Establishment of Native Wildflowers into Fescue Pastures

Summary: Adding native wildflowers to tall fescue pastures can provide valuable food resources for pollinators without affecting cattle production. Wildflower establishment into pastures can be challenging, however, and few protocols for planting native wildflowers into tall fescue pastures have been developed. We conducted a series of complementary field experiments testing different methods to establish wildflowers into realistic pasture situations. A range of planting rates was evaluated for wildflower mixtures, and we found good evidence that rates between 2 and 10 lbs. per acre can produce good stands. Higher planting rates above 10 lbs/ac. do not necessarily improve establishment success. We also found that cold treatments of wildflower seed improved establishment success, but this method is probably impractical when planting large quantities of seed. Additional experiments tested different planting arrangements, sequences, and timings for establishing wildflowers with native grasses. Our results showed that it is best to seed grass first, control weeds, and then sow wildflowers the following year.

A wildflower enhanced pasture in Virginia.

Project Objectives:

- Evaluate how differences in site preparation, planting date, seeding rate, and seed treatment would influence wildflower establishment.
- Evaluate how varying the timing and placement of wildflowers in grass swards would affect establishment.

Farmer Takeaways:

- For pastures, planting rates for standard wildflower mixes should be between 2 and 10 lbs/acre. Planting rates closer to the high end of this range are recommended if seed is relatively inexpensive.
- Cold treatment of wildflower seed (stratification) can improve establishment success, especially at low planting rates (e.g., 2 lbs./acre). Treating large amounts of seed for big plantings (e.g., greater than 2 acres) might be difficult logistically, however.
- When establishing a completely new stand of native wildflowers and grasses, it is best to seed grasses first, control weeds with selective herbicides, and then plant wildflowers into the established grass stand the following year.

Methods:

- Small plot experiments were conducted in 2020 and 2021 using a wildflower seed mix with 16 different species. The experiment evaluated wildflower establishment across seeding rates of 2, 10, 25 and 50 lbs/ac.
- A parallel experiment was also run at the same time with seed that was exposed to a cold treatment to increase germination rates. The cold treatment was done by mixing wildflower seeds with moist peat moss and then refrigerating for four weeks at 40 °F prior to planting.
- Another set of field experiments were conducted from 2021 to 2023 using different planting arrangements of wildflowers designed to improve their establishment success.
- Treatments included grass and wildflower seed that was planted mixed together in the same space, wildflower and grass seed planted side by side in rows, or where grasses and wildflowers were planted in different sequences (e.g., grass seed planted before wildflowers).

A vegetation survey conducted on a wildflower enhanced field in Virginia.

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Results: Technical Findings

- The establishment of wildflowers was successful in the field experiments, as evidenced by the higher forb density, averaging 88 stems/m^2 in the treatment plots. The most abundant species included *Heliopsis helianthoides, Rudbeckia hirta, Coreopsis lanceolata, Tridens flavus, Desmanthus illinoiensis, Bouteloua curtpiendula, Senna herbecarpa, and Zizia aurea*.
- Overall, wildflower density was positively associated with seeding rate and was also greater with cold stratification – especially in 2022. A seeding rate of 50 lbs/ac. (56 kg/ha) resulted in almost three times as many wildflowers compared with the lowest seeding rate. However, rates between 2 and 10 lbs/ac (2.2 and 11 kg/ha) produced enough plants for a good wildflower stand (> 5 plants/ft^2 or 50 plants/m^2).
- Additional field experiments tested different planting arrangements, sequences, and timings for establishing wildflowers with grasses. Depending on the goal of the planting, our results point to several recommendations.
- The best way to balance grasses and wildflower establishment is to seed grasses first, control weeds with selective herbicides, and then sow wildflowers the following year. If the main goal is to favor wildflowers, then they should be planted first followed by grasses in the second year.

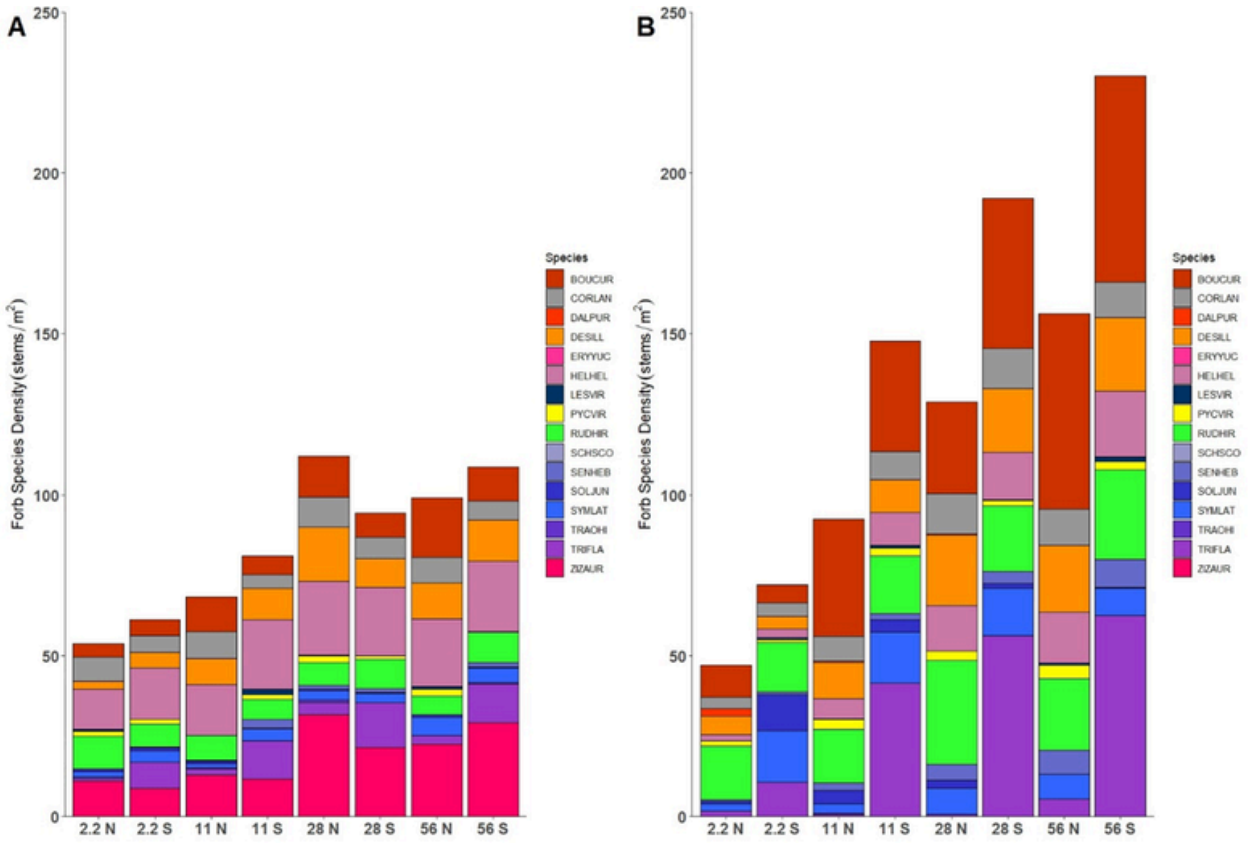

Figure 1. Wildflower/forb density recorded in the field experiments conducted in 2021 (A) and 2022 (B). Caption and bar colors refer to the various wildflower species that were present. Numbers on the x-axis are the planting rates- 2.2, 11, 28 and 56 kg/ha or 2, 10, 25 and 50 lbs/ac. N indicates establishment from non-treated seed and S refers to the seed that was cold stratified. Modified from Bellangue et al. 2024.

References & More Information:

- Bellangue, D., J. Barney, M. Flessner, J. Kubesch, M. O'Rourke, B. Tracy and J.L. Reid. "Site preparation and planting strategies to improve native forb establishment in pasturelands." *Agronomy*, vol. 14, no. 11, 2024, p. 2676. https://doi.org/10.3390/agronomy14112676
- Kubesch, J., S. Greiner, G. Pent, J.L. Reid and B. Tracy. "Evaluating different methods to establish biodiverse swards of native grasses and wildflowers for pasturelands." *Agronomy*, vol. 14, 2024, p. 1041. https://doi.org/10.3390/agronomy14051041

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