

Ecosystem Services of Perennial Forages

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Priscila was born in Zárate, Buenos Aires, Argentina. She is an agricultural engineer and earned her doctorate degree at University of Buenos Aires, sponsored by a CONICET scholarship. Since she started her research career, she has been particularly interested in agroecosystem sustainability. She has worked in the Pampas region of Argentina and Uruguay, where the “service crops” (not just cover crops) could recover several ecosystem services frequently lost under continuous agriculture. Since service crops adoption is incipient in this region, she gave several conferences and actively participated in roundtable discussions with farmers. Currently, she is researching the perennial dual-purpose crop Kernza in the Picasso lab and hopes to contribute to sustainable agriculture with this project. She enjoys doing field research, team-working, and going to music concerts.

Historically, food production was the only goal of agriculture. However, a paradigm shift is necessary to mitigate the associated environmental problems. The management of agroecosystems must guarantee the provision of ecosystem services. In this talk, I will show different results from my work in Argentina and the USA (Wisconsin) that provide a framework for the ecological intensification of agroecosystems. Particularly, this framework includes the role of 1) increasing the biodiversity and perenniality in the agroecosystems, 2) integrating crop and livestock systems, 3) increasing the belowground inputs to the soil and, 4) replacing part of the use of synthetic fertilizers by biological nitrogen fixation. The increased use of alfalfa in coupled systems of agriculture and livestock is very promising. Alfalfa provides several high-quality forage harvests per year to feed multiple livestock species contributing to food production. Additionally, as it is perennial, fallow periods are reduced and soil is protected from erosion. The nutrient catching is high, avoiding groundwater contamination. In turn, the belowground biomass inputs to the soil are key to the formation of organic matter and carbon sequestration to mitigate climate change. On the other hand, as alfalfa is a legume, a proportion of the N comes from biological N fixation replacing external inputs of N fertilizer. Also, alfalfa provides habitat for pollinators, improves water infiltration, and improves resilience to climate change due to its resistance to drought. The ecosystem services that alfalfa provides make it a key component of agricultural rotations to design multifunctional agroecosystems.