-145.
12. Fuhrmann, J.J., and B.L. Vasilas. 1993. Field response of the *Glycine-Bradyrhizobium* symbiosis to modified early-nodule occupancy. Soil Biol. Biochem. 25:1203-1209.
13. Fuhrmann, J.J., and B.L. Vasilas. 1994. Variability among soybean cultivars in response to nodulation by a rhizobitoxine producing strain of bradyrhizobia. Agron. J. 86:294 298.
14. Hartel, PG; Myoda, SP; Ritter, KJ; Kuntz, RL; Rodgers, K; Entry, JA; Wey, SAV; Schroder, EC; Calle, J; Lacourt, M; Thies, JE; Reilly, JP; Fuhrmann, JJ. 2007. Geographic sharing of ribotype patterns in *Enterococcus faecalis* for bacterial source tracking. J. Water Health 5:539-551.
15. Gentry, T.J., D.C. Wolf, C.M. Reynolds, , J.J. Fuhrmann. 2003. Pyrene and phenanthrene influence on soil microbial populations. Bioremediation J. 7:53-68.
16. Myoda, S.P., C.A. Carson, J.J. Fuhrmann, B.-K. Hahm, P.G. Hartel, H. Yampara-Iquise, L. Johnson, R.L. Kuntz, C.H. Nakatsu, M.J. Sadowsky, and M. Samadpour. 2004. Comparison of genotypic-based microbial source tracking methods requiring a host origin database. J. Water Health 1:167-180.
17. Olexa, T.J., T.J. Gentry, P.G. Hartel, D.C. Wolf, J.J. Fuhrmann, and C.M. Reynolds. 2000. Mycorrhizal colonization and microbial community structure in the rhizosphere of annual ryegrass grown in pyrene-amended soils. Int. J. Phytorem. 2:213-231.
18. Qin H, Niu L, Wu Q, Chen J, Li Y, Liang C, Xu Q, Fuhrmann JJ, Shen Y. 2017. Bamboo forest expansion increases soil organic carbon through its effect on soil arbuscular mycorrhizal fungal community and abundance. Plant and Soil 420:407-421.
19. Rhine, E.D., J.J. Fuhrmann and M. Radosevich, 2003. Microbial community responses to atrazine exposure and nutrient availability: linking degradation capacity to community structure. Microb.

Ecol. 46 :145-160
20. Schutter, M.E., and J.J. Fuhrmann. 2001. Soil microbial community responses to fly ash amendment as revealed by analyses of whole soils and bacterial isolates. Soil Biol. Biochem. 33:1947-1958
21. Sojka, R.E., J.A. Entry, and J.J. Fuhrmann. 2006. The influence of high application rates of polyacrylamide on microbial metabolic potential in an agricultural soil. Appl. Soil Ecol. 24:243-252.
22. Srinivasiah, S, J. Lovett, S. Polson, J. Bhavsar, D. Ghosh, K. Roy, J.J. Fuhrmann, M. Radosevich, K.E. Wommack. 2013. Direct assessment of viral diversity in soils by random PCR amplification of polymorphic DNA. Appl. Environ. Microbiol. 79:5450–5457.
23. Srinivasiah, S., Lovett, J., Ghosh, D., Roy, K., Fuhrmann, J., Radosevich, M., and Wommack, K.E. 2015. Dynamics of autochthonous soil viral communities parallels dynamics of host communities under nutrient stimulation. FEMS Microbiol. Ecol. 91 (doi: 10.1093/femsec/fiv063)
24. Teng, J., Xiang, T., Huang, Z., Wu, J., Jiang, P., Meng, C., Li, Y., and Fuhrmann, J.J. 2016. Spatial distribution and variability of carbon storage in different sympodial bamboo species in China. J. Environ. Man. 168:46-52.
25. van Berkum, P., and J.J. Fuhrmann. 2001. Characteristics of soybean bradyrhizobia for which serogroup affinities have not been identified. Can. J. Microbiol. 47:519-525.
26. van Berkum, P., J. J. Fuhrmann. 2000. Evolutionary relationships among the soybean bradyrhizobia reconstructed from 16S rRNA gene and Internally Transcribed Spacer region sequence divergence. Int. J. Syst. Evol. Microbiol. 50:2165-2172.
27. van Berkum, P., J. J. Fuhrmann. 2009. Evidence from internally transcribed spacer sequence analysis of soybean strains that extant Bradyrhizobium spp. are likely the products of reticulate evolutionary events. Appl. Environ. Microbiol. 75:78-82.
28. Vasilas, B. L., and J. J. Fuhrmann. 1993. Field response of soybean to nodulation by a rhizobitoxine-producing strain of *Bradyrhizobium*. Agron. J. 85:302-305.
29. Vasilas, B., L. Vasilas, J. Thompson, A. Rizzo, J. Fuhrmann, T. Evans, J. Pesek, and K. Kunkle. 2004. Ectomycorrhizal mantles as indicators of hydrology for jurisdictional wetland determinations. Wetlands 24: 784-795.
30. Williamson, K.W., J.J. Fuhrmann, K.E. Wommack, M. Radosevich. 2017. Viruses in soil ecosystems: an unknown quantity within an unexplored territory. Annual Review of Virology 4:16.1–16.19.
31. Xiong, K., and J.J. Fuhrmann. 1996. Soybean response to nodulation by wild-type and an isogenic Bradyrhizobium elkanii mutant lacking rhizobitoxine production. Crop Sci. 36:1267-1271.
32. Xu, Qiu-Fang, Pei-Kun Jiang, Jia-Sen Wu, Guo-Mo Zhou, Ren-Fang Shen, J.J. Fuhrmann. 2015. Bamboo invasion of native broadleaf forest modified soil microbial communities and diversity. Biol. Invasions 17:433–444.

CURRENT GRANTS

Wommack, K, J Gleghorn, S Polson, J Fuhrmann, M Marston, G Steward, J Van Etten, K Edwards, D Dunigan, and J DeLong. National Science Foundation. EPSCoR RII Track-2 FEC: G2P in VOMs: An experimental and analytical framework for genome to phenome connections in viruses of microbes. ~$6,000,000. 2017-2021.