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RESPONSE
to Finch-Savage and Footitt's opinion paper 'To germinate or not to germinate: a question of dormancy relief not germination stimulation'

Germination and dormancy breaking: two different things

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Finch-Savage and Footitt (2012) take issue with our recent opinion piece (Thompson and Ooi, 2010), in which we attempt to explain the crucial distinction between dormancy breaking and stimulation of germination, even though our paper consisted mostly of quotes from other authorities (e.g. Carol and Jerry Baskin) who seem to agree with us. Here is our very brief reply. Let's start where we can agree, with Finch-Savage and Footitt's (2012) statement, quoting Finch-Savage and Leubner-Metzger (2006), that 'any environmental cue that alters the conditions required for germination is by definition altering dormancy'. Unfortunately, Finch-Savage and Footitt (2012) appear not to accept the inevitable corollary of this statement, which is that 'conditions required for germination' do actually exist. In Finch-Savage and Footitt's (2012) universe, conditions required for germination do not exist, other than 'possibly water'. We don't know what to make of that 'possibly'.

The argument appears to hinge on the answer to the question: do light and nitrate (for example) result in a 'change in the seed', specifically one that enlarges the range of conditions under which germination will occur? If they do [since we both also seem to agree with Vleeshouwers *et al.* (1995) that 'dormancy is a seed characteristic, the degree of which defines what conditions should be met to make the seed germinate'], then light and nitrate break dormancy, and cannot by definition be germination cues. But here's the crux of the matter, which we admit owes a lot to looking at seeds from an ecological perspective. Anything that 'changes the seed' is indeed breaking dormancy, if that's all it does; in other words, if the result of that change is still a seed. A seed that is one step nearer germination, but still a seed nevertheless. On the other hand, anything that persuades the seed that here is the place and now is the time to germinate, is a germination cue.

The distinction is profound, and transcends any similarity in the underlying molecular events. Changes to the seed (dormancy breaking) may well fine-tune its response to light, to nitrate or to karrikinolide, but it's the light that tells the seed it is near the surface of the soil, the nitrate that tells the seed it's in a competition-free gap, and the karrikinolide that tells the seed there has just been a fire. It's that final, crucial cue that tells the seed that now is the time to take the most important step it will ever take. And that is why a germination cue is fundamentally, qualitatively different from dormancy breaking, and why the distinction is worth preserving.

References

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