Seed Ecology III

Instructions for Preparing Extended Abstracts

Authors whose summary abstracts have been accepted for oral or poster presentations are now being invited to submit an extended abstract.

Extended abstracts are due **April 15, 2010**. Please submit abstracts to abstracts@seedecology3.org. Late submissions will not be accepted.

Extended abstracts will be reviewed and edited, and will be provided to conference delegates as a printed volume at the meeting. We also plan to post the extended abstracts online to make them more widely available after the conference. If you do not wish your extended abstract to be posted online, please indicate this at the time of submission.

- Extended abstracts are restricted to one or two letter-size pages (8 ½ x 11 inches; 215 x 280 mm) in length, including up to three tables or figures. Text should be typed using size 10 Arial font (unless otherwise specified), single-spaced throughout. Page margins should be 1 ½ inch (40 mm) left-hand margin, ¾ inch (20 mm) right-hand, top and bottom margins. Please refer to the **example Word file** provided below.

- The title should be centered on the page, in upper and lower case bold type and be informative, containing key words. Authors and institutional address(es) should be centered on the page. Where necessary, each author's name should be followed by an identifying superscript number (1, 2, 3) associated with the appropriate institutional address. The same superscript number should precede the institutional address. For papers with more that one author, the corresponding author's name should be followed by a superscript asterisk*. Please provide an email address for the corresponding author immediately below the institutional address(es).

- The text should be divided into sections of Introduction, Methods, Results and Conclusions, References. All headings should be in upper and lower case, bold type and left justified.

- References should be listed chronologically in the text. Use "et al." where there is more than one author. At the end of the paper, list references in alphabetical order. Please refer to the sample abstract for referencing styles. References should be in size 8 Arial font.

- Generic and specific names in the text should be in italics, with the nomenclatural authorities included upon first mention.

- The IS Units system should be used in all instances.

- Up to three tables and/or figures may be included, within the 2-page limit. Tables and figures should be numbered in the order they appear in the text. Table headings and figure captions should be in size 10 Arial font. Tables and/or figures should appear at the end of the text.

- The abstract file should be in a PC-compatible Microsoft Word file type.

Bromus tectorum Seed Banks: Impact of the Pathogen *Pyrenophora semeniperda*

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Introduction

Bromus tectorum L. is an exotic winter annual that is abundant in western North America. Its seeds are dormant at dispersal but after-ripen over summer and are poised to germinate in response to autumn precipitation. Most seeds that do not autumn-germinate re-enter dormancy. *Pyrenophora semeniperda* (Brittlebank and Adam) Shoemaker is a native fungal pathogen that attacks seeds of cool-season grasses. Its impact depends upon seed germination rate; seeds that germinate quickly escape mortality, while those that germinate slowly often fall prey (Beckstead et al. 2007). Fast-germinating *B. tectorum* seeds in the autumn seed bank are rarely killed, while dormant seeds in the potential carryover seed bank can suffer high mortality (Meyer et al. 2007). We tested the hypothesis that *P. semeniperda* is more important on xeric sites, where germination-triggering autumn precipitation is less likely, than on sites with regular fall precipitation.

Methods

We sampled *B. tectorum* seed banks at 32 sites across a range of habitats in interior western North America in late spring 2005. We quantified apparently viable and pathogen-killed seeds in ten randomly-collected samples from each site. This fungus has readily recognizable stromata that protrude from killed seeds. Following after-ripening, apparently viable seeds were incubated for 2 wks at 20C and scored as nonviable, germinable (viable), or pathogen-killed. Viable and pathogen-killed seeds constituted the potential carryover seed bank. The successful carryover fraction was calculated as: (viable seeds)/ (viable + pathogen-killed seeds). Both field and laboratory-killed seeds were included.

Results and Conclusions

The fraction of potential carryover seeds to escape *P. semeniperda*-caused mortality was significantly positively correlated with both mean annual precipitation and precipitation the previous autumn, i.e., seeds at drier sites with less autumn precipitation experienced higher pathogen-caused mortality and lower survival (Fig. 1a, b). Seed survival decreased exponentially with increasing absolute density of potential carryover seeds (Fig. 1c). Xeric sites with high potential carryover are also likely to have high inoculum loads, resulting in low seed survival. Mesic sites have low potential carryover, but low inoculum loads result in high survival of the few seeds present. This inverse relationship between potential carryover seed density and seed survival tends to normalize the density of successful carryover seeds, which ranged from 0-25 seeds per dm^2 and was not correlated with precipitation. At xeric sites, this pathogen destroyed >90% of potential carryover seeds, greatly limiting the ability of *B. tectorum* to form long-lived seed banks. This study is among the first to quantify effects of a specific fungal pathogen on seed bank dynamics.

References

Beckstead J, Meyer S, Molder C, Smith C. (2007) A race for survival: Can *Bromus tectorum* seeds escape *Pyrenophora semeniperda*-caused mortality by germinating quickly? *Annals of Botany* **99**:907-914.

Meyer S, Quinney D, Nelson D, and Weaver J. (2007) Impact of the pathogen *Pyrenophora semeniperda* on *Bromus tectorum* seedbank dynamics in North American cold deserts. *Weed Research* **47**: 54-62.

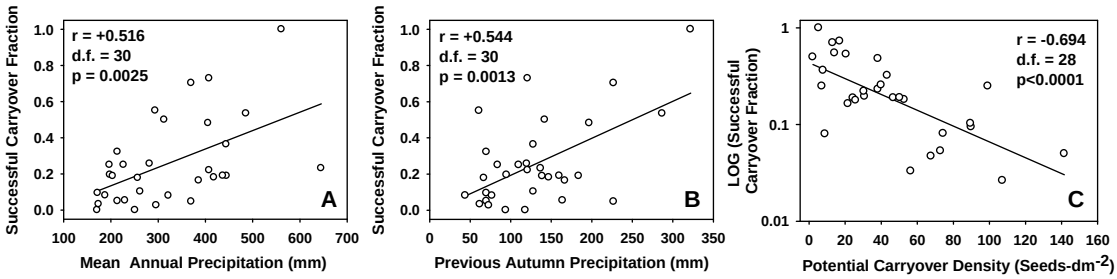

Figure 1. Fraction of the potential *B. tectorum* carryover seed bank that escaped *P. semeniperda*-caused mortality and successfully carried over, expressed as a function of: (A) mean annual precipitation at the sample site, (B) precipitation the previous autumn (August-November) at the sample site, and (C) absolute density of the potential carryover seed bank.