

EFFECTS OF SEASONAL FIRES ON THE TEMPORAL STABILITY OF HERBACEOUS PRODUCTION IN A MESQUITE-ENCROACHED GRASSLAND

Michael J. Castellano and R. James Ansley

Texas Agricultural Experiment Station, P.O. 1658, Vernon, TX 76384, USA

ABSTRACT

In Great Plains ecosystems, fire has long been used to suppress shrub encroachment and augment herbaceous production. Accordingly, the effects of fire on vegetative physiognomy and herbaceous production have received much attention. However, the effect of fire on the temporal stability of herbaceous production has received relatively little attention. Here we evaluate the results of repeated seasonal fires on the post-treatment temporal stability of herbaceous production within honey mesquite (*Prosopis glandulosa*)-encroached grasslands. We define temporal stability as the coefficient of variation for herbaceous biomass ($CV = 100 \times 1 \text{ SD}/\text{mean}$) within each treatment plot across years. In one analysis, we examine the effects of repeated winter fires or repeated summer fires in combination with either simulated grazing or no grazing on the temporal stability of an ecologically and economically important C_4 midgrass. In a second analysis, we examine the effects of repeated summer fires, repeated winter fires, and alternating winter–summer fires on the temporal stability of a complete herbaceous community exclosed from livestock grazing. Preliminary results indicate summer fire decreases temporal stability, while winter fire and grazing have little effect. Post-fire mesquite regrowth is highest in winter burn treatments and likely lowers herbaceous production but increases temporal stability. Potential effects of seasonal fires, or the resultant alteration in shrub physiognomy, on the temporal stability of herbaceous production are important information for land managers, especially in arid and semiarid environments where precipitation varies greatly between years. Long-term, post-fire biomass data are needed to determine how fires affect processes such as temporal stability and drought resilience.

Citation: Castellano, M.J., and R.J. Ansley. 2007. Effects of seasonal fires on the temporal stability of herbaceous production in a mesquite-encroached grassland [abstract]. Page 62 in R.E. Masters and K.E.M. Galley (eds.). Proceedings of the 23rd Tall Timbers Fire Ecology Conference: Fire in Grassland and Shrubland Ecosystems. Tall Timbers Research Station, Tallahassee, Florida, USA.