

Warm-season forage options in Northern Dryland Regions

Abstract

Rotating summer fallow with wheat (*Triticum* spp.) is done in dryland grain farming at upper latitudes to stabilize yields over time and to prevent crop failure. However, summer fallow is costly since weeds must be controlled and crops are not grown. Replacing summer fallow with grain crops can generate low economic returns. Previous research indicated that annual cool-season forages can be substituted for summer fallow in dryland cropping systems. Our objective was to determine if annual warm-season species were suited for forage production in monocultures and polycultures in the U.S. northern Great Plains. Dry matter (DM) production by 20 warm- and cool-season crop monocultures and 4 polycultures was determined across six environments during 2016, and by 25 warm- and cool-season crop monocultures and polycultures across four environments from 2016 through 2018. Maize (*Zea mays* L.) monoculture produced forage DM in amounts equal to, or greater than, those produced by other warm- and cool-season crop treatments ($P < 0.05$). Maize DM production averaged 2.5 to 5.7 Mg ha⁻¹, depending on the study and environment. Sorghum (*Sorghum bicolor* L.), foxtail millet [*Setaria italica* (L.) P. Beauv.] and sunflower (*Helianthus annuus* L.) also produced relatively large amounts of forage DM. Polycultures failed to produce more DM than monocultures consistently ($P > 0.40$). These results indicate that maize and other warm-season crops are adapted for dryland forage production in cool regions at upper latitudes. Additional research is needed to determine the impacts of annual warm-season forages on grain yield in a forage-wheat crop sequence.

Carr, Patrick M, Boss, Darrin L, Chen, Chengci, Dafoe, Julia M, Eberly, Jed O, Fordyce, Simon, Hydner, Roger M, Fryer, Heather K, Lachowiec, Jennifer A, Lamb, Peggy F, McVay, Kent A, Khan, Qasim A, Miller, Perry R, Miller, Zachariah J, and Torrior, Jessica A. "Warm-season Forage Options in Northern Dryland Regions." *Agronomy Journal* 112.5 (2020): 3239-3253.