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Grassland bud and shoot demographic responses to single and recurrent droughts vary across an aridity gradient

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Clonal demographic traits play important roles in regulating community dynamics. Yet, it remains unclear how the responses of these clonal traits to drought might depend on previous drought exposure, and how drought responses vary among grasslands. We conducted a repeated drought experiment across four grasslands along an aridity gradient in the Mongolian plateau. We assessed the effects of single (precipitation reduction in 2021-2022) vs. recurrent (precipitation reduction in 2015-2018 and 2021-2022) drought on bud density, shoot density, and the ratio of bud to shoot density. Drought reduced bud density at all grasslands and shoot density at most grasslands. Drought reduced the ratio of bud-to-shoot density only in the most arid grasslands. Recurrent drought had larger negative effects than a single drought on bud density and composition of bud and shoot at only one of four grasslands, and on shoot density at two of four grasslands. Our results suggest that previous drought exposure can alter the response of plant clonal demographic traits to subsequent drought in some but not all grasslands and that responses can vary with mean climate.

Keywords: bud limitation, climate change, drought frequency, population regeneration, Mongolian plateau

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