Morphological and Physiological Interactions in Diverse Plant Communities. (C06-skinner075552-Oral)

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Abstract:

Morphological and physiological interactions among plants in multi-species forage mixtures affect responses to environmental stresses. White clover growing under drought stress in a five-species mixture which included a deeprooted forb had greater transpiration rates and higher leaf water potentials than white clover growing in a two-species mixture. Potential causes for the improved water relations include: 1) niche separation and more uniform utilization of soil water resources; 2) increased water availability to white clover through hydraulic lift by the deep-rooted species; and 3) shifts in the genetic makeup of white clover populations in response to changes in species composition and environmental stress. Soil moisture content in the upper 30 cm of the soil profile was higher in the complex compared with the simple mixture suggesting that more water from deep soil layers was available to plants in the complex mixture. Both mixture complexity and environmental stress affected the genetic makeup of white clover populations with environmental conditions having the greatest effect. Formulation of species mixtures based on plant functional characteristics will be discussed.

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