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Sown Forb Performance in CP42 Fields

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Background

- CP42 is a general conservation practice that attempts to establish pollinator-friendly habitat
- In total, >500,000 acres have been converted to CP42 (>40% of which is in Iowa) [1]
- To date, there has been no formal assessment of practice success (i.e., post-seeding forb establishment)
- In this study, we assess forb establishment in randomly selected CP42 fields near Cedar Falls, Iowa
- We identify forbs with high/low establishment and relate this to seed cost in an effort to improve seed mix design

Methods

- In 2018, we surveyed 18 randomly selected three-year old CP42 fields, located within 60 minutes of Cedar Falls, Iowa (Fig. 1)
- Five-100m transects were randomly placed at each site
- Along each transect, we surveyed fifteen 0.5m x 2m quadrats (total per site: 75m²)
- We recorded: # plants (>20cm), stems/plant, sown grass cover, unsown grass cover, and bare ground

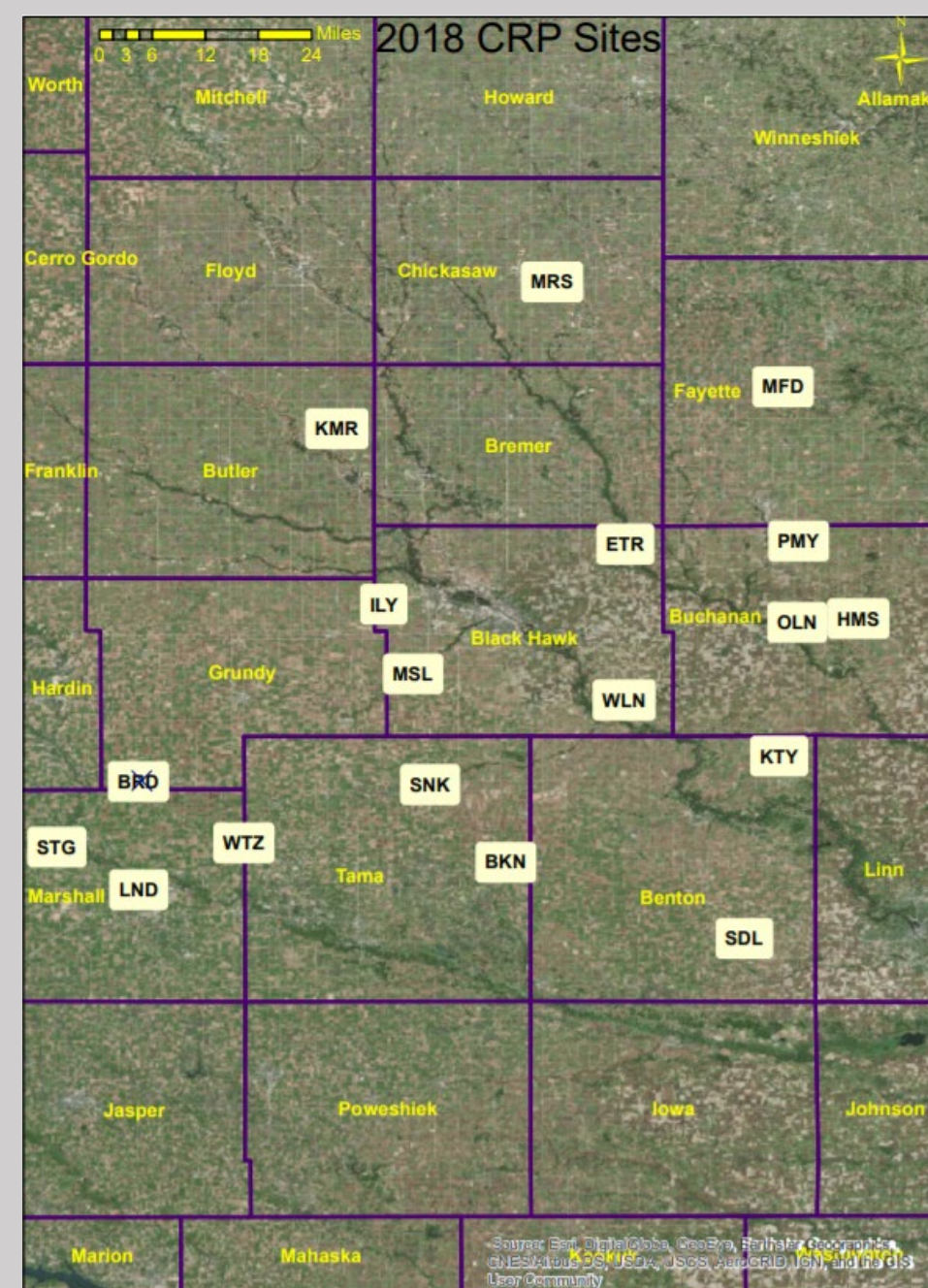


Fig. 1 Surveyed fields

Analyses:

- In this study, we focus on the 26 species seeded in >50% of surveyed fields
- At each field, we computed % establishment as: number of plants per acre / number of sown seeds per acre, for each species [2]
- We computed average species establishment across sites
- Species were divided into four categories based on cost per 10,000 seeds: \$0-2, \$2-5, \$5-50, >\$200 [3]
- We compared 2017 establishment [4] and 2018 establishment for the 26 focal species in this study



Fig. 2 Summer research students (L-R): Alyssa Burgert, Jenn Pauley, Alec Glidden, Olivia Wiloughby, Michael Lashbrook, Corrine Myers, Ethan Marburger, Nathan Theel

Results

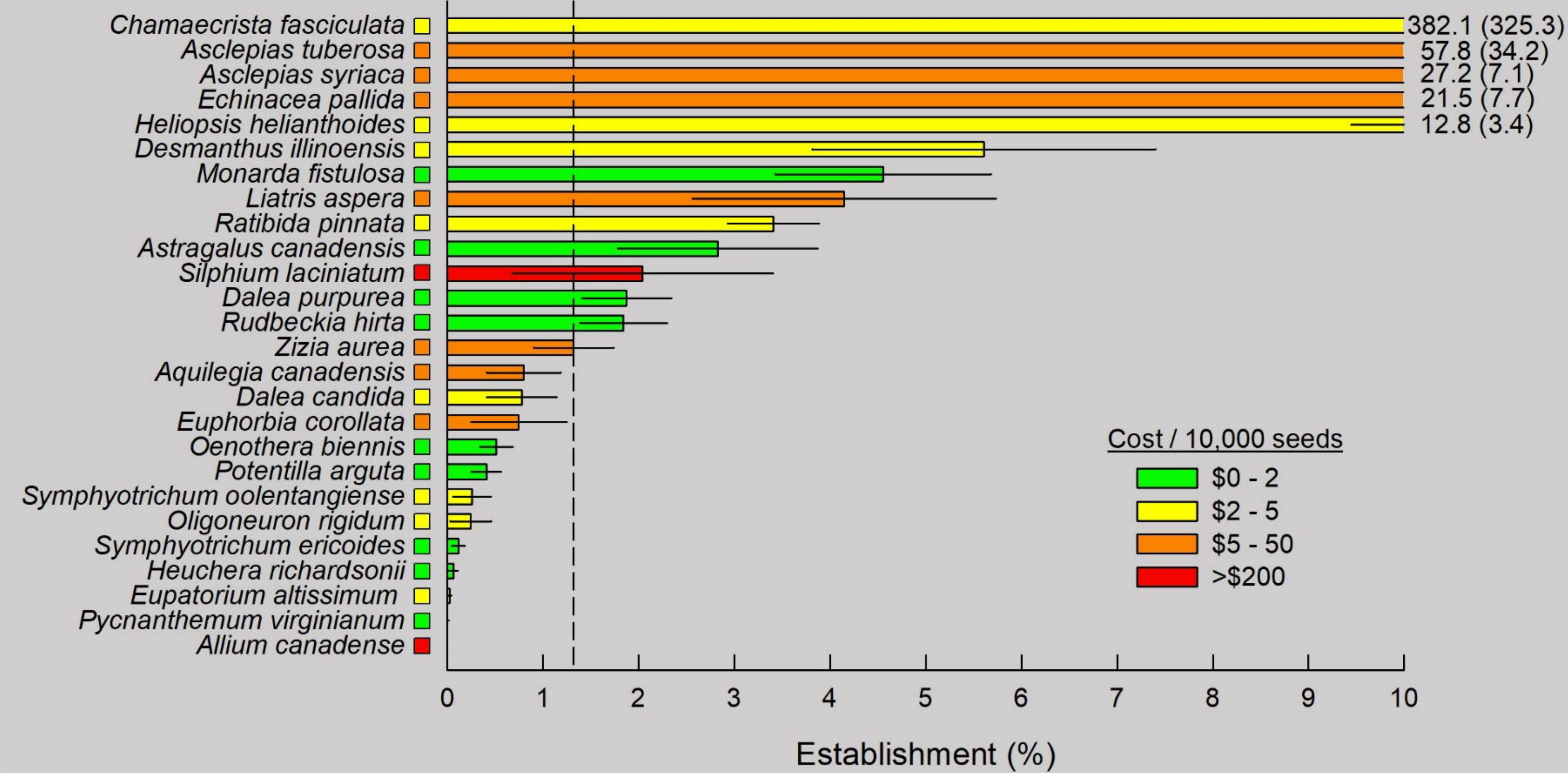


Fig. 3 Percent establishment of the 26 most commonly seeded species in surveyed CP42 fields. Dashed line indicates median establishment (=1.325). Mean (SE) establishment for species with >10% establishment are indicated with text.

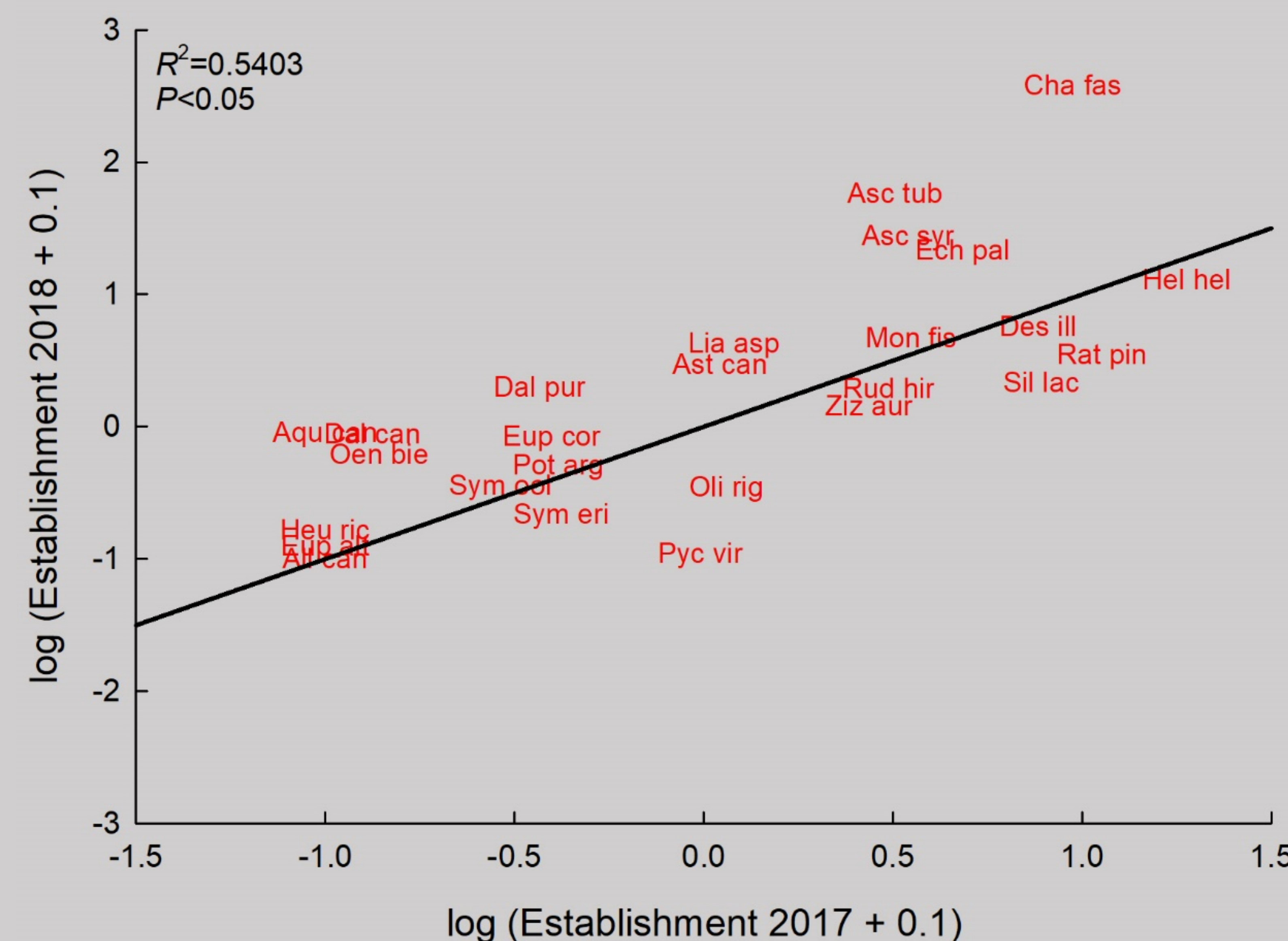


Fig. 4 Linear regression between 2017 and 2018 establishment data for the 26 focal species in this study. Line represents 1:1 establishment (i.e., species above line had higher establishment in 2018 survey and species below line had higher establishment in 2017 survey). Species are represented by six-letter genus and species identifier.

Interpretation

- Median establishment was 1.325% across species (Fig. 3)
- Species with high establishment include: *Chamaecrista fasciculata*, *Asclepias tuberosa*, *Asclepias syriaca*, *Echinacea pallida*, and *Heliopsis helianthoides*
- *C. fasciculata* is an annual and may become less common
- Species with low establishment include: *Heuchera richardsonii*, *Aquilegia canadensis* and *Allium canadense*, but all three are early flowering species that may be necessary to meet the requirements of CP42 (i.e., 3 species flowering April-June 15)
- *Aquilegia canadensis* and *Allium canadense* are also costly
- Species establishment in 2017 and 2018 were correlated (Fig. 4), suggesting that species establishment values are somewhat consistent across years in CP42 fields

Management Recommendations

- **With consideration to CP42 seed mix design:**
 - It may be possible to reduce seeding rates of species with high establishment (e.g., *C. fasciculata*, Fig. 5)
 - Species that: (1) are costly, (2) have poor establishment, (3) provide few resources for pollinators, and (4) are not essential to meet practice requirements (e.g., *Euphorbia corollata*), should be replaced with other candidate species
 - Fruit removal could improve establishment success for *Allium canadense*



Fig. 5 *C. fasciculata*

Acknowledgements

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References

- 1) USDA: Conservation Reserve Program, Monthly Summary – June 2018 (www.fsa.usda.gov)
- 2) Seeds per ounce are based on Kew (when available) or Prairie Moon Nursery
- 3) Seed costs are based on lowest value from: Allendan, Prairie Moon, Agrecol, Hoksey, Osenbaugh, Minnesota Native Landscapes, Shooting Star, Ion Exchange
- 4) Jonas K, Jackson L (2017) Effects of planting time and grass-forb seeding ratio on establishment in CRP pollinator habitat. UNI SURP Poster

