Impact of Grazing Regimen on Wildflowers Interseeded within Pasture Systems

Summary: Limited floral resources have contributed to pollinator habitat fragmentation and population declines. Although native warm-season grass (NWSG) pastures can bridge fragmented habitats with interseeded wildflowers, grazing management may affect wildflower abundance, persistence, and blooming patterns. Therefore, we conducted three parallel studies to determine the effects of grazing and pasture rest on these outcomes. First, we seeded native wildflowers individually and clipped them 2 – 3 times each summer. The other two studies involved grazing NWSG pastures interseeded with diverse wildflower mixes. The first grazing study evaluated rest treatments over five summers and the second evaluated continuously grazed NWSG pastures for three summers. The repeated clipping reduced wildflower density and forage mass, but the biennial black-eyed Susan and annual partridge pea were the only species to be eliminated. When grazed, lanceleaf coreopsis, black-eyed Susan, ticktrefoil, purple coneflower, and oxeye sunflower were the most abundant, persistent, and commonly grazed.

Maximilian sunflowers selectively grazed by steers. Photo by: Jessica Prigge

Project Objectives:

- Monitor native wildflowers for persistence, forage mass, and flowering patterns under repeated defoliation in single-species small plots.
- Evaluate wildflower abundance, persistence, flowering ability, and grazing preference when:
  - Continuously grazed in big bluestem/indiangrass pastures.
  - Grazed under variable pasture rest regimen in switchgrass and big bluestem/indiangrass pastures.

Farmer Takeaways:

- In both grazing studies, wildflowers decreased in population density as annuals and biennials reduced, but forage mass increased as established perennial plants (e.g., Maximilian and oxeye sunflowers, purple coneflower) grew larger.
- Grazing management did not substantially impact wildflower persistence and affords flexibility in timing and stocking.

Methods:

- 12 native wildflowers were seedined individually in small plots and clipped 2 – 3 times each summer for three summers. Researchers recorded plant density, forage mass, and weekly flowering patterns.
- A big bluestem/indiangrass/little bluestem pasture was interseeded with 18 wildflowers and continuously grazed by weaned steers for three grazing seasons. Researchers monitored wildflower populations, flowering patterns, forage mass, and grazing preference.
- A big bluestem/indiangrass and a switchgrass pasture were both interseeded with 11 wildflowers and grazed for five summers. Each pasture was divided into paddocks that allowed each to be grazed under a systematic rest schedule: three weeks during early, middle, or late season, or excluding grazing all together. Researchers documented wildflower populations, flowering patterns, and grazing preference.

Bumble bee visiting a flowering purple coneflower in a small plot trial subjected to repeat harvests. Photo by: Jessica Prigge

Results: Technical Findings

- In small plots, wildflower population density and forage mass decreased but black-eyed Susan and partridge pea were the only species eliminated (Figure 1).
- When grazed, lanceleaf coreopsis, black-eyed Susan, ticktrefoil, purple coneflower, and oxeye sunflower were the most abundant and persistent. For additional information on wildflower rankings, please see tables in articles 1 and 2 linked below!
- Without grazing, wildflower persistence and flowering declined due to the competition from the tall-growing NWSG.

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Results: Technical Findings

- Flowering period and timing differed by species (Figure 2).
- Ticktrefoil species, oxeye sunflower, purple coneflower, and lanceleaf coreopsis were the most frequently grazed in both continuously grazed and systematically rested pastures.
- Pastures continuously grazed with low stocking densities increased selectivity, leading to weed encroachment. Pastures continuously grazed with low stocking densities created stand gaps due to more selective grazing, which increased weeds and wildflowers within those gaps.
- Although each wildflower had a different flowering period, grazing regimen did not affect the length of the period (Figure 3).

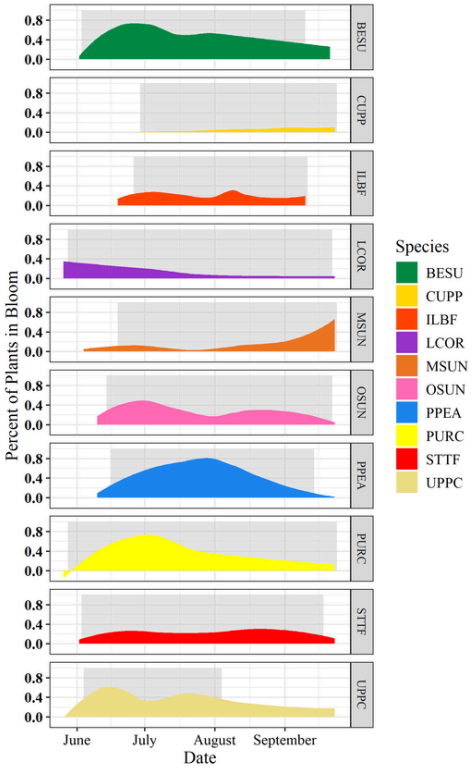

Figure 2: The mean flowering period length (grey) and proportion of plants flowering (colored bands) for 10 native wildflower species* observed 2020 – 2022 at the East Tennessee AgResearch and Education Center, Plant Science Unit, Knoxville, TN, USA. *Black-eyed Susan, BESU; cup plant, CUPP; Illinois bundleflower, ILBF; lanceleaf coreopsis, LCOR; Maximilian sunflower, MSUN; oxeye sunflower, OSUN; partridge pea, PPEA; purple coneflower, PURC; showy tick-trefoil, STTF; upright prairie coneflower, UPPC.

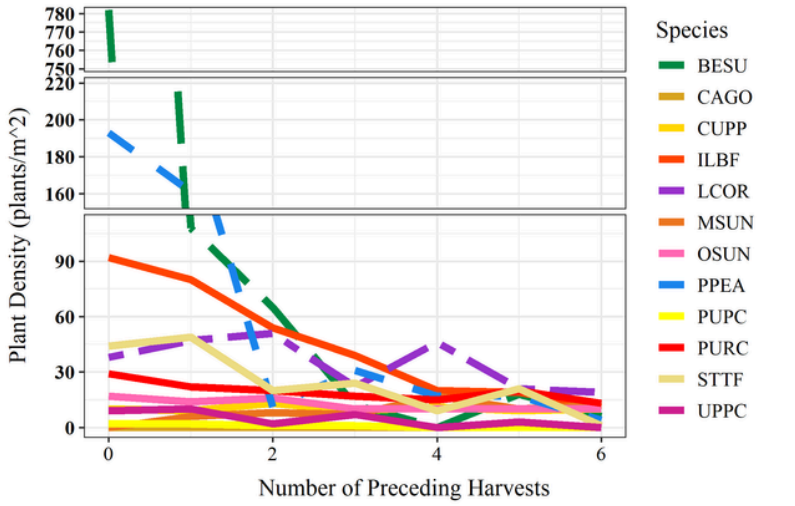

Figure 1: Plant densities (plants m^{-2}) of 12 native wildflower species subjected to repeat harvest, 2020 – 2022, at the East Tennessee AgResearch and Education Center, Plant Science Unit, Knoxville, TN.
†Blue dashed line, annual (partridge pea, PPEA); green dashed line, biennial (black-eyed Susan, BESU); purple dashed line, short-lived perennial (lanceleaf coreopsis, LCOR); solid lines, perennial (Canada goldenrod, CAGO; cup plant, CUPP; Illinois bundleflower, ILBF; Maximilian sunflower, MSUN; oxeye sunflower, OSUN; purple prairie clover, PUPC; purple coneflower, PURC; showy tick trefoil, STTF; upright prairie coneflower, UPPC).

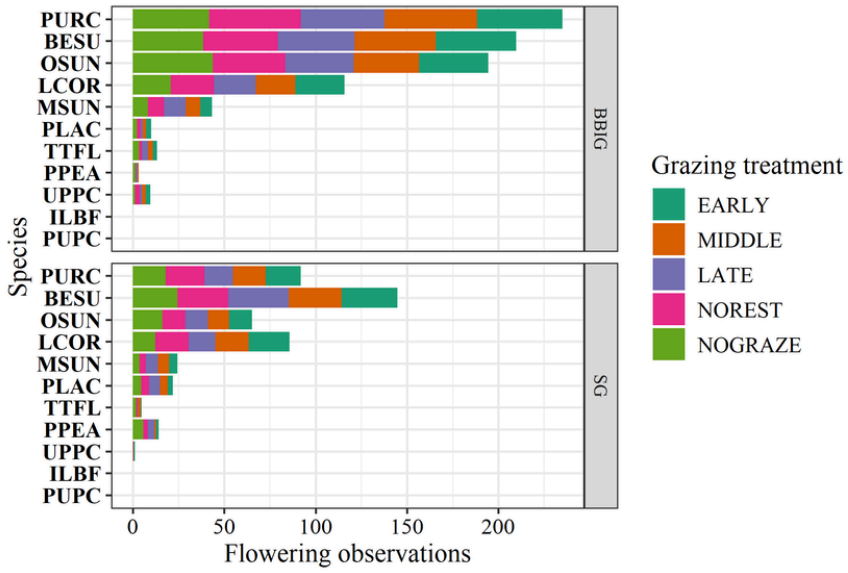

Figure 3: Frequency of observed wildflower* flowering presence by grazing regimen in NWSG pastures, 2018 – 2022, Northeast Tennessee AgResearch and Education Center, Greeneville, TN. *Purple coneflower, PURC; Black-eyed Susan, BESU; oxeye sunflower, OSUN; lanceleaf coreopsis, LCOR; Maximilian sunflower, MSUN; plains coreopsis, PLAC; dixie ticktrefoil, TTFL; partridge pea, PPEA; upright prairie coneflower, UPPC; Illinois bundleflower; purple prairie clover, PUPC; early season rest from grazing, EARLY; middle season rest from grazing, MIDDLE; late season rest from grazing, LATE; no rest from grazing, NOREST; no grazing, NOGRAZE.

References & More Information:

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