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Does the presence of invasive grasses affect fire behavior and severity in Brazilian tropical savannas?

Elizabeth Gorgone-Barbosa1, Vânia Pivello2, Susana Bautista3, Mariana Ninno Rissi1, Talita Zupo1, Jonathan Galdi1, Heloisa Zirondi1, Alessandra Fidelis1 [1] Universidade Estadual Paulista "Júlio de Mesquita Filho", São Paulo, Brazil; [2] Universidade de São Paulo, Brazil; [3] Universidad de Alicante, Spain

The African grass Urochloa decumbens is one of the most aggressive invasive species in Cerrado (Brazilian tropical savanna). Some invasive grasses have been reported to change fire behavior and frequency in the invaded habitat. Since fire is an important component of Cerrado, this study aimed to verify how Urochloa decumbens affects fire behavior and severity and if fire behavior changes according to season (July=dry season; October=beginning of rainy season) in cerrado invaded areas. The study was conducted at the Reserva Natural Serra do Tombador, Central Brazil. Experimental fires were conducted in "campo sujo" physiognomy (dominant herb layer, with scattered small shrubs), in four plots (20 × 15 m) for each treatment: Invaded area, July fire (UJ); native vegetation, July fire (NJ); Invaded area, October fire (UO). Before, during, and after the prescribed burns we measured weather conditions (temperature, relative humidity and wind speed), fuel load (dead biomass, coarse/stems and grass crowns, fine/leaves and culms of grasses and forbs, and U. decumbens, kg/m2), and fire parameters (maximum temperature, rate of spread; flame height; residence time; burning efficiency; Byram's fire intensity). One-way ANOVA and Mann-Whitney tests were used to compare the variables between treatments (UJ × NJ, and UJ × UO). The weather conditions were quite similar in all experimental fires. The fuel load in NJ was significantly higher than in UJ (p0.05). All other variables did not vary significantly for both invasive × native, and dry x rainy season. Even with a lower fuel load in July, the presence of U. decumbens increased maximum temperature and the flame height of prescribed fires, while season did not affect the measured variables in invaded sites even with higher fuel load. Our study shows that the presence of U. decumbens can affect fire behavior in cerrados and probably bring ecological outcomes to system.