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Carbon sequestration capacity and secondary succession in a dry environment

Carme Estruch (1), Yudi M. Lozano (1,2,3), Cristina Armas (1), and Francisco I. Pugnaire (1)

(1) Estación Experimental de Zonas Áridas, Consejo Superior de Investigaciones Científicas, Carretera de Sacramento s/n, E-04120 La Cañada de San Urbano, Almería, Spain (c.estruch.p@gmail.com), (2) Freie Universität Berlin, Institut für Biologie, Plant Ecology, D-14195 Berlin, Germany, (3) Berlin-Brandenburg Institute of Advanced Biodiversity Research (BBIB), D-14195 Berlin, Germany

Human activities often alter natural plant communities which, after disturbance, undergo a process of secondary succession with important changes in C dynamics. In arid environments this process is very slow, and its links with C cycling are little known. We addressed changes in C balance along a chronosequence of land abandonment in a semiarid environment and assessed the consequences of secondary succession on C sequestration capacity at community scale. We used a closed-chamber method to estimate the daytime contribution of whole-plants and bare soil to whole-community C exchange. Plant community composition and cover strongly affected C balance across the chronosequence. Overall, whole-community C exchange shifted from C source to C sink with succession. However, only after 63 years of agriculture abandonment the system did recover its natural C sequestration capacity. Thus, the capacity of semiarid ecosystems to recover native plant communities after anthropogenic disturbance may contribute to decrease C emissions in the long term.