

Weed suppression from frost-seeded *Brassicaceae* cover crops

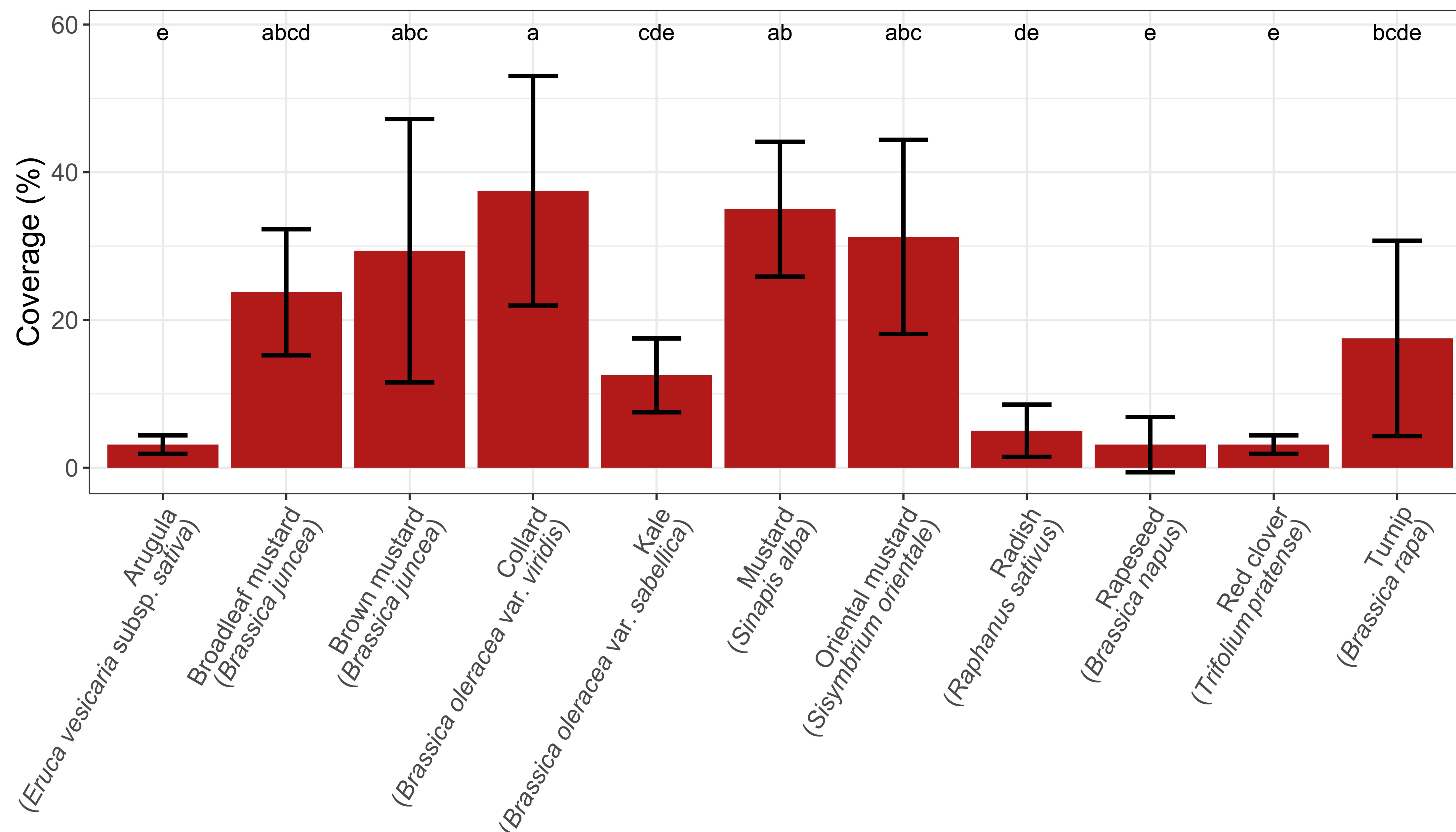
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Motivation

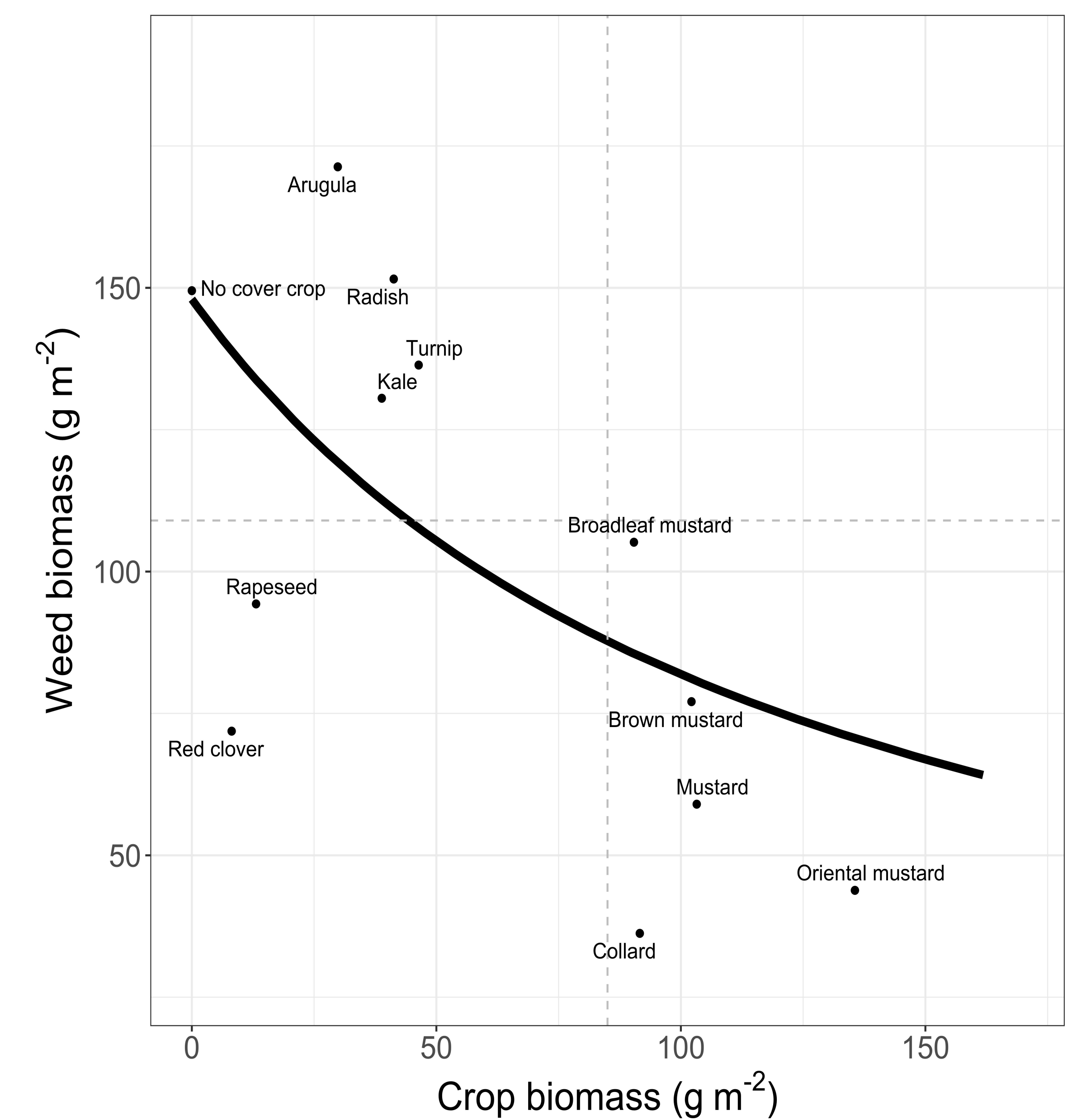
- Cover crops can suppress weeds through a variety of mechanisms, including competition for resources. Most research on cover crops has focused on grass and legume species that are seeded in the fall.
- Red clover (*Trifolium pratense* L.) is a winter-hardy cover crop that provides multiple benefits [1] and requires minimal management [2], but its weed suppression performance is inconsistent [3,4].
- Brassicas are cool-season crops. Yellow mustard, spring canola, and winter rapeseed residues, when incorporated into the soil, can reduce weed seedling emergence [5]. **Can brassicas provide reliable weed suppression?**

Results

Collard's coverage was significantly higher than that of red clover.



Cover crop significantly reduced weed biomass ($p = 0.0137$). Collard provided the strongest weed suppression among all the *Brassicaceae* species.



Materials and Methods

- Randomized complete block design with 4 replications (N = 48). Each replication consisted of 10 brassica cover crop species and 2 control treatments (red clover and no cover crop). All crops were frost-seeded into rolled-crimped cereal rye (*Secale cereale* L.) and soybean residue (*Glycine max* (L.) Merr) mulch on March 23rd, 2022.
- Cover crop coverage was evaluated from a 0.25 m² quadrat per plot on June 2nd, 2022 and crop and weed biomass were sampled from a 0.25 m² quadrat per plot on June 3rd, 2022.
- A non-linear model for crop – weed competition was fitted with `nls` and a linear model for crop coverage was fitted with `lm` (stats package version 3.6.2 [6]) in R version 4.2.1 [6]. The competition conforms to $B_w = \frac{C}{1 + i_w * B_c}$ [7], where B_w is the weed biomass with no cover crop present, C is the weed biomass when no cover crop presented, i_w is the crop – weed competition coefficient, and B_c is the cover crop biomass.

Conclusion

Given the cover crop's low biomass and coverage percentage, frost seeding may not be an appropriate seeding method when soil is covered with soybean residue and mulch from cereal rye.

References

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