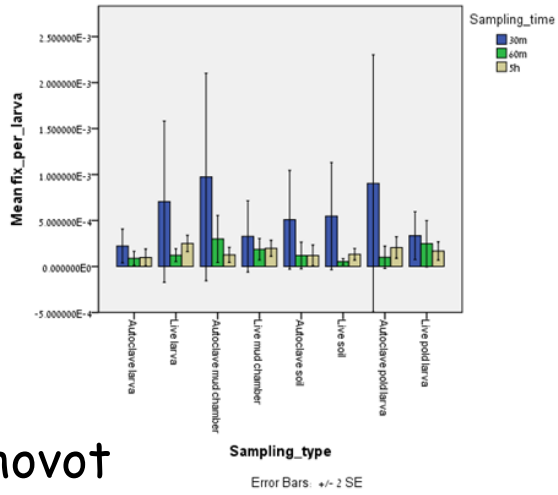
Ben-Gurion University of the Negev
Jacob Blaustein Institutes for Desert Research
The Swiss Institute for Dryland Environmental and Energy Research
Mitrani Department of Desert Ecology



Seminar

Efrat Sheffer

Faculty of Agriculture,
Food and Environment,
The Hebrew University, Rechovot

Tuesday, November 13, 2018, 12:00
Seminar Room, Old Administration Building

Participants are invited to meet the seminar speaker at the MDDE meeting room immediately after the seminar (~ 13:00). Please bring your lunch; snacks will be provided.

Fixing the Nitrogen Gap: The Ecology of Nitrogen Fixation in Mediterranean Ecosystems

Mediterranean and dryland ecosystems are home to an incredible diversity of legumes, including hundreds of annuals and dozens of perennial plants. Most of these legumes potentially fix atmospheric dinitrogen (N_2), through root symbiosis with N_2-fixing bacteria. Furthermore, current understanding is that legumes first evolved and diversified from what is now the Mediterranean Basin (around the Tethys sea), prior to the development of the seasonally dry Mediterranean climate. However, the persistence of nitrogen-fixing legumes in Mediterranean ecosystems is puzzling, given the high physiological cost of fixation, especially in light of the combination of strong water-limitation, a long history of intensive grazing, and likely limitation by other nutrients. My research explores the strategies that allow symbiotic nitrogen fixation in these ecosystems, and their influence on the nitrogen cycle. In this talk I will present an evaluation of the climatic, biogeochemical and ontogenetic factors influencing nitrogen fixation in an abundant Mediterranean legume shrub, *Calicotome villosa*, and in a suite of ephemeral herbaceous legume species, using a combination of controlled experiments and field observations. Our findings indicate that a diversity of nitrogen fixation strategies have been adopted by ephemeral herbaceous legumes, while perennial legumes, which have to survive through the dry rainless summers, always downregulate their investment in fixation when provided with external nitrogen source (facultative strategy). Furthermore, in the legume shrub we found a strong seasonal pattern, shifting between high fixation rates during the rainy season, at flowering and seed-set times, to almost none in the rainless season. I conclude that seasonal nitrogen fixation, regulation of fixation, and nitrogen conservation, are key adaptations influencing the dominance of dryland legumes in the community, with broader consequences on the ecosystem nitrogen cycle.