

**Shallow seeding depths produced the greatest emergence rates, especially under soil crusting conditions. Seeding depths of 1/8 to 1/4" were ideal, if moisture was available.**

## Agronomic Implications of Perennial Flax Domestication

### RATIONALE

- Perennial crops may enhance cropping system **sustainability**, as well as improving aspects of **soil health**, e.g., organic matter.
- Highly variable soil moisture often prevents timely planting and harvesting in annual cropping systems - perennials add operational **FLEXIBILITY** for farmers.
- **Established markets** for flaxseed and flax oil ensure reliable crop value for farmers, making **PERENNIAL FLAX** (*Linum lewisii*) an ideal perennial crop to diversify north central Great Plains cropping systems.

### METHODS

- All trials conducted using organic management approaches.
- 2020 spring-sown field trials at two sites (MN and ND) to test perennial flax seeding rates, row spacings, and cover crops or intercrops.
- Additional work determined ideal flax seeding depth under crusting conditions on clay soils.
- 2020 fall-sown flax (after spring wheat harvest) at one MN site, testing seeding rate/depth on establishment.

### OBJECTIVE

Investigate agronomic best practices for planting and establishing productive perennial flax stands.

### RESULTS and DISCUSSION

- At the MN site, heavy rains buried seedlings in our first attempted spring planting. Heavy rains after a second planting caused an impenetrable crust.
- At the ND site, spring-planted flax establishment was poor due to drought.
- Fall planted perennial flax was more successful, resulting in nearly complete emergence at planting depths of 1/8 to 1/4" (Figure 1).
- Perennial flax emerges very slowly (~ 2 weeks), so ideal emergence conditions (avoiding crusting) need to be maintained for a longer period compared to other crops.

### CONCLUSIONS

Fall seeding is preferred because heavy rainfall and resulting soil crusting is rare in fall and more common in spring. Fall seeding also works well with typical Midwestern organic crop rotations that include small grains.



Figure 1. Fall flax emergence interplanted with oat. Oats were intended to limit weed germination and provide snow catch for winter cover.



Figure 2. Mature flax blooming in late summer.