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Cover crops as a weed seed bank management tool: A soil down review

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Introduction

- The herbicide resistant weed epidemic and increasing pesticide regulations have led us in search of other forms of weed suppression.
- The ability to manipulate the weed seed bank environment through cover crops in order to reduce weed seed survival, promote dormancy, or discourage germination is a tool that can potentially be used as an integrated weed management tactic
- Our objective is to connect literature on weed seed fate to literature on how cover crops alter the environment surrounding weed seeds. We stop short of weed establishment as this is covered in other works.

Conclusions

1. Cover crops alter the weed seed bank environment, influencing survival, dormancy, and germination.
2. Weed seedling density may be reduced by decreased temperature and fluctuations thereof, light, and soil nitrogen.
3. Weed seedling density may be increased by greater soil moisture, soil nitrogen, and oxygen.
4. The complexity of differing responses due to location and environment deters from providing uniform recommendations for producers.
5. For greatest potential, management should maximize cover crop biomass, decrease soil nitrogen, and delay termination.
6. Future research should include measurements of weed seed banks, including dormancy status, predation, and germination.

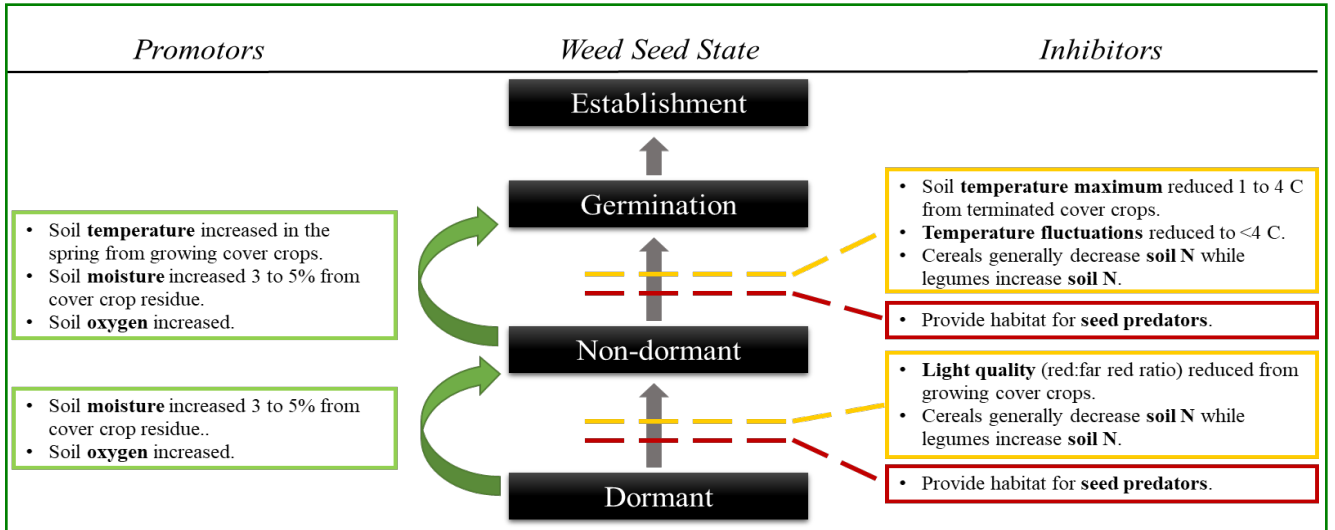

Figure 1. Potential for cover crops to promote (green), reduce in some but not all cases (yellow), or inhibit (red) advancements in weed seed state toward establishment. Figure adapted from Rius and Darling (2014).

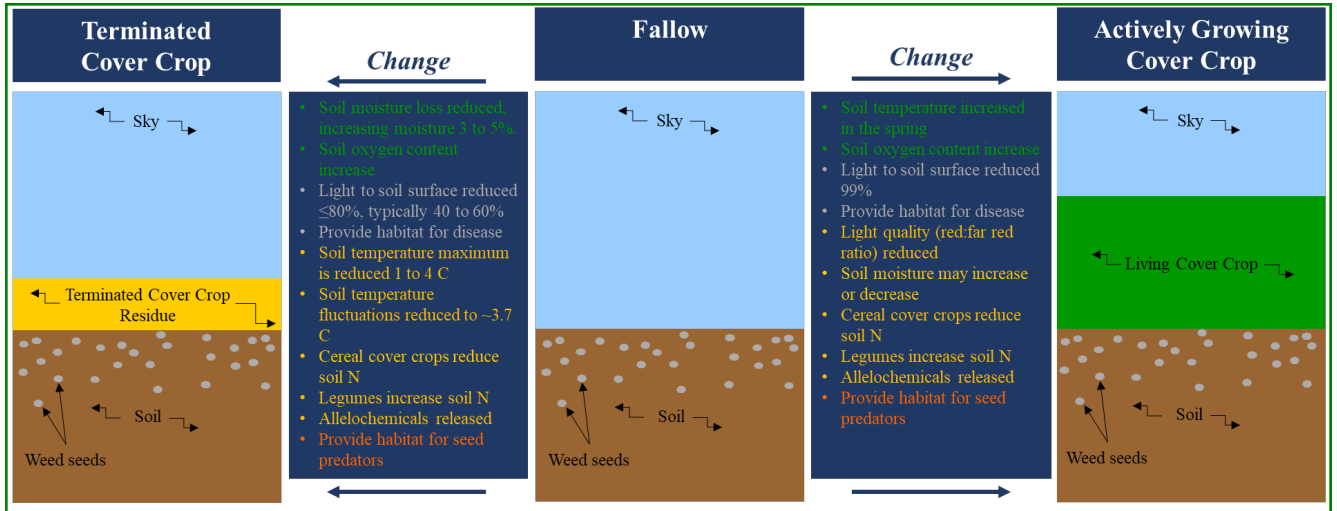

Figure 2. Changes in the environment surrounding weed seeds as a result of actively growing cover crops, living cover crop (left) and terminated, dead cover crop residue (right) compared to fallow (center). The deeper the seeds' position in the soil, the less pronounced the change. The color of text indicates dormancy or germination response of weed seeds. Red text indicates inhibition, yellow text indicates variable response, green text indicates promotion of weed germination, and gray text indicates neither a neutral response (neither inhibition or promotion).

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