The Growth Response of Two East African Perennial Grasses to Defoliation, Nitrogen Fertilizer and Competition

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Abstract

Two East African perennial grasses, Digitaria macroblephara (Hack) Stapf. and Sporobolus ioclados (Trin.) Nees, were grown in pure and mixed culture in a factorial treatment design of defoliation, nitrogen fertilizer and plant density for a period of 90 d. With regard to controls, defoliation reduced total yield of both species per plant by 81%; higher density decreased total yield per plant by 56%; and intraspecific competition decreased total yield per plant 24% more than interspecific competition. High nitrogen promoted total yield per plant by 168%. Total yield per plant of D. macroblephara was 3.2 times greater than that of S. ioclados. With defoliation, density dependent competition decreased total yield per plant by 42% while, without defoliation, density dependent competition decreased total yield per plant by 601%. With defoliation, high nitrogen increased yield per plant by 9% while without defoliation high nitrogen increased yield per plant by 315%. The results suggest that the magnitude of the negative aspects of density dependent competition may be lessened by defoliation and growing plants in mixed culture. It is concluded that in grazing ecosystems it may be advantageous to grow plants in mixed culture since the negative effects of interspecific competition are less than those arising from intraspecific competition.