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IMPACT OF MATURE, FEMALE EASTERN RED CEDAR (*JUNIPERUS VIRGINIANA* L.) TREES ON SOIL SEED BANK IN THE MIXED-GRASS PRAIRIE OF THE NORTHERN GREAT PLAINS

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ABSTRACT

Eastern red cedar (ERC) (*Juniperus virginiana* L.) trees are invading prairies throughout the Great Plains due to fire suppression and overgrazing. This encroachment poses a threat to native plant communities in terms of their reproduction, regeneration, diversity, and invasiveness. It is unknown how ERC trees impact belowground propagules in the mixed-grass prairie and how it may alter heterogeneity. The objective of this study was to evaluate how mature female ERC trees impact the soil seed bank composition. In October 2020 in south-central South Dakota ten female ERC trees with canopy diameters = 5-10 m, similar environmental characteristics, and isolated from other large trees were selected for soil seed bank sampling at four treatments: under canopy (UC), drip-line (DL), two meters outside dripline (2M), and grassland control (GL). Four cardinal direction transects extended from each tree stem where a soil core (10 cm dia. x 10 cm depth) was sampled at the four treatment distances, totaling 16 cores per tree and 160 cores overall. Soil cores were sieved through a 2 mm sieve, planted on 2 cm of Miracle Gro® potting soil, and grown in a greenhouse at 23 ± 3 °C under 16-hour light. A total of 12,563 seedlings emerged consisting of 26 families, 75 genera, and 89 species. Plant community analyses were conducted in PC – ORD using nonmetric multidimensional scaling and multi-response permutation procedures for treatment comparisons. Seed bank composition significantly differed among treatments ($P = 0.0139$). We found significant differences in seed bank composition between UC and 2M ($P = 0.0079$) and between UC and GL ($P = 0.0055$), which were primarily due to more introduced annual forbs found under the ERC canopy compared to 2M and GL; other comparisons were not significant. Our results suggest that the impact of female ERC trees on soil seed bank composition is limited within the canopy of ERC with no difference detected 2M and beyond.