

RESEARCH OPINION

Mistakes in germination ecology and how to avoid them

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Abstract

Frequently, in studies on seed germination ecology mistakes are made that lead to problems in determining the kind of dormancy and in extrapolating data to the field situation. In this paper, we discuss 22 of these issues and offer suggestions on how to avoid them.

keywords: germination test procedures, seed dormancy seed germination, seed germination ecology

Introduction

One of the major goals of seed germination ecology is to understand how dormancy (if present) is broken and how timing of germination is controlled in nature. Ideally, we can conduct studies in the laboratory/greenhouse/field and answer these questions. However, all too often, (seemingly small) mistakes lead to big problems in trying to germinate seeds and extrapolate data to the natural world. These problems sometimes result in manuscripts having to be revised or, even worse, rejected. The purpose of this paper is briefly to discuss various points related to research in germination ecology that potentially lead to problems, if appropriate actions are not taken. Some of these points are derived from the numerous questions asked by graduate students over the years, while others are problems frequently encountered by reviewers of manuscripts on germination biology.

Throughout this short paper we assume the aim is to understand how dormancy is broken and germination is controlled in nature, but other research aims are

possible. It is frequently necessary to provide seedlings for research purposes, and here the aim is simply to produce seedlings by the quickest and most convenient route. Given that aim, treatments that seeds would never receive in nature may be applied (e.g. concentrated sulphuric acid, gibberellins). Note however, that there is a grey area. Even if treatments that seeds might experience in nature (e.g. nitrates smoke) are effective in promoting germination, it is not safe to assume that they play an important role in nature.

Questions and discussion

1. What should I try to germinate?

As far as possible, you should use the intact natural dispersal unit, because removal of parts from it may increase/decrease germination percentages. The 'intact natural dispersal unit' means the fruit or seed is the form in which it would normally occur in nature after dispersal. For fleshy fruits, this means removing the flesh, which often contains germination inhibitors. Unless it is likely to happen in the field, you should not attempt to remove structures such as the lemma and palea that remain tightly bound to many grasses grains, even if their removal promotes germination.

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