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Biomass and Carbon Dynamics of Secondary Growth Forests in the Eastern Amazon

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RADER, RUSSELL B. and CURTIS J. RICHARDSON. USDA Forest Service, Rocky Mountain Station, Laramie, WY, 82070 USA and Duke University, Durham, NC, 27708 USA. Influence of phosphorus and macroinvertebrates on the decomposition of spike rush (Eleocharis cellulosa Torr.), cattail (Typha domingensis Pers.), and sawgrass (Cladium jamaicense Crantz).

Phosphate concentrations were manipulated in a series of experimental channels located in an unenriched slough in the northern Everglades. Fifteen 10 g bundles of spike rush, cattail, and sawgrass were placed in an unwalled control section, a channel with no P added, and 2 channels with input concentrations of 50 and 150 µg/L PO_4-P (45 bundles/channel). Five bundles of each species were enclosed in a fine mesh (150 µm) container to exclude shredding macroinvertebrates. There was no difference in spike rush decomposition between the 150 and 50 µg/L PO_4-P treatments. However, decay rates of both P enriched treatments were 10X faster than the unenriched controls. For both recalcitrant species (cattail & sawgrass), the 150 treatment was 2X faster than the 50 treatment which was 2X faster than both unenriched controls. Macroinvertebrates seemed to play a minor role in the decomposition of these macrophytes.

RAMSEIER, DIETER. Harvard University, Cambridge, MA, 02138, USA. Seedmass based evenness on sown strips within arable fields in Central Europe.

Seed diversity may play an important role in maintaining a high diversity of birds and small mammals in agricultural systems. I tried to develop a seed mixture that can be sown within arable fields in Central Europe that will produce diverse food sources for a variety of consumers with different feeding niches. Twenty-nine herbaceous species were selected on the basis of their behavior in a preliminary test. The mixtures were sown in fall and spring on 5 experimental sites with 4 replicates each. The biomass of seeds produced was estimated as (number of flowers per m^2) x (number of seeds per flower) x (mass of seeds). I used the Shannon index to calculate the evenness of biomass of seeds produced. The evenness increased from the first to the second year. It was lower for sown species than for volunteer species when the two were looked at separately. Plots with high seed biomass (>1000 g m^{-2}) always had a low evenness (approximately .05); whereas plots with a low seed biomass (< 200 g m^{-2}) had evenness values as high as .50. In this experiment high evenness of seed biomass production can only be achieved with low productivity, high productivity always resulted in low evenness. This may have implication for agricultural production.

RANDA, LYNDA A., DOUGLAS M. COOPER, JOHN A. YUNGER, and PETER L. MESERVE. Northern Illinois University, DeKalb, IL 60115 USA. The influence of prey availability on activity and diet selection of a large terrestrial predator.

Predators may forage in a variety of ways, such as specializing on particular prey species, switching to alternative prey, or by varying spatial activity patterns. The latter two modes can occur in a heterogeneous landscape. We investigated the effect of fluctuating mammalian prey numbers on the activity patterns and diet selection of a large terrestrial predator, the coyote (Canis latrans). The study site was located in northern Illinois, at Fermi National Accelerator Laboratory (Fermilab), in seven different habitats of a heterogeneous landscape. Availability of small mammalian prey was assessed by monthly mark-recapture sampling conducted along three 200 m transects in each location. Availability of squirrels (Sciurus spp.), eastern cottontail rabbits (Sylvilagus floridanus) and Ring-necked Pheasants (Phasianus colchicus) was assessed by monthly visual counts along the same transects. Spatial activity patterns of C. latrans were determined from scent station lines parallel to the small mammal trapping transects. Scats collected along standardized routes were analyzed for number and occurrence of prey items. During 1994 there was significant differences in prey availability in the different months between the seven locations. There was not a strong correlation of prey availability with predator activity. This lack of correlation may be due to habitat selection by coyotes. Dietary analyses indicated a trend toward switching to more abundant prey species. This behavioral switching has been shown experimentally to dampen prey populations.

RANDOLPH, J.C., EMILIO F. MORAN and EDUARDO S. BRONDIZIO. Indiana University, Bloomington, IN 47405 USA. Biomass and carbon dynamics of secondary growth forests in the eastern Amazon.

Although deforestation of the rain forests of Amazonia has received increasing attention in recent years, the nature and rate of secondary succession has been less well studied. We examined 14 sites with vegetation ranging from one year old to 35 years old in two areas west of Belem, Para, Brazil, using a nested-plot design. We used harvest techniques in the field and standard analytical techniques in the laboratory to determine biomass, carbon, and nitrogen content by plant part (leaves, branches, boles, roots) for all vegetation and litter, and bulk density, carbon, nitrogen content of soils taken at three depths. Although total biomass per unit area increased with successional age of vegetation as expected, the proportions of carbon allocation into different compartments was highly variable. Amounts of carbon in both understory vegetation and in litter were fairly constant across successional ages. At early ages, most carbon was found in roots and upper soil horizons. With increasing age, amounts of carbon in boles increased, but still remained less than the amounts found in the soil.

RASHLEIGH, BRENDA. University of Tennessee, Knoxville, TN 37996 USA. An analysis of coexistence between freshwater mussel species in competition for fish hosts.

An analytic model was developed to describe competition between two species of freshwater mussels for two species of fish which serve as hosts for mussel larvae. According to the equilibrium solution of the model, stable coexistence was possible only when the two mussel species were sufficiently dissimilar in their life history traits, resource use, or a combination of the two. The model specified that a sufficiently dissimilar species pair could coexist only within a limited range of relative fish host abundances. The equations from the analytic model were also incorporated into a simulation model which allowed fish host abundances to vary. When fish host abundances fluctuated about stationary means, the simulation results were equivalent to equilibrium predictions.

ACT Publications 1994

No. 94-01
Moran. E.F., E.S. Brondizio, P. Mausel, and Y. Wu. "Integrating Amazonian Vegetation, Land Use, and Satellite Data." *BioScience* 44(5):329-338.

No. 94-02
Moran, E.F., E.S. Brondizio, and P. Mausel. "Secondary Succession." *Research and Exploration* 10(4):458-476.

No. 94-03
Brondizio, E. S., E.F. Moran, P. Mausel, and Y. Wu. "Land Use Change in the Amazon Estuary: Patterns of Caboclo Settlement and Landscape Management." *Human Ecology* 22(3):249-278.

No. 94-04
Moran, E.F. "The Law, Politics and Economics of Amazonian Deforestation" *Indiana Journal of Global Legal Studies* 1(2):397-407.

No. 94-05
Li, Y, E.F. Moran, E.S. Brondizio, P. Mausel, and Y. Wu. "Discrimination Between Advanced Secondary Succession and Mature Moist Forest Near Altamira, Brazil Using Landsat TM data". *Proceedings of the American Society for Photogrammetry and Remote Sensing*. 1994 annual meeting of ASPRS in Reno, NV.

No. 94-06
Brondizio, E. S., E.F. Moran, A.D.Siqueira, P. Mausel, Y. Wu, and Y. Li. "Mapping Anthropogenic Forest: Using Remote Sensing in a Multi-level Approach to Estimate Production and Distribution of Managed Palm Forest in the Amazon Estuary". *Proceedings of the International Soc. for Photogrammetry and Remote Sensing*. Eco-Rio94. Rio de Janeiro.

No. 94-07
Brondizio, E., E.F. Moran, and P. Mausel. "Discrimation between alfisols and oxisols in areas along the Transamazon Highway Using Landsat TM data". *Proceedings of the International Soc. for Photogrammetry and Remote Sensing*. Eco-Rio 94. Rio de Janeiro.