NUTRITIONAL ASPECTS IN TRACHYPOGON SAVANNAS RELATED TO NITROGEN AND PHOSPHORUS CYCLING

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Contents

Summary

Savannas are well extended in northern South America and, if the soils are dystrophic and well drained, Trachypogon spp. are the dominant species in the herbaceous layer. Plant species of Trachypogon savannas are characterized by their low productivity and adaptation to acid, nutrient depleted soils, especially nitrogen and phosphorus. Fire becomes a tool to eliminate lignified material and stimulate the regrowth of more palatable grasses for cattle. Recurrent fires have been also considered as an ecological factor to determine plant structure, floristic composition, productivity and nutrient cycling of these ecosystems. The data compiled indicated that annual N budgets show a positive balance for burned and protected savannas, since losses, including volatilization by fires, were compensated by inputs through precipitation and biological fixation. Aproximately 45% of the total N incorporated by total net primary production came from plant internal recycling, and the rest is extracted from mineralization-

decomposition processes of aerial and subterranean biomass, biological fixation and precipitation. Nitrogen fixation mediated by free-living organisms associated with the grass roots is the most important N input and accounts for 43% in the protected and 61% in the burned savanna. These amounts of N sustained the productivity of the vegetation experiencing annual fires. In contrast, P balance for burned savannas under annual fires was negative, and inputs due to precipitation did not compensate losses due to fire, leaching and cattle extraction. The amount of P losses is almost 0.1% of the total P in this ecosystem and 7.8% of the available P. A decline in P capital is expected unless compensation comes from low input fertilization. Concerning to the fate of *Trachypogon* savannas, African grasses have displaced South American native species, converting relatively diverse and open savanna communities into monospecific grassland stands. The conversion of savannas has important consequences for ecosystems structure and function, particularly on biomass production and nutrient cycling.

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Danilo López-Hernández received the Biologist degree from Universidad Central of Venezuela (1965-1966, UCV), the Ph.D. degree London University in 1973 and postdoc from Ecole Normale Supérieure, Paris in 1979. He has been a faculty member at UCV and other universities in Venezuela; also he was appointed Director of the Venezuelan Natural and Human Ecology Program of School for International Training (1994-1995). In 1996 he was elected president of Venezuelan Ecology Society (1996-2002). From 2000-2002 he was appointed President of the National Fund for Science and Technology (FONACIT, ex-CONICIT). He has received several national prizes for research and teaching activities: Annual Research Prize UCV (1994), Order José María Vargas (1980), Francisco de Venanzi and Andres Bello (2000-2001). His biography has been selected by "Who is who in Science and Science and Engineering" since 1992. At the moment he is part-time at Institut de Recherche pour le Développement (Valpédo, IRD, Montpellier) and UCV. He has been author, coauthor and editor of several books and he has over 140 refereed papers in scientific journals. His research interests include soil chemistry and biochemistry, nutrient cycling in natural and agro ecosystems and ecology of savannas.

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