Impact of Outdoor Gestating Gilts on Soil Nutrients, Vegetative Cover, Rooting Damage, and Pig Performance

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ABSTRACT

The objectives of this study were to document changes over time in soil nitrate and phosphorus (P) concentrations, percentage of ground cover, rooting holes, and gilt and litter productivity for pastures of “Spar” old-world bluestem (Bothriochloa ischaemum) that were either burned or not burned before occupation. Pregnant gilts (seven in each pasture; n = 56) were assigned at random to each of four replicated treatments of burned or non-burned pastures (0.4 ha each). Each pasture was subdivided into three regions: (1) inner-hub, (2) middle, and (3) outer-with a feeding place along the fence-line. Soil samples (12 per pasture) were collected at 0-15.2 cm depth every 30 days and assayed for nitrate, and percentage of ground cover visually estimated. Four composites from initial and final soil samples, corresponding to the three regions plus the feeding place, were used to determine P concentration. Rooting holes were counted and sizes measured on day 0, 30, and 60. Ground cover decreased ($P < 0.05$) initially when precipitation was limited but did not differ ($P > 0.49$) between burned and non-burned pastures. Numbers (0.18/d) and sizes (55 cm2/d) of rooting holes increased ($P < 0.05$) with time, and non-burned pastures had more ($P < 0.01$) rooting holes than burned pastures at day 60. Soil nitrate concentration were higher ($P < 0.05$) on day 90 for non-burned pastures than the burned but not on other day ($P < 0.20$) and concentration in the outer region increased ($P < 0.03$) with time. Phosphorus concentration did not differ ($P > 0.08$) between treatments; however, the feeding place had higher ($P < 0.05$) concentration than other regions. There also was a trend ($P < 0.08$) for non-burned pastures having higher P concentration by day 150. Gilts on non-burned pastures lost more ($P < 0.05$) body weight during lactation than those on previously burned pastures. Burning a pasture and stocking it with gilts during winter impacted groundcover negatively in terms of both vegetative growth and botanical composition. During periods of low rainfall, nutrients accumulated in soil, especially in pasture with dormant vegetation, denuded ground, or places where feeding on the ground occurred. Pasturing pregnant pigs could help in general distribution and recycling of nutrients as well as potentials of mitigating the negative public perceptions on animal welfare typical of conventional systems, but animal and environmental management aspects need further studies.

KEYWORDS. Environment, pasture, pig behavior, soil nutrients, sustainability