About the README File Template

1. Dataset Title:Vegetation cover

2. Name and contact information of PI:

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6. Funding source: Utah Agriculture Experiment Station.

7. Project summary, description or abstract: Precipitation events are becoming more intense around the world, changing the way water moves through soils and plants. Plant rooting strategies that sustain water uptake under these conditions are likely to become more abundant (e.g., shrub encroachment). Yet, it remains difficult to predict species responses to climate change because we typically do not know where active roots are located or how much water they absorb. Here, we applied a water tracer experiment to describe forb, grass, and shrub root distributions. These measurements were made in 8 m by 8 m field shelters with low or high precipitation intensity. We used tracer uptake data in a soil water flow model to estimate how much water respective plant root tissues absorb over time. In low precipitation intensity plots, deep shrub roots were estimated to absorb the most water (93 mm yr-1) and shrubs had the greatest aboveground cover (27%). Grass root distributions were estimated to absorb an intermediate amount of water (80 mm yr-1) and grasses had intermediate aboveground cover (18%). Forb root distributions were estimated to absorb the least water (79 mm yr-1) and had the least aboveground cover (12%). In high precipitation intensity plots, shrub and forb root distributions changed in ways that increased their water uptake relative to grasses, predicting the increased aboveground growth of shrubs and forbs in these plots. In short, water uptake caused by different rooting distributions predicted plant aboveground cover. Our results suggest that detailed descriptions of active plant root distributions can predict plant growth responses to climate change in arid and semi-arid ecosystems.

8. Brief description of collection and processing of data: Percent cover by visual estimation determined in 9, 1m x 1m fixed plots located in each of 14 experimental plots (each plot was 8 m x 8m). Vegetation was surveyed by species one to three times per year between 2016 and 2021.

9. Description of files (names, or if too numerous, number of files, file type(s): ‘Vegetation cover’

10. Definition of acronyms, codes, and abbreviations:

12. Descriptions of parameters/variables

a. Temporal (beginning and end dates of data collection): 2016-2021

b. Instruments used and units of measurements: visual estimation to 1% ground cover

c. Column headings of data files (for tabular data):

|  |
| --- |
| Column A - date (year-month-day), April 2016 to June 2021 |
| Column B - sample event (1-10) |
| Column C - year (2016-2021) |
| Column D - plot (1-14) |
| Column E - treatment (cc,4.8, 5.3, 6.2,7.2,8.4, 10.5,19.4) |
| Column F- subplot (1-9) |
| Column G - 'cover-estimate' (means of estimating vegetation cover, visual) |
| Column H - code (6 letters species code, 3 letters for genus, 3 letters for species) |
| Column I - 'cover' (percent cover in fixed 1 m2 plot, determined from visual estimation, values from 0-117) |
| Column J - genus (genus name) |
| Column K - species (species name) |
| Column L - native (1 = native, 0= non-native) |
| Column M - growth-habit (forb, grass, shrub, |
| Column N - duration (lifespan - annual, perennial, |

d. Location/GIS Coverage (if applicable to data): 41° 36’ 53” N, 111° 34’ 1” W

e. Symbol used for missing data:NA

14. Publications that cite or use this data: Root distributions predict shrub-steppe responses to precipitation intensity. Kulmatiski A., Holdrege M.C., Chirvasa, C., and Beard K.H. Biogeosciences. Special issue: Ecosystems experiments as a window to future carbon, water, and nutrient cycling in terrestrial ecosystems.