

Postgrado en Ecología Tropical
Instituto de Ciencias Ambientales y Ecológicas (ICAE)
Universidad de Los Andes, Mérida, Venezuela

TALLER TUTORIAL

“MECANISMOS DEL SÍNDROME NODRIZA EN AMBIENTES ÁRIDOS”.

Dirigido a estudiantes del Programa de Doctorado en el Postgrado de Ecología Tropical, Fac. Ciencias, U.L.A.

Responsable: Profesor Pascual Soriano

N° de horas de teoría: 32

N° de Créditos: 02 Unidades Crédito

Objetivo:

Familiarizar al estudiante con la temática de la facilitación como proceso determinante en la estructuración de comunidades vegetales de ambientes áridos. Dicha temática representará el aspecto medular de su Tesis Doctoral.

Tópicos a tratar:

Revisión bibliográfica sobre interacciones positivas y negativas entre cactus columnares y plantas nodriza, enfatizando los siguientes aspectos:

- Asociación espacial entre ambas formas de vida
- Espacios disponibles bajo las plantas nodriza: causas y excepciones
- Dispersión dirigida de semillas de cactus columnares
- Destino de la relación cactus-planta nodriza: aspectos ecofisiológicos y evidencia de competencia
- Implicaciones para la conservación de ambientes semiáridos.

Modalidad a seguir y evaluación:

Cada semana el estudiante preparará una síntesis de varios artículos de la bibliografía seleccionada, relacionados con los tópicos arriba mencionados y realizará una discusión crítica de ellos. De estas discusiones el estudiante preparará una monografía en formato de “review”

La calificación del Taller tendrá dos componentes: cada una de las discusiones semanales tendrá una calificación, de manera que el promedio de dichas calificaciones aportará el 50% de la nota definitiva. El restante 50% lo aportará la calificación proveniente de la monografía.

Bibliografía seleccionada

Aguiar, M. & Sala, O.E. (1999). Patch structure, dynamics and implications for the functioning of arid ecosystems. *Trends in Ecology and Evolution*, 14: 273-277.

- Barnes, P.W. & Archer, S. (1996). Influence of an overstorey tree (*Prosopis glandulosa*) on associated shrubs in a savanna parkland: implications for patch dynamics. *Oecologia*, 105: 493-500.
- Bertness, M.D. & Callaway, R.M. (1994). Positive interactions in communities. *Trends in Ecology and Evolution*, 9: 191-193.
- Bowers, J.E. (1994). Natural conditions for seedling emergence of three woody species in the Northern Sonoran Desert. *Madroño*, 2: 73-84.
- Bowers, J.E., Webb, R.H. & Rondeau, R.J. (1995). Longevity, recruitment and mortality of desert plants in Grand Canyon, Arizona, USA. *Journal of Vegetation Science*, 6: 551-564.
- Bowers, J.E. (1997). Demographic pattern of *Ferocactus cylindraceus* in relation to substrate age and grazing history. *Plant Ecology*, 133: 37-48.
- Bowers, J.E., Web, R.H. & Pierson, E.A. (1997). Succession of desert plants on debris flow terraces, Grand Canyon, Arizona, U.S.A. *Journal of Arid Environments*, 36: 67-86.
- Callaway, R.M. (1995). Positive interactions among plants. *Botanical Review*, 61: 306-349.
- Callaway, R.M. (1997). Positive interactions in plant communities and the individualist-continuum concept. *Oecologia*, 112: 143-149.
- Callaway, R.M. & Walker, L.R. (1997). Competition and facilitation: a synthetic approach to interactions in plant communities. *Ecology*, 78: 1958-1965.
- Callaway, R.M. (1998). Are positive interactions species-specific?. *Oikos*, 82: 202-207.
- Campos, C.M. & Ojeda, R.A. (1997). Dispersal and germination of *Prosopis flexuosa* (Fabaceae) seeds by desert mammals in Argentina. *Journal of Arid Environments*, 35: 707-714.
- Carrillo-García, A., Bashan, Y. & Bethlenfalvay, G.J. (2000)a. Resource-island soils and the survival of the giant cactus, cardon, of Baja California Sur. *Plant Soil*, 218: 207-214.
- Carrillo-García, A., Bashan, Y., Díaz, E. & Bethlenfalvay, G.J. (2000)b. Effects of resource-island soils, competition, and inoculation with *Azospirillum* on survival and growth of *Pachycereus pringlei*, the Giant Cactus of the Sonoran Desert. *Restoration Ecology*, 8: 65-73.
- Charley, J.L. & West, N.E. (1975). Plant-induced soil chemical patterns in some shrub-dominated semi-desert ecosystems of Utah. *Journal of Ecology*, 63: 945-963.
- Cody, M.L. (1993). Do cholla cacti (*Opuntia* spp. Subgenus *cylindropuntia*) use or need nurse plant in the Mohave Desert?. *Journal of Arid Environments*, 24: 139-154.
- Connell, J.H. (1971). On the role of natural enemies in preventing competitive exclusion in some marine animals and in rain forest trees. In: Gradwell, P.J. & Gradwell, G.R. (Eds.), *Dynamics of Populations*, pp. 298-312. Wageningen: Center for Agricultural Publishing and Documentation.
- Davidson, D.W., Samson, D.A. & Inouye, R.S. (1985). Granivory in the Chihuahuan Desert: interactions within and between trophic levels. *Ecology*, 66: 486-500.
- Dawson, T.E. (1993). Hydraulic lift and water use by plants: implications for water balance, performance and plant-plant interactions. *Oecologia*, 95: 565-574.
- de Viana, M.L., Suhring, S. & Manly, B. (2001). Application of randomization methods to study the association of *Trichocereus pasacana* (Cactaceae) with potential nurse plants. *Plant Ecology*, 156: 193-197.
- Ehleringer, J.R. (1984). Intraspecific competitive effects on water relations, growth and reproduction in *Encelia farinose*. *Oecologia*, 63: 153-158.
- Fleming, T.H., Tuttle, M.D. & Horner, M.A. (1996). Pollination biology and the relative importance of nocturnal and diurnal pollinators in three species of Sonoran Desert columnar cacti. *Southwestern Naturalist*, 41: 257-269.

- Fleming, T. (2002). Pollination biology of four species of Sonoran Desert columnar cacti. In: Fleming, T. & Valiente-Banuet, A. (Eds.), *Columnar cacti and their mutualists*, pp. 207-224. Tucson: The University of Arizona Press.
- Flores-Martínez, A., Ezcurra, E. & Sánchez-Colón, S. (1994). Effect of *Neobuxbaumia tetetzo* on growth and fecundity of its nurse plant *Mimosa luisana*. *Journal of Ecology*, 82: 325-330.
- Fonteyn, P.J. & Mahall, B.E. (1981). An experimental analysis of structure in a desert plant community. *Journal of Ecology*, 69: 883-896.
- Franco, A.C. & Nobel, P.S. (1989). Effect of nurse plants on the microhabitat and growth of cacti. *Journal of Ecology*, 77: 870-886.
- Franco, A.C. & Nobel, P.S. (1990). Influences of root distribution and growth on predicted water uptake and interspecific competition. *Oecologia*, 82: 151-157.
- Godínez-Alvarez, H., Valiente-Banuet, A & Rojas-Martínez, A. (2002). The role of seed dispersers in the populational dynamics of the columnar cactus *Neobuxbaumia tetetzo*. *Ecology* 83: 2617-2629.
- Grubb, P.J. (1977). The maintenance of species-richness in plant communities: the importance of the regeneration niche. *Biological Review*, 52: 107-145.
- Ibañez, J. (2000). Hormigas, aves y roedores como potenciales depredadores de semillas de cactáceas columnares en un enclave semiárido venezolano. *B.Sc. Thesis*. Universidad de Los Andes, Venezuela.
- Inouye, R.S., Byers, G.S. & Brown, J.H. (1980). Effects of depredation and competition on survivorship, fecundity, and community structure of desert annuals. *Ecology*, 61: 1344-1351.
- Jordan, W.P. & Nobel, P.S. (1979). Infrequent establishment of seedling of *Agave deserti* (Agavaceae) in the northwestern Sonoran Desert. *American Journal of Botany*, 66: 1079-1084.
- Jordan, W.P. & Nobel, P.S. (1981). Seedling establishment of *Ferocactus acanthodes* in relation to drought. *Ecology*, 62: 901-906.
- McAuliffe, J.R. (1984). Sahuaro-nurse tree associations in the Sonoran Desert: competitive effects of sahuaros. *Oecologia*, 64: 319-321.
- McAuliffe, J.R. (1988). Markovian dynamics of simple and complex desert plant communities. *American Naturalist*, 131: 459-490.
- Mills, L.S., Soule, M.E. & Doak, D.F. (1993). The keystone-species concept in ecology and conservation. *Bioscience*, 43: 219-224.
- Montiel, S. & Montaña C. (2003). Seed bank dynamics of the desert cactus *Opuntia rastrera* in two habitats from the Chihuahuan Desert. *Plant Ecology*, 166: 241-248.
- Naranjo, M.E., Rengifo, C. & Soriano, P.J. (2003). Effect of ingestion by bats and birds on seed germination of *Stenocereus griseus* and *Subpilocereus repandus* (Cactaceae). *Journal of Tropical Ecology*, 19: 19-25.
- Nobel, P.S., Miller, P.M. & Graham, E.A. (1992). Influence of rocks on soil temperature, soil water potential, and rooting patterns for desert succulents. *Oecologia*, 92: 90-96.
- Nobel, P.S. & Bobich, E.G. (2002). Plant frequency, stem and root characteristics, and CO₂ uptake for *Opuntia acanthocarpa*: elevational correlates in the northwestern Sonora Desert. *Oecologia*, 130: 165-172.
- Pugnaire, F.I. & Lázaro, R. (2000). Seed bank and understorey species composition in a semi-arid environment: the effect of shrub age and rainfall. *Annals of Botany*, 86: 807-813.
- Phillips, D.L. & MacMahon, J.A. (1981). Competition and spacing patterns in desert shrubs. *Journal of Ecology*, 69: 97-115.
- Schupp, E.W. (1993). Quantity, quality and the effectiveness of seed dispersal by animals. *Vegetatio*, 107-108: 15-29.

- Schupp, E.W. (1995). Seed-seedling conflicts, habitat choice, and patterns of plant recruitment. *American Journal of Botany*, 82: 399-409.
- Soriano, P.J., Naranjo, M.E., Rengifo, C., Figuera, M., Rondón, M. & Ruíz, L. (1999). Aves consumidoras de frutos de cactáceas columnares del enclave semiárido de Lagunillas, Mérida, Venezuela. *Ecotropicos*, 12: 91-100.
- Soriano, P.J. & Ruíz, A. (2002). The role of bats and birds in the reproduction of columnar cacti in the Northern Andes. In: Fleming, T. & Valiente-Banuet, A. (Eds.), *Columnar cacti and their mutualists*, pp. 241-263. Tucson: The University of Arizona Press.
- Sosa, M. & Soriano, P.J. (1993). Solapamiento de la dieta entre *Leptonycteris curasoae* y *Glossophaga longirostris* (Mammalia: Chiroptera). *Revista de Biología Tropical*, 41: 529-532.
- Sosa, M. & Soriano, P.J. (1996). Resource availability, diet and reproduction in *Glossophaga longirostris* (Mammalia: Chiroptera) in an arid zone of the Venezuelan Andes. *Journal of Tropical Ecology* 12: 805-818.
- Sosa, V. & Fleming, T. (2002). Why are columnar cacti associated with nurse plant?. In: Fleming, T. & Valiente-Banuet, A. (Eds.), *Columnar cacti and their mutualists*, pp. 306-323. Tucson: The University of Arizona Press.
- Suzán, H., Nabhan, G.P. & Patten, D.T. (1994). Nurse plant and floral biology of a rare night-blooming cereus, *Peniocereus striatus* (Brandege) F. Buxbaum. *Conservation Biology*, 8: 461-470.
- Suzán, H., Nabhan, G.P. & Patten, C.A. (1996). The importance of *Olneya tesota* as a nurse plant in the Sonoran Desert. *Journal of Vegetation Science*, 7: 635-644.
- Tewksbury, J.J., Nabhan, G.P., Norman, D., Suzán, H., Tuxill, J. & Donovan, J. (1999). In situ conservation of wild chiles and their biotic associates. *Conservation Biology*, 13: 98-107.
- Tewksbury, J.J. & Lloyd, J.D. (2001). Positive interactions under nurse-plants: spatial scale, stress gradients and benefactor size. *Oecologia*, 127: 425-434.
- Valiente-Banuet, A. & Ezcurra, E. (1991). Shade as a cause of the association between the cactus *Neobuxbaumia tetetzo* and the nurse plant *Mimosa luisana* in the Tehuacán Valley, Mexico. *Journal of Ecology*, 79: 961-971.
- Valiente-Banuet, A., Vite, F. & Zavala-Hurtado, J.A. (1991)a. Interaction between the cactus *Neobuxbaumia tetetzo* and the nurse shrub *Mimosa luisana*. *Journal of Vegetation Science*, 2: 11-14.
- Valiente-Banuet, A., Bolongaro-Crevenna, A., Briones, O., Ezcurra, E., Rosas, M., Núñez, H., Barnard, G. & Vasquez, E. (1991)b. Spatial relationship between cacti and nurse shrubs in a semi-arid environment in central Mexico. *Journal of Vegetation Science*, 2: 15-20.
- Villagra, P.E., Marone, L. & Cony, M.A. (2002). Mechanisms affecting the fate of *Prosopis flexuosa* (Fabaceae, Mimosoideae) seeds during early secondary dispersal in the Monte Desert, Argentina. *Austral Ecology*, 27: 416-421.
- Yeaton, R.I. & Cody, M.L. (1976). Competition and spacing in plant communities: the Northern Mohave Desert. *Journal of Ecology*, 64: 689-696.
- Yeaton, R.I. (1978). A cyclical relationship between *Larrea tridentata* and *Opuntia leptocaulis* in the Northern Chihuahuan Desert. *Journal of Ecology*, 66: 651-656.
- Yeaton, R.I. & Romero, A. (1986). Organization of vegetation mosaics in the *Acacia schaffneri*-*Opuntia streptacantha* association, Southern Chihuahuan Desert, Mexico. *Journal of Ecology*, 74: 211-217.