GS: Complicated piece to write, in part because Monica is unfamiliar with the methods.

On the whole, made good decisions about what to include in the main text versus what to put in the supplemental material. The final decision about how to place text might have to be left up to people who are more familiar with those kinds of approaches

Framing. It would be easy to frame if the results came up in a way that is predictable. What Monica found…

In terms of framing, with the introduction felt that I needed to give more background on what bet hedging is.

The two points that I raise in addition, density-dependent models and predictive germination. If I’m not going to be talking about those things later on, placing that much of an emphasis on those two this early doesn’t necessarily make sense.

Questions 4 & 5 are listed as ways of exploring ‘where does this take us’. But reading through the paper, wasn’t sure how those analyses would shape the paper. When I say ‘complementary hypotheses’ where exactly am I headed with that. Where I’m heading with that might shape what comes above that in the Introduction.

If precipitation isn’t a good predictor of reproductive success, but is for others, it might be adaptive for some populations but not for others

If I were a reader in this paper, in the Discussion, what would the next steps be. Concretely discuss what the next steps would be. What would you want to say about what the next steps would be.

Discussion: bigger plants might have smaller seeds. If I were a reader, I would want to know – haven’t you ever measured seed mass to see if your hypothesis about smaller seeds being less likely to germinate even makes sense.

What kind of data would we need to address that. Discuss a separate analysis.

One thing that Kate does nicely in her manuscripts: in her introduction she always identifies the gaps in knowledge. In her discussion she outlines the next steps that one would want to take to nail down those open questions.

Predictive germination

Organisms should respond to a cue that is predictive of good conditions later on. Are populations responding to a cue, that tells them whether the spring is going to be good for growing or not? If they’re in populations where spring precipitation doesn’t predict reproductive success; if they’re in populations where spring precipitation is a predictor is there a cue available?

Need a better explanation of this pattern.

Sort of set up the introduction as being a connection between rainfall and fitness. Even if that assumption is false, it doesn’t negate the fact that bet hedging might not evolve. Even if we don’t understand the drivers, there is still tremendous variation from year to year.

Spring precipitation is not the cue that they are using to germinate. When exactly is the season.

Rainfall up through January may be the cue that plants are responding to.

One thing I never show in the paper is to actually plot, according to easting, the survivorship of seeds or other aboveground fitness components.

Plot survivorship of seeds or variance in RS against easting.

Plot g\_1

Do some populations experience more variation among years in rainfall relative to others?

If I think it’s seed survivorship that is the biggest driver, what would the plot of survivorship vs. rainfall look like?

Relationship between seed survivorship and rainfall?

Another thing with the data

We’re measuring germination rates of seeds across 20 populations

Each of those populations has a different environment. Only looking at local seed in their local environment. The germination behavior is going to be a GxE – combination of genetics and environment.

We were hoping to find a evolved, genetic pattern of differences in germination behavior that could be attributed to bet hedging hypothesis.

Could there be a simple environmental explanation for why we get germination differences? Since germination is responsive to winter rains, if you plotted the g\_1 across the 3 years; look at correlation between winter precipitation do you find a relationship.

Are interpopulation differences in germination related to interpopulation differences in winter precipitation.

Rather than germination estimate providing a metric of interpopulation difference in dormancy, are our estimates simply the result of environmentally induced differences in how much rainfall.

Would have to study the seeds in a constant/same environment to really see whether there are genetic differences.

The first transplant does demonstrate that there are environmental differences that affect germination.

Separate issue would be predictive germination

If winter precipitation is the cue that’s being used to trigger germination, then it’s ability to be used as a cue depends on how winter and spring precipitation are correlated. Winter precipitation is going to be a good predictor of reproductive success if (a) reproductive success is tied to spring precipitation, and (b) winter precipitation is predictive of spring precipitation. Figure 6 suggests the tie in (a) varies among populations. We also looked at the correlation among winter and spring precipitation, that also varies among populations.

Keeping the paper focused on fitness – is OK

Provide more background and set up the paper; what’s known about this in the real world. Expand the paragraph on line 25. What’s known about intraspecific variation, the best test have been interspecific, this paper comes back to intraspecific variation. If we’re not really getting into complications, maybe we shouldn’t make that the focus of the 2nd paragraph.

Clarkia: we have these data, we know there is year to year variance in reproductive success, population differences in germination/dormancy, we think it’s driven by the variance in reproductive success, variation in rainfall and shows some geographic pattern.

For Monica: first need to understand what the data are in order to understand the models

Maybe start with the goal: we needed to do a study/experiment in which we could follow seeds/germination and do seed longevity. Small seeds, do experiment to retrieve for germination.

With aboveground: why did we have 30 permanent plots, etc.

Goal – data – analysis

How the data were obtained – explain this more clearly – and how they were going to be used

Before discussing how they were going to be analyzed

Data are collected in order to estimate vital rates

Interest in vital rates, and in order to use the vital rates for various purposes

Some are rates themselves (seeds per fruit),

Others are more complicated (seed bag rates)

1. In the introduction, comments focus on providing more background for the reader. This includes information about how seed banks are favored as they maximize geometric mean fitness because they reduce variance in fitness, even if they reduce the arithmetic mean, information about the traits that are related to seed banking, background on predictive germination, and details on predictions of bet hedging theory.
   1. Should I focus on doing a better job of introducing the theory around bet hedging, the biology of seed banks, or both?
   2. At this point, does it seem to be more of a matter of how I am discussing the topics or that I’m missing key references/ideas that I need to revisit?
   3. What organization for the introduction would allow me to best address the comments? Should I discuss the biology of seed banks first and then discuss the theory, or vice-versa?
2. In the methods, comments return to the theme that the methods are abstract. Specifically, there is not enough detail about the data (especially the seed bag data), the models are not described concretely, and that the language might confuse to readers.
   1. How do I balance the need for more details on the experimental data with the need to provide concrete details about the modeling and models?
3. For me the throughline to these comments is that there is both too much detail (things that won’t be familiar to someone with a particular analytical background) and not enough (introduction, data collection). I want to leave the meeting with a better sense of why particular areas seem too detail rich while others are not. For me, some of this comes from a lack of focus for the paper.
   1. For example, should I be focused on discussing bet hedging theory in terms of variance in fitness? If so, how much do I need to do to introduce environmental variation or at least how much space do I need to give it in the introduction/methods/results?
   2. Should I include predictive germination as part of the paper? We keep coming back to it in our conversations but I feel like it further muddies the paper.
   3. What parts of the models should I focus on addressing? For example, is it better describing the assumptions of the approach, the language that I’m using, the connection between data and model, the goals, etc.